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EU-27

Biofuels Annual

EU-27 Annual Biofuels Report

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Report Highlights: This report provides an EU-27 biofuels policy overview and estimates of production, supply, and demand for bioethanol and biodiesel. Information on biomass, such as wood pellets, and advanced biofuels is also provided. The overall market for biofuels in the EU continues to be driven by policies at both the EU and Member State level. Despite steady increases in consumption, the EU did not achieve its biofuel blending targets for 2010. EU imports of a range of biofuels – bioethanol, biodiesel, and wood pellets - are expected to grow in 2011. In 2011, total EU imports of bioethanol are forecast to be close to 1 billion liters, with the U.S. gaining market share. The trade in biodiesel is increasingly influenced by differences in the timing and manner in which Member States implement the Renewable Energy Directive's sustainability requirements.

Post:
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Executive Summary

Policy and Programs

The main regulations impacting the EU biofuels market are the Biofuels Directive (2003/30), the Fuel Quality Directive (2009/30), and the EU Energy and Climate Change Package (CCP). The CCP, which was adopted by the European Council in 2009, includes the so-called "20/20/20" mandatory goals for 2020, one of which is a 20 percent share for renewable energy in the total EU energy mix. Part of this 20 percent share is a 10 percent minimum target for renewable energy consumed in the transportation sector. This goal is to be achieved by all EU Member States and, in practice, is the driver behind demand for biodiesel and ethanol.

Under the EU system, biofuels must meet certain criteria to count against the 10 percent goal. The Renewable Energy Directive (RED), which is part of the CCP, lays out specific sustainability requirements. These include minimum greenhouse gas (GHG) emissions reductions as well as economic and social criteria, which focus on food price impacts, and adherence to International Labor Organization conventions. The RED entered into force on June 25, 2009 and was to be transposed into national legislation by December 5, 2010. However, in most EU Member States, full implementation is expected to drag out at least through 2011 and possibly longer. A notable exception is Germany, the EU's largest biofuels user, which has fully implemented RED directives.

The RED creates a framework in which Member States have the freedom to implement their own system of proving compliance with the EU's sustainability criteria. This diversity in Member State approaches, coupled with the approval by the European Commission (EC) of voluntary certification schemes, complicates the process of supplying biofuels to the EU market and is adversely affecting trade in some U.S. commodities, such as soybeans. Another barrier to trade is the absence of international standards for the calculation of GHG emission savings.

Conventional and Advanced Biofuels

Biofuels supply and demand trends during 2006 – 2010

Biodiesel is the main biofuel for road transport used in the EU and accounted for about 80 percent of the biofuels market on energy basis in 2010 (see table below). Bioethanol had a 20 percent market share. Many expectations rest on cellulosic ethanol and drop-in fuels, such as biomass-to-liquid (BtL), to support the transition to advanced biofuels. However, advanced biofuels are still in their infancy and it will take some years before these fuels reach a significant volume. Despite a steady increase in biofuels consumption, and stagnate use of fossil fuels, the EU did not achieve its Directive 2003/30 target in 2010.

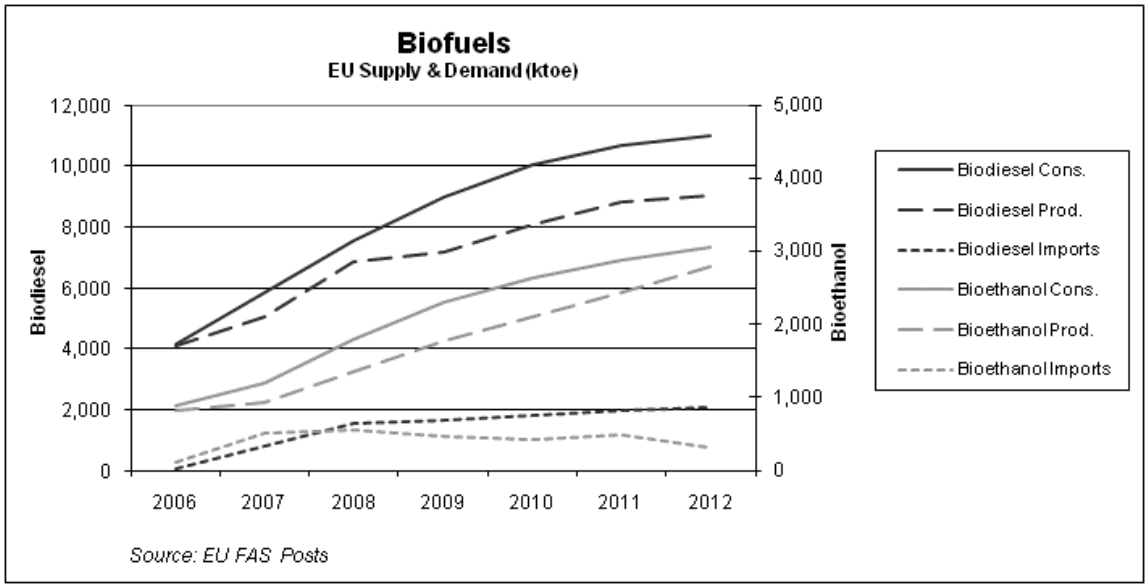
Road Transportation Fuels Consumption (Ktoe)							
Calendar Year	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Conv. Bioethanol	880	1,200	1,792	2,304	2,624	2,867	3,059
Conv. Biodiesel	4,145	5,848	7,516	8,998	10,019	10,690	10,982
ow Adv. Biofuels	-	-	2	2	5	25	25
Total Biofuels	5,025	7,048	9,308	11,304	12,643	13,557	14,041

Diesel	183,636	190,245	188,990	184,608	186,454	188,319	190,202
Gasoline	110,393	106,650	101,388	97,992	97,796	97,600	97,405
Tot. Fossil Fuels	294,029	296,895	290,378	282,600	284,250	285,919	287,607
Tot. Transport Fls.	299,054	303,943	299,686	293,904	296,893	299,476	301,648
Actual Blending	1.68%	2.32%	3.11%	3.85%	4.26%	4.53%	4.65%
Goal (*)	2.75%	3.50%	4.25%	5.00%	5.75%	-	-

(*) As set in EU Directive 2003/30. Source Biofuels data: EU FAS Posts. Source Fossil Fuel data: Eurostat (2006 - 2009) and EC (European Energy and Transport Trends to 2030).

During 2006 - 2008, EU Member State mandates for blending, and relatively high crude oil prices, spurred domestic production and use of biofuels. Since 2007, however, imports of both bioethanol and biodiesel have put domestic producer margins under pressure. Despite the imposition of countervailing and anti-dumping duties on imports of biodiesel from the United States in March 2009, total EU imports of biodiesel have continued to increase (see graph).

Imports of bioethanol, however, declined during 2009 and 2010, as the supply from Brazil fell. At the same time, low feedstock prices and rising ethanol prices supported higher profit margins. In first quarter of 2010, imports from Brazil were replaced by competitive imports from the United States. A majority of these imports avoided high tariffs for ethanol falling under product code HS 2207 and the price spread between world and protected EU markets closed. As a result, EU domestic prices for bioethanol fell.



Biofuels supply and demand trends during 2011 – 2012

Based on ample and competitive U.S. supplies, bioethanol imports from the United States are anticipated to grow further this year. In 2011, total EU imports of bioethanol are forecast to be close to 1 billion liters. Despite efforts by the EU to control bioethanol imports, limited supplies from Brazil and the United States is the main factor behind lower forecast imports in 2012. As a result of lower bioethanol imports, and the introduction of E10 in Germany, domestic producers are expected to benefit.

EU biodiesel production is forecast to stagnate in 2012, in part because of anticipated higher price

competitive biodiesel imports. In addition, the introduction of E10 gasoline in Germany will constrain biodiesel consumption, as a large part of the German overall biofuel mandate allows both fuels to be substituted for each other.

The feedstock requirements for the forecast biofuels production in 2011 are estimated at about 10 million metric tons (MMT) of cereals, about 10 MMT of sugar beets, and about 10 MMT of vegetable oils and animal fats. In 2011, total production of byproducts from bioethanol and biodiesel production is forecast to reach, respectively, nearly 3.65 MMT (mainly DDG) and 15 MMT of oil meals (some of which is produced outside of the EU).

Biomass for heat and power

Biomass

Wood-based biomass is the main source for bioenergy in Europe, followed by wastes and agricultural-based biomass. Most of the biomass is used for heat, and to a lesser extent, in combined heat and power (CHP) applications. Heat and power from biomass are expected to play an important role in meeting the 20 percent target for renewable energy use by 2020 and in the future reduction of European CO_2 emissions and wood pellets in particular are becoming increasingly important. Europe is the world's largest pellets market, with annual consumption of about 10 MMT per year. Experts are expecting a tenfold increase in the market within 10 years, from roughly 10 MMT in 2010 to over 100 MMT in 2020.

Biogas

European farmers are increasingly investing in on-farm biogas digesters to convert agricultural crops, manure and other residues into methane gas. The leader in this production segment is Germany, with about 6,000 digesters of various sizes in operation in 2010. In Germany, biogas requires about 800,000 hectares of cropland. The majority of the biogas is used to generate electricity and/or heat.

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Introduction

Disclaimer: This report presents the situation and outlook for biofuels in the EU. This report presents the views of the authors and does not reflect the official views of the U.S. Department of Agriculture (USDA). The data are not official USDA data. Official government statistics on biofuels are not available in many instances. This report is based on analytical assessments, not official data.

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Policy and Programs

The EU Energy and Climate Change Package (CCP) was adopted by the European Council on April 6, 2009. The Renewable Energy Directive (RED), which is part of this package, entered into force on June 25, 2009, and was supposed to be transposed into national legislation in the Member States by December 5, 2010. Member States were also required to submit National Renewable Energy Action Plans (NREAP) by June 30, 2010. In practice, the Directive, and the nature of its requirements, did not allow enough time for either Member States nor the Commission to prepare for implementation.

The EU Energy and Climate Change Package includes the "20/20/20" goals for 2020:

- A 20 percent reduction in green house gas (GHG) emissions compared to 1990.
- A 20 percent improvement in energy efficiency compared to forecasts for 2020.
- A 20 percent share for renewable energy in the EU total energy mix. Part of this 20 percent share is a 10 percent minimum target for renewable energy consumed in transport, which is to be achieved by all Member States.

The goal for 20 percent renewable energy is an overall EU goal. The RED sets different targets for different Member States. Some Member States will have to reach much higher targets than the 20 percent renewable energy by 2020, whereas other Member States will have lower targets. Sweden, for example, will have to reach 49 percent, while the target for Malta is only 10 percent. The targets for the four largest economies of Europe: Germany, France, UK and Italy, are 18, 23, 15 and 17 percent respectively. These targets are set by the European Commission (EC) depending on the current situation and potential for growth in different Member States.

In contrast, the 10 percent target for renewable energy in transport is obligatory for all Member States. The Commission hopes that a 10 percent target in transport for each Member State will address concerns that this sector is projected to account for most of the growth in energy consumption and thus requires more discipline. People are travelling more, transportation of goods is increasing and automobiles are not improving efficiency as fast as desired. Fuel use in transportation is growing faster than any other sector, and is anticipated to increase about 1 percent per year to 2020, according to the European Commission's model. The latest official number for the use of biofuel was 3.5 percent (volume basis) in 2008. There are no official numbers for 2009 or 2010. Estimates are just above five percent for 2010.

Biofuels have to meet certain sustainability criteria to be counted against the 10 percent goal:

- Reduce GHG emissions by at least 35 percent compared to fossil fuels. From 2017, the reduction has to be 50 percent, and at least 60 percent for new installations.
- Second-generation biofuels get double credit. This means that biofuels made out of ligno-cellulosic, non-food cellulosic, waste- and residue materials will count double towards the goal. This calculation is made on an energy basis.
- Renewable electricity consumed by cars will be counted by a factor of 2.5 and, like second generation biofuels, will help countries achieve targets faster.

With almost no adoption of any certification scheme in place for biofuel produced in the United States, there is a risk that the full implementation of the RED will adversely impact U.S. producers of fuel ethanol, biodiesel, and soybeans crushed in Europe for biodiesel.

A key requirement of the Fuel Quality Directive (FQD) is that all fuel suppliers (oil companies) must

meet a 6% cut in GHG emissions by 2020 across all fuel categories supplied to the market. This will tend to move demand toward biofuels with higher GHG savings. In addition, the FQD limited ethanol blends to 10% or less when ethanol is used as an oxygenate. Thus a blend wall is created capping future growth in ethanol use in certain countries. Fuel specifications for biodiesel place limits on the palm-oil and soyoil content of biodiesel.

Sustainability Criteria

For biofuels to be eligible for financial supports and count towards the target they must comply with the sustainability criteria that are provided in the RED. These sustainability criteria have to be met by imported and EU produced biofuels.

Specific requirements are laid out for GHG emissions-saving criteria and a 35 percent threshold is set as a starting point. It increases in 2017. Environmental sustainability criteria covering bio-diverse and high-carbon-stock lands are also laid out in the RED. Other sustainability criteria are mentioned and reporting requirements are established, but specific requirements and thresholds are not identified. These cover other environmental criteria for soil, water, and air quality, as well as social criteria, which focus on food price impact, and adherence to International Labor Organization conventions.

Biofuels may not be made from raw material obtained from land with high biodiversity value such as primary forest and other wooded land, areas designated by law or by the relevant competent authority for nature protection purposes, highly biodiverse grassland or highly biodiverse non-grassland. The EC is currently developing the criteria for biodiverse grasslands based on an open consultation conducted early in 2010. The biodiversity criteria apply to land that was classified as highly biodiverse in January 2008. Also, biofuels shall not be made from raw materials produced on land with high carbon stock such as wetlands, peatlands, or continuously forested areas.

The agricultural raw materials produced in the EU must be produced in accordance with the minimum requirements for good agricultural and environmental conditions. These are established in the common rules for direct support schemes under the common agricultural policy (CAP) (Article 17 § 6 of the RED). This requirement is only valid for farmers within the EU and means they have somewhat stricter demands than feedstock producers outside the EU.

Member States are responsible for not counting anything as biofuel that does not fulfill sustainability criteria toward goals, mandates, and tax credits. Member States have to establish a checklist, are not allowed to have higher or lower sustainability criteria than those set by the EC, and must accept all certification systems recognized by the EC. However, with each Member States having different checklists, there will be 27 different national certification schemes that the EC would like to have registered and recognized and these will apply to EU members as well as third countries. This system of having Member States specific systems of proving compliance with sustainability criteria has the potential to greatly complicate the procedure of exporting biofuels to the EU and might have an effect on trade.

GHG emissions

To count toward the 10 percent target, biofuels must have a GHG emissions saving of at least 35 percent. Starting in 2017, the GHG emission saving has to be 50 percent. For biofuels produced in installations for which production starts in 2017 and onwards, the GHG savings must be 60 percent. GHG emission savings are calculated using lifecycle analysis and following methodologies described in RED annexes.

The European Commission's Joint Research Center (JRC) has been defining the GHG emissions savings for different raw materials and selected production and supply pathways and the result of these are presented in the RED annex. JRC has calculated GHG emissions for cultivation, processing and transport and distribution for different raw materials, and used this for calculation of the GHG emissions savings. Net carbon emissions from indirect land-use change are not included. Under the RED, it is possible to use actual numbers using proper documentation and LCA procedures to achieve GHG emission saving values which are higher than the defaults. It is possible to claim the default value without supporting documentation.

	Typical GHG[1] savings	**Default GHG[2] savings**
Rape seed biodiesel	45%	38%
Soy bean biodiesel	40%	31%
Sun flower biodiesel	58%	51%
Palm oil biodiesel (Process not specified)	36%	19%
Palm oil biodiesel (process with methane capture at oil mill)	62%	56%
Corn ethanol, Community produced (natural gas as process fuel in CHP plant)	56%	49%
Sugar beet ethanol	61%	52%
Sugar cane ethanol	71%	71%
Waste vegetable or animal oil biodiesel	88%	83%

Source: European Commission, RED (Indirect land use is not included)

(1) Typical implies an estimate of the representative greenhouse gas emission saving for a particular biofuel production pathway.
(2) Default implies a value derived from a typical value by the application of pre-determined factors and that may, in circumstances specified in this Directive, be used in place of an actual value.

When the default values were calculated, the Commission applied a "discount factor" from the typical value, to ensure that the biofuel pathway was not inflated. It is interesting to note that if the typical value is used for biodiesel made from soybeans is used, it would have a GHG saving value of 40 percent and be above the 35 percent threshold.

According to the RED, biodiesel made from soya oil does not automatically comply with the GHG emission criteria. The RED's GHG emissions saving default reference value for soy diesel is 31 percent, which is below the minimum GHG threshold. On closer examination, this value was calculated using a pathway where soybeans are first shipped from Brazil, then transformed into soy oil and biodiesel in the EU. Using lifecycle analysis, the value for soy-based biodiesel produced in and shipped from the United States, by nature of having a different pathway, would be different. According to the U.S. Environmental Protection Agency, U.S. soy-based biodiesel has a GHG emissions savings value of 80 percent when it is produced and consumed in the United States, and this calculation includes an ILUC discount factor.

With no international standard in place for the calculation of GHG savings, there are some concerns that GHG thresholds could be used to hamper trade. The American Soybean Association (ASA) has published a GHG savings study using the EC methodology. Focusing on the American production of soybeans, and soybean oil based biodiesel, it shows GHG percentages up to 52 percent. The ASA has submitted numbers to the JRC and has requested a revised GHG number. However, EC officials have stated they do not wish to have GHG saving numbers for different geographical

areas, but prefer to base these GHG numbers on specific pathways, such as no-till farming, to allow for easier updates. As such, the data submitted by the American Soybean Association has not been used to date.

In March 2010, the USDA's Foreign Agriculture Service (FAS) discussed an update of the GHG numbers with the JRC. The update includes new GHG numbers based on information sent from USDA to the JRC referring to production of soybeans in the United States. The JRC said they were working on new numbers that they would send to DG Energy at the end of March. As of June 2011, no new numbers have been published by the Commission. The Commission is not likely to publish any new GHG saving numbers until the question of Indirect Land Use Change (ILUC) is solved.

Indirect Land Use Change (ILUC)

The EC considers that the calculation and inclusion of ILUC in GHG emissions savings values is appropriate if crops used for biofuel production are grown on arable land that could be used to grow food crops, and that this food crop production then moves to other lands which were previously not used to produce crops. The concern is that the conversion of new lands, especially high-carbon content lands, would lead to additional GHG releases into the atmosphere. The EC therefore seeks to count those additional indirect releases. It follows that the inclusion of ILUC would lower the GHG savings values for most first generation biofuels. There is great debate however within the EU, and around the world, as to the degree of impact, or even existence of, indirect land use change.

In December 2010, the Commission published a report on ILUC. The report acknowledges that ILUC can reduce GHG emission savings but also identifies a number of uncertainties associated with the available models. The EC is reviewing different methodologies to calculate GHG emissions caused by indirect land use changes and so that current published values can be adjusted. The Commission has been working on an impact assessment which it will publish in July 2011. The impact assessment will consider the following policy options:

- Take no action for the time being, while continuing to monitor.
- Increase the minimum GHG saving threshold for biofuels and bioliquids.
- Introduce additional sustainability requirements on certain categories of biofuels and bioliquids.
- Attribute a quantity of GHG emissions to biofuels reflecting the estimated indirect land use change impact.

The impact assessment will, if appropriate, be accompanied by a legislative proposal for amending the Renewable Energy and Fuel Quality Directives.

It is unclear as to which of these four policy options the Commission will choose. None of them currently seems to have more weight than the others.

On the Commission's "transparency platform" there are several pieces of work on ILUC that the EC has launched in order to better understand the effects of indirect land use change associated with biofuels and bioliquids. These documents were originally related to the internal work in the EC, and were only published after a court obliged the EC to do this due to the EU transparency principle. These studies are to be seen as working documents and do not necessarily express the view of the EC.

Certification of biofuels

There are three different ways for biofuels, including those that are exported to the EU, to be certified and count towards the 2020 target. Those three options are:

- Voluntary schemes
- Agreement with a specific Member State
- Bilateral or multilateral Agreements

The Commission says the voluntary schemes will be by far the most important way for biofuels to be certified. However, the RED was to be transposed into national legislation by December 5, 2010, and currently, there are not yet any voluntary schemes endorsed for use by the Commission. The U.S. government has inquired about a bilateral agreement with the Commission that would recognize U.S. conservation and environmental protection laws as equivalent to the sustainability requirements in the RED. This would allow U.S. production of biofuels and biofuel feedstock to count toward national mandates and receive tax incentives like other, certified sustainable, biofuels and biofuel feedstocks.

The Commission has made public the seven voluntary schemes for certification that will be in the first batch of schemes to certify biofuels in the EU. The schemes are:

- Abengoa "RED Bioenergy Sustainability Assurance" (RBSA) - All kinds of feedstock in all regions.
- Biomass Biofuels (2BaSvs) - All kinds of feedstock in all regions.
- Bonsucro – Sugarcane in all regions.
- Greenergy Brazilian Bioethanol verification program – Sugarcane in Brazil.
- International Sustainability & Carbon Certification (ISCC) – All kinds of feedstock in all regions.
- Roundtable of Sustainable Biofuels EU RED - All kinds of feedstock in all regions.
- Roundtable for Responsible Soy – Soybeans outside the EU.

These seven schemes were all adopted at a Committee on the Sustainability of Biofuels and Bioliquids meeting on May 27, 2011. The schemes need to be translated into all the EU official languages, following which there will be the formal Commission approval of the schemes and their subsequent publication into the EU Official Journal. This process is expected to be finalized by end of June – beginning of July, 2011. There are currently 19 schemes that have applied to the Commission. A second group of voluntary schemes is expected to be published early autumn.

National Renewable Energy Action Plans

The RED required Member States to submit National Renewable Energy Action Plans (NREAPs) by June 30, 2010. Most Member States did not submit those plans on time; however, they have now all been submitted and the Commission is currently evaluating them. These plans provide detailed roadmaps of how each Member States expects to reach its legally binding 2020 target. Some of the Member States are asked for further information and clarifications and at least one have been asked to resubmit the report.

The information in the NREAPs predicts that the overall share of renewables in 2020 will be 20.7 percent, slightly exceeding the target. Many Member States say they will increase the use of biomass for the production of renewable energy. However, they do not specify from where the biomass would come. This has intensified the discussions on sustainability criteria for biomass. More information on this can be found in the policy section of biomass.

Trade Policy

In the projections for biofuels, the Commission is making the assumption that even though it would be agronomically possible to grow all the feedstock needed to reach the policy goals domestically, a certain amount of the feedstock and biofuels will have be imported to reduce price pressure on EU feedstock. The Commission is expecting about 70 percent of the feedstock to be produced internally and 30 percent of the feedstock to be imported.

There are no specific codes identifying biofuels in international trade nomenclature. Individual tariff lines used by the EU and the United States include biofuels as well as other products and so it is impossible to get a close fix on trade volumes and values using codes alone. The codes in the EU system have so far referred to the product regardless of its final use; however, the Commission is planning to change classifications starting January 2012 so that ethanol used for fuel would be imported under HS code 2207. Currently for ethanol the two main codes are 220710 for undenatured ethanol and 220720 for denatured ethanol. Blends with gasoline may also appear under other codes depending on the proportion of the mix. For biodiesel, there is a code that covers fatty-acid mono-alkyl esters (FAMAE) that was introduced in January 2008. However, other forms of biodiesel could still enter under other tariff classifications depending on chemical composition.

HS Code	Description	Duty Rate
38249091	FAMAE	6.5% (plus AD and Cv duties for US and most Canadian companies)
220710	Undenatured ethanol	€19.2/hl
220720	Denatured ethanol	€10.2/hl

On March 12, 2009, the Commission published Regulation 193/2009 and Regulation 194/2009, containing provisional anti-dumping and countervailing duty measures on imports of biodiesel from the United States containing 20 percent or more of biofuels. The Regulations and duties entered into force on March 13, 2009 and applied for 6 months, after which they were made fixed for a 5-year period.

On May 5, 2011, the European Commission published a decision to extend countervailing and anti-dumping duties. Measures are retroactive and extend to August 13, 2010. They consist of:

• Anti-dumping and countervailing duties to imports of biodiesel consigned from Canada (unless originating from two exempt companies). The maximum combined anti-dumping and countervailing duty will apply, €409.2/ton, based on the content of biodiesel on the blend.

• Countervailing duties on all imports of biodiesel originating in the United States containing blends of 20 percent or less. For U.S. companies that were investigated in 2009, the combined duties will apply, € 213.8 - € 409.2/ton. Other U.S. companies will be subject to the highest combined duty of € 409.2/ton, based on the biodiesel content in the blend. The Council Decisions can be found at:

http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2011:122:0001:0011:EN:PDF
http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2011:122:0012:0021:EN:PDF

Revision of the EU Energy Taxation Directive

On April 13, 2011, the Commission presented a proposal on a new Energy Taxation Directive. The

new Directive would promote energy efficiency and more environmental friendly products by restructuring the way energy products are taxed to remove current imbalances and take into account both CO_2 emissions and energy content. Currently, the most polluting energy sources are the least taxed. Biofuels are among the most heavily taxed energy sources in spite of the EU's commitment to increase the share of renewable energies in transport. The new proposal would remove these inconsistencies.

The new Directive would split the minimum tax rate into two parts:

• The first would base the tax rate on CO_2 emission of the energy product. This would be fixed at €20 per ton of CO_2.
• The second would base the tax rate on energy content. This would be fixed at €9.6/Gigajoule (GJ) for motor fuels and €0.15/GJ for heating fuels.

The EU biofuel industry welcomes this new proposal which they say addresses the fact that renewable energy has a lower energy density than fossil fuels and is acknowledged to be CO_2 free at the end use. These two points were not recognized by the Commission's previous Directive. According to the industry, the proposal would end the paradox of clean renewable fuels being taxed at a higher rate that fossil fuels.

The proposal will be discussed in the European Parliament and the Council, and if adopted, enter into force in 2013 with a gradual introduction of the new taxation system.

E90

E90 is a blend that contains 90 percent bioethanol and 10 percent fossil fuel. Imports of E90 to the EU have increased largely since the beginning of 2010.

The EU industry believes that they are suffering because the Unites States is currently able to export ethanol at lower prices than the EU can supply domestically. However, there is no reliable data to substantiate this claim. Representatives of the European ethanol industry (ePURE) have threatened to demand that the Commission take legal action against the U.S. to protect the EU industry.

Biomass sustainability

The RED required the Commission to look into whether sustainability criteria for solid and gaseous biomass are needed. On February 25, 2010, the Commission adopted a sustainability report for biomass other than biofuels and bioliquids. The report makes recommendations on sustainability criteria in order to avoid obstacles for the functioning of the internal market for biomass; however, no obligatory sustainability criteria are set. The report gave recommendations on content in sustainability criteria for individual Member States to use as guidance.

The report also stated that the Commission would look into the need for sustainability criteria on biomass again by December 2011. The Commission held a public consultation on this issue and received 160 comments. The responses to the public consultation can be found here. The expected increase in use of biomass has increased the interest for sustainability criteria, and it is very likely that the Commission will come to the conclusion that there is need for some sort of harmonized criteria in the coming report.

Conventional Bioethanol

EU Production, Supply and Demand Table

Compared to the United States and Brazil, the EU is only a minor producer of bioethanol. On an energy basis, bioethanol represented about 20 percent of the total biofuels market in the road transport sector in 2010.

Ethanol - Conventional & Advanced Fuels (million liters)							
Calendar Year	**2006**	**2007[r]**	**2008[r]**	**2009[r]**	**2010[e]**	**2011[f]**	**2012[f]**
Production	1,630	1,840	2,660	3,480	4,180	4,810	5,510
Imports	230	1,000	1,100	900	830	950	630
Exports	50	60	60	60	80	90	90
Consumption	1,740	2,370	3,550	4,560	5,190	5,670	6,050
Ending Stock	70	480	630	390	130	130	130
Production Capacity (Conventional)							
No. of Biorefineries	40	51	61	65	71	74	80
Capacity	2,400	3,390	5,150	6,600	7,430	8,000	8,700
Capacity Use (%)	89	63	62	59	60	62	66
Production Capacity (Advanced)							
No. of Biorefineries	1	1	2	3	5	6	6
Capacity	0.15	0.15	5	5	13	31	31
Co-products from Conventional Biofuel Production (1,000 MT)							
DDG	1,490	1,360	1,530	2,460	3,090	3,650	4,550

r = revised / e = estimate / f = forecast EU FAS Posts. Sources: EU FAS Posts and statistics of Eurostat, World Trade Atlas and the European Renewable Ethanol Association (ePURE). Production capacity as of December 31 of year stated. DDG = Distillers Dried Grains, theoretical maximum production.

Ethanol - Conventional & Advanced Fuels (1,000 MT)							
Calendar Year	**2006**	**2007[r]**	**2008[r]**	**2009[r]**	**2010[e]**	**2011[f]**	**2012[f]**
Production	1,290	1,450	2,100	2,750	3,300	3,800	4,350
Imports	180	790	870	710	650	750	500
Exports	40	45	45	50	60	70	70
Consumption	1,375	1,875	2,800	3,600	4,100	4,480	4,780
Ending Stock	55	375	500	310	100	100	100
Production Capacity							
No. of Biorefineries	40	51	61	65	71	74	80
Capacity	1,900	2,680	4,070	5,210	5,870	6,320	6,870

Ethanol[a] – Total, All Uses (million liters)							
Calendar Year	**2006**	**2007**	**2008**	**2009[e]**	**2010[e]**	**2011[f]**	**2012[f]**
Production	2,710	3,120	3,580	4,780	5,480	6,110	6,810
Imports	970	1,670	2,390	1,900	1,440	1,500	1,180
Exports	70	70	60	70	90	100	100
Consumption	3,610	4,310	5,760	6,850	7,090	7,510	7,890
Ending Stock	120	530	680	440	180	180	180
Production Capacity							

Capacity	3,900	4,890	6,650	8,100	8,930	9,500	10,200
Capacity Use (%)	69	64	54	59	61	64	67

Sources: EU FAS Posts and statistics of World Trade Atlas and the European Renewable Ethanol Association (ePURE) (a) Ethanol produced by fermentation of agricultural products.

Production Capacity

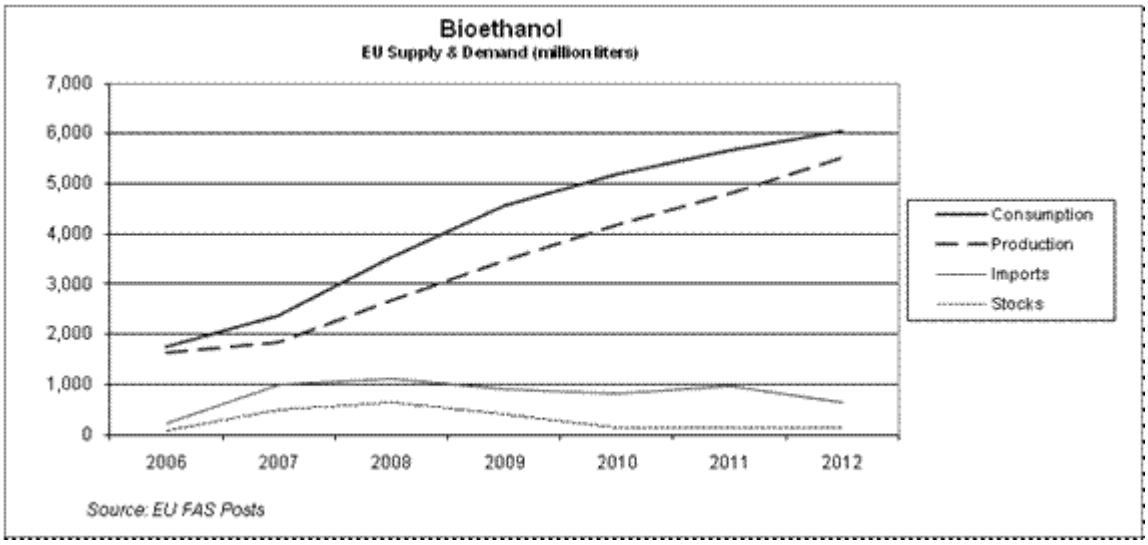
Bioethanol production capacity is forecast to increase from 2,400 million liters in 2006 to 8,700 million liters in 2012. The majority of the production capacity has been installed in France, the Benelux countries, Germany, the UK, Poland, and Spain. During the period 2007 - 2010, only about sixty percent of the available capacity was utilized. This is partly due to the fact that the EU is building its sector and new plants need a start up phase to be fully operational. During 2007, 2008 and 2010, utilization was also low due to high grain prices, in particular wheat. Another reason for the underutilization was competitive bioethanol imports from Brazil during 2006 – 2009, and from the United States during 2010.

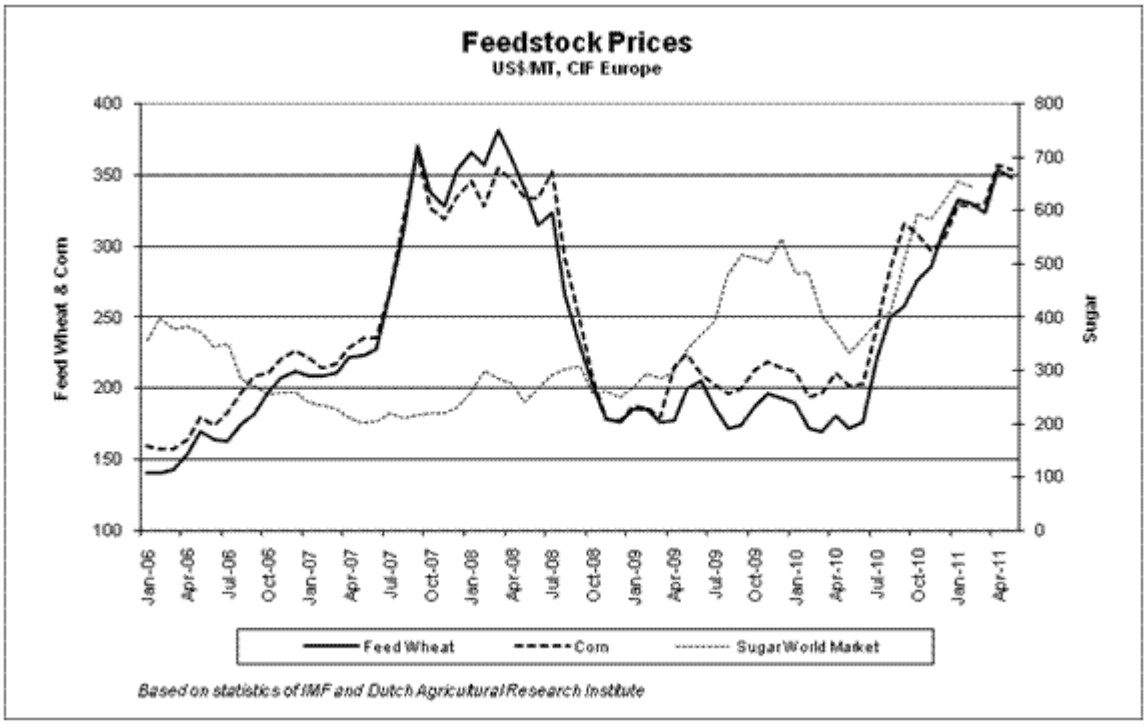
Fuel Ethanol Production – Main Producers (million liters)							
Calendar Year	**2006**	**2007[r]**	**2008[r]**	**2009[r]**	**2010[e]**	**2011[f]**	**2012[f]**
Germany	430	400	580	750	740	1,010	1,270
Benelux	20	40	80	140	510	820	1,140
France	300	530	770	800	750	760	760
Spain	410	360	350	465	470	470	470
United Kingdom	0	20	70	90	320	350	440
Poland	160	120	110	170	220	280	320
Other	310	370	700	1,060	1,170	1,130	1,120
Total	**1,630**	**1,840**	**2,660**	**3,480**	**4,180**	**4,810**	**5,510**

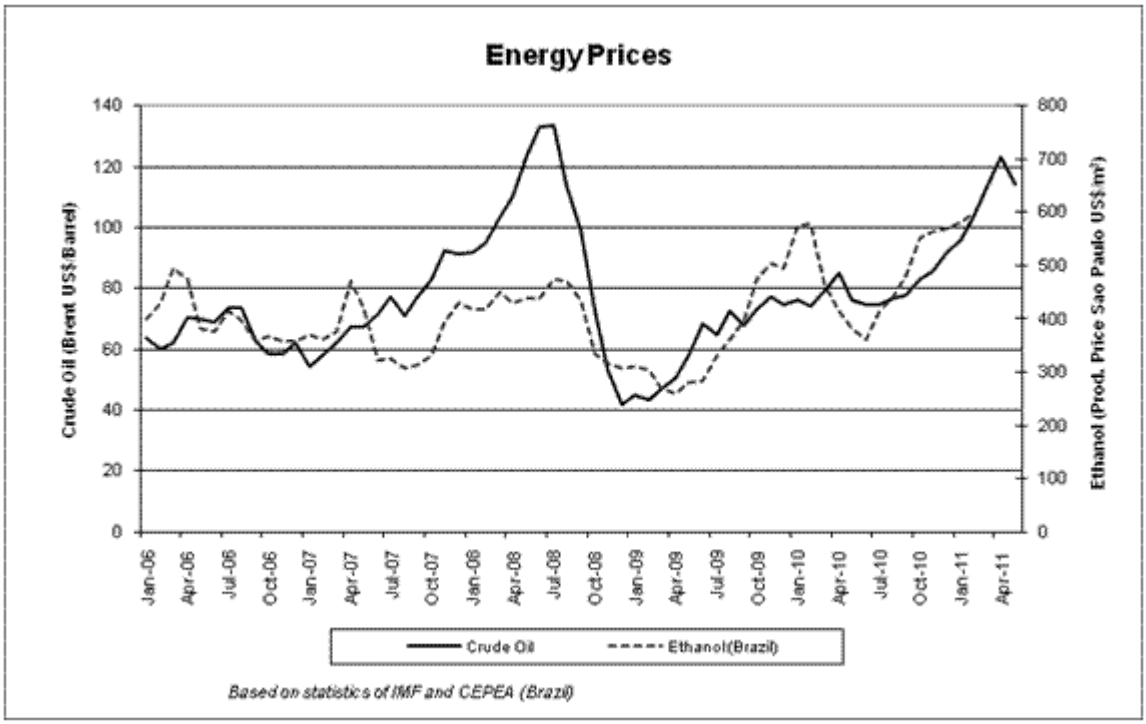
r = revised / e = estimate / f = forecast EU FAS Posts. Source: EU FAS Posts

Production

The growth of EU bioethanol production flattened somewhat from an annual increase of about 800 million liters in 2008 and 2009 to 700 million liters in 2010 (see graph below). The EU bioethanol production in 2010 is estimated at 4,180 million liters. On an energy basis, this is equivalent to 26.2 million barrels of crude oil. During 2009 and the first half of 2010, production margins were supported by low domestic feedstock prices (see graph below). Production margins also benefitted from the elevated ethanol price during 2010 (see graph below). In addition, high feed stock prices during the second half of 2010 were partly compensated by high prices for the by-products, mainly Distillers Dried Grains (DDG) due to the limited availability of vegetable proteins on the EU market (see FAS EU Oilseeds Annual). In general, producers experienced the best margins during the last half of the year 2009.


Bioethanol
EU Supply & Demand (million liters)
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
2006
2007
2008
2009
2010
2011
2012
Consumption
Production
Imports
Stocks
Source: EU FAS Posts


Feedstock Prices
US$/MT, CIF Europe
Feed Wheat & Corn
Sugar
400
350
300
250
200
150
100
800
700
600
500
400
300
200
100
0
Jan-06
Apr-06
Jul-06
Oct-06
Jan-07
Apr-07
Jul-07
Oct-07
Jan-08
Apr-08
Jul-08
Oct-08
Jan-09
Apr-09
Jul-09
Oct-09
Jan-10
Apr-10
Jul-10
Oct-10
Jan-11
Apr-11
Feed Wheat
Corn
Sugar World Market
Based on statistics of IMF and Dutch Agricultural Research Institute



Producer margins reportedly deteriorated due to plummeting domestic ethanol prices since the first quarter of 2010. In 2010 and the first half of 2011, the EU bioethanol industry faces the same problems as the EU biodiesel industry previously experienced, namely an oversupply on the market due to elevated domestic production, slackening demand and competitive imports, mainly from the United States. For this reason, the domestic production estimate for 2010 and 2011 is lower than anticipated in the previous Annual Biofuels Report, and is adjusted downwards by 250 and 570 million liters, respectively. In the UK for instance, a bioethanol plant with a capacity of about 300 million liters temporarily stopped production in May 2011. This closure is probably related to the supply of competitive third country imports and was reportedly also due to the lower than expected consumption of E10 in Germany. Consolidation of the sector, with closure of smaller plants and investments in larger size plants, seems inevitable, and is expected to take place when market conditions improve. At the moment, plants are owned by large multinationals as well as by larger and midsized domestic cooperatives and processors, such as corn wet millers and sugar producers.

During 2011, the volume of competitive imports is anticipated to increase further, but forecast to decline in 2012. These lower imports from the world market will create room for domestic producers to supply the regulated growing demand for bioethanol. During this period, production in France and Spain is expected to stabilize, while a major expansion is forecast in Germany, the Benelux countries, the UK, Poland and Hungary. In Germany, bioethanol production remained stagnant in 2010 but is forecast to increase in 2011 in response to the anticipated higher demand created through the introduction of E10 on the German market and the opening of a new production plant. Production is expected to surge in the Netherlands and Belgium as the seaports in this region can deliver feedstocks from a wide range of suppliers. Rotterdam also serves as a hub for fossil fuel logistics, which makes it also a strategic location for biofuels blending and further distribution. In the port of Rotterdam, a bioethanol plant with a capacity of about 570 million liter started production mid 2010. In the UK, bioethanol production was substantially boosted by a new plant coming on stream in the first half of 2010 and is set to increase further if another plant successfully starts up by the end of 2011. All plants are located on the east coast of England in

close proximity to deep water ports. This removes reliance on the UK domestic market, giving the ability to import feedstock, and export products, as market conditions dictate. In Hungary, the ample domestic supply of corn will be utilized by a bioethanol plant with an annual production capacity of 200 million liter. The plant will be equipped with American technology and is planned to be completed by the end of 2011.

Feedstock Use

Feedstock Used for Fuel Ethanol Production (1,000 MT)							
Calendar Year	**2006[r]**	**2007[r]**	**2008[r]**	**2009[r]**	**2010[e]**	**2011[f]**	**2012[f]**
Wheat	1,360	1,390	1,650	2,540	3,870	4,930	6,650
Corn	400	560	1,230	2,350	2,640	2,700	2,780
Rye	1,040	680	720	960	1,110	1,450	1,680
Barley	1,230	1,030	540	780	730	790	1,180
Sugar beet	3,170	5,480	8,480	12,740	9,190	9,930	10,090

r = revised / e = estimate / f = forecast EU FAS Posts. Note: Official data for feedstock use is scarcely available. The figures above represent estimates by EU FAS posts based on known feedstock / ethanol conversion rates.

In the EU, bioethanol is mainly produced from wheat, corn, rye, barley and sugar beet derivatives. A limited volume of bioethanol is produced from the surplus of wine alcohol. During grain marketing years 2008/2009 and 2009/2010, an abundance of wheat reduced cereal prices (see graph above). But during 2010/2011, limited supplies of grains on the world markets increased prices back to the high price levels reported during 2007/2008. Supplies are anticipated to remain tight during 2011/2012 (see FAS EU Grain and Feed Annual). In general, negative margins on bioethanol production with cereals as feedstock are anticipated during seasons with a tight supply of grains on the EU and world market.

Wheat is mainly used in northwestern Europe, while corn is predominantly used in Central Europe and Spain. Rye is applied as feedstock for bioethanol production in Poland and Germany, while barley is mainly used in Spain. In northwestern Europe and in the Czech Republic also use sugar beets as a feedstock. During the high grain prices in 2007/2008, sugar beet derivatives, mainly sugar syrup, were a preferred feedstock for bioethanol production. As from the start of 2009, however, sugar prices have risen, and as a result, the increase in bioethanol production from sugar beets has slowed down (see FAS EU Sugar Annual).

The required feedstock for the anticipated production in 2011, 4,810 million liters of bioethanol, is estimated at about 10 MMT of cereals and about 10 MMT of sugar beets. This is about 3.5 percent of total EU cereal production and 10 percent of total sugar beet production. Co-products of the bioethanol production are Distillers Dried Grains (DDG), wheat gluten and yeast concentrates. In 2010, the maximum theoretical production of co-products is forecast to reach 3.65 MMT. This is about 2 percent of total EU feed grain consumption in the EU. However, not all by-products are yet processed into marketable feed products, as an unknown volume is used as fertilizer or as feedstock for biogas production.

Consumption

Fuel Ethanol Consumption – Main Consumers (million liters)							
Calendar Year	**2006**	**2007[r]**	**2008[r]**	**2009[r]**	**2010[e]**	**2011[f]**	**2012[f]**
Germany	600	580	790	1,140	1,470	1,580	1,770

France	290	540	870	890	890	890	890
Spain	230	250	225	360	550	550	560
Sweden	330	440	430	430	440	440	470
Benelux	40	170	230	350	390	420	460
United Kingdom	0	100	130	250	350	380	410
Poland	120	80	190	250	270	320	340
Other	130	210	730	890	830	1,090	1,150
Total	**1,740**	**2,370**	**3,550**	**4,560**	**5,190**	**5,670**	**6,050**

r = revised / e = estimate / f = forecast EU FAS Posts. Source: EU FAS Posts

During 2006 – 2010, EU bioethanol consumption expanded by 0.6 to 1.2 million liters per year. But the growth has significantly flattened during 2010, and is anticipated to remain moderate during 2011 and 2012. In 2008, consumption was supported by the high crude oil prices (see graph above) which made substitution, or blending, of gasoline with bioethanol attractive. Since 2009, however, this beneficial price difference has deteriorated, mainly due to surging ethanol prices. This price development made substitution of gasoline with bioethanol unattractive. In some EU Member States, oil companies chose to pay the penalties for not complying with the blending mandates. In France for instance, the use of biofuels in fossil fuels did not reach the seven percent national target in 2010. In Sweden, flexi-fuel drivers tend to abandon ethanol when gasoline cost less. Another factor which tempers the bioethanol consumption is the financial crisis, which reduced the total demand for transport fuels.

However, based on the mandates and national policy incentives, bioethanol consumption is forecast to continue to grow to over 6 billion liters in 2012. This anticipated growth is taking into account the introduction of E10 in Germany and Sweden. On January 1, 2011, the German Government allowed the marketing of E10. Prior to this date only E5 was allowed to be sold. The introduction of E10 translates into a potential market for bioethanol of 1.9 billion liters, if all gasoline sold in Germany were to be E10. However, the actual market introduction in E10 only started in February and spurred much resistance from the public due to poor communication to consumers about the compatibility of cars with E10. As a result, the German bioethanol consumption increase is forecast to be limited in 2011 and may pick up only in 2012. Also in Sweden, the introduction of E10 is being hindered. The Swedish government's proposal of a tax exemption for low-blend of only up to 6.5 percent ethanol, has made gasoline companies reluctant to increase ethanol blending. During 2011 and 2012, the main markets will remain Germany and France. France will be for the most part self sufficient. Also, most other main markets, such as Spain, the UK and Poland, have the capacity or are planning to fulfill their demand using domestic production. A surplus will be available in the Benelux countries, and to a lesser extent in Central European countries, such as Austria, Hungary and Slovakia. Germany will depend on imports for thirty percent of consumption. Scandinavia is also a deficit region.

Trade

During 2006 – 2010, the majority of the bioethanol was imported by the Benelux countries, Sweden, Finland, and the UK, mainly through the port of Rotterdam. On April 11, 2008, the Dutch and Brazilian Governments signed a Memorandum of Understanding in which the strategic location of the Rotterdam port for the transit of biofuels to the EU was recognized. A portion of bioethanol imports are blended with gasoline in Rotterdam, but most is blended at a final destination in order to fulfill Member State requirements.

The EU has two schemes for preferential trade regarding ethanol imports; first the new Generalized System of Preferences (GSP), including the Everything But Arms (EBA) initiative, and

secondly the Cotonou Agreement. Countries eligible under these two schemes can export ethanol to the EU without paying any tariffs. Egypt and Norway have a separate agreement with the EU for duty free access of their ethanol exports. The two schemes apply for the following countries;

• GSP scheme: Bolivia, Colombia, Costa Rica, Ecuador, Guatemala, Honduras, Panama, Peru, El Salvador, Venezuela, Georgia, Sri Lanka, Mongolia, Moldova, and under the EBA initiative: the Least Developed Countries.
• Cotonou Agreement: the African, Caribbean, and Pacific (ACP) countries excluding South Africa.

The EU tariff on undenatured ethanol (HS 220710) is 192 Euro per thousand liters, while the tariff on denatured ethanol (HS 220720) is 102 Euro per thousand liters. By denaturing the ethanol is made unsuitable for human consumption by adding substances according EC Regulation 3199/93. Most EU Member States only permit blending with undenatured ethanol, by which their domestic market is protected by the higher tariff rate. The governments of the UK, the Netherlands, Finland, Denmark, the Czech Republic and Slovakia, however, also permit blending with denatured ethanol.

Bioethanol is also imported under other HS codes than HS 2207. From 2004 until 2007, bioethanol was also imported under the HS code 3824 into Sweden, which was subject to a lower tariff, 6.5 percent of the customs value. This was achieved by blending the ethanol with gasoline under customs control. In 2007, this quota was terminated but has been reopened in April 2010 with an import license for a period of one year. Imports through this quota are estimated at about 150 million liters. Sector sources state that the practice of blending gasoline with bioethanol is conducted on larger scale and in more EU Member States, either before arrival on the continent, or under customs control on EU territory. As a result, a significant gap exists between the reported HS 2207 exports to the EU and reported HS 2207 imports by the EU. From 2006 – 2010, Brazilian exports of ethanol exported under HS 2207 have been 200 to 500 million liters higher than reported EU HS 2207 imports from Brazil. The EU bioethanol import figures and analysis in this report are therefore based on the ethanol export figures from the main origins, namely Brazil and the United States, rather than on EU import figures.

During 2009 and 2010, EU bioethanol imports declined due to the high stocks on the EU market, the elevated domestic production, and restricted world supply, mainly from Brazil. During 2010, a part of the reduced imports from Brazil was replaced by increased imports from the United States, reportedly the majority of it as E90. As these imports avoided the high tariffs on HS 2207, the price deviation between the world and protected EU market disappeared, and as a result, EU domestic prices for bioethanol fell. Imports from Brazil were also replaced by increased imports of ETBE, from both Brazil and the United States. EU imports of ETBE increased steadily from 140 million liters in 2008 to 500 million liters in 2010.

In 2011 and 2012, EU imports from Brazil are not expected to recover following the continuing restricted production and strong domestic demand. However, based on the ample and competitive supply, imports from the United Sates are anticipated to grow further this year. In 2011, total EU imports of bioethanol are forecast to be close to 1 billion liters. These exports of U.S. corn based ethanol could be constrained by the implementation of the new sustainability requirements laid down in the Renewable Energy Directive 2009/28/EC (RED) in national Member State legislation. Sector sources have reported, however, that it is not the requirements themselves but the complexity of the regulations and their implementation that are the main hurdle. It is anticipated that the transition process will be finalized in 2012 and the sustainability requirements itself will not significantly limit the imports from non EU origins. Future policies of the EC, and Member State Governments' interpretation and implementation of the RED, remain and complicate forecasts of import demand. Imports could be hampered by a stricter or inconsistent execution of

the RED.

In addition, the EC is reportedly planning to change the nomenclature for ethanol starting January 2012. Ethanol for fuel use would be imported under HS 2207, and taxed at the higher rate. While ethanol imported for industrial use would be imported under HS 3825, at 6.5 percent ad valorem. Considering the competiveness of the current inflow of bioethanol, it is unlikely that a reclassification would cut off imports. Despite efforts by the EC to regulate imports, a main factor reducing EU imports in 2012 may well be limited supplies from Brazil and the United States. In 2012, the U.S. exportable supply of bioethanol is forecast to be lower than this year as a result of anticipated elevated corn prices and the introduction of E15 in the United States.

Stocks

As a result of elevated domestic production and imports, ethanol stocks have been building during 2007 and 2008. The storage capacity for ethanol, bioethanol and ethanol for non-fuel use, in the port of Rotterdam is estimated at about 450 million liters, and will reportedly be expanded to 600 million liters. During 2009 and 2010, stocks were reduced and are not expected to build during 2011 and 2012 as world supply is anticipated to decline, while domestic demand is forecast to grow.

Conventional Biodiesel

EU Production, Supply and Demand Table

The EU is the world's largest biodiesel producer, consumer, and importer. Biodiesel is also the most important biofuel in the EU. On an energy basis it represents about 80 percent of the total biofuels market in the transport sector. Biodiesel was the first biofuel developed and used in the EU in the transport sector in the 1990s. At the time, the rapid expansion was driven by an increasing crude oil price, the Blair House Agreement [1] and resulting provisions of the EU's set-aside scheme, and generous tax incentives mainly in Germany. The Blair House Agreement allowed the EU to produce oilseeds for non-food use of up to 1 million MT of soybean equivalent. EU biofuels goals set in directive 2003/30/EC (indicative goals) and in the RED 2009/28/EC (mandatory goals) further pushed the use of biodiesel. In addition, the Fuel Quality Directive gave the industry considerable latitude to market higher blends in the fuel supply.

[1] The Blair House Agreement allowed the EU to produce oilseeds for non-food use of up to 1 million MT of soybean equivalent. For details please refer to page 5 of report GM4048 http://www.fas.usda.gov/gainfiles/200411/146118126.pdf

Biodiesel - Conventional & Advanced Fuels (million liters)							
Calendar Year	**2006 [r]**	**2007 [r]**	**2008[r]**	**2009[r]**	**2010[e]**	**2011[f]**	**2012[f]**
Production	5,410	6,670	9,080	9,485	10,680	11,655	11,930
Imports	70	1,060	2,020	2,190	2,400	2,610	2,730
Exports	0	0	70	80	120	110	110
Consumption	5,480	7,730	9,930	11,885	13,235	14,120	14,510

Ending Stocks	0	0	1,100	810	535	570	610
Production Capacity (Conventional Fuel)							
No. of Biorefineries	119	186	234	243	256	255	256
Capacity	6,600	13,030	19,025	23,730	24,550	25,100	25,270
Capacity Use (%)	55%	68%	57%	44%	44%	47%	47%
Production Capacity (Advanced Fuel)							
No. of Biorefineries	0	0	0	0	0	1	1
Capacity	0	0	0	0	0	17	17

r = revised / e = estimate / f = forecast EU FAS Posts. Production capacity as of December 31 of year stated. Sources: FAS Posts, World Trade Atlas (GTA), European Biodiesel Board (EBB).

Biodiesel - Conventional & Advanced Fuels (1,000 MT)							
Calendar Year	**2006[r]**	**2007[r]**	**2008[r]**	**2009[e]**	**2010[f]**	**2011[f]**	**2012[f]**
Production	4,760	5,870	7,990	8,340	9,400	10,260	10,505
Imports	60	930	1,780	1,930	2,113	2,300	2,400
Exports	-	-	60	67	103	100	100
Consumption	4,820	6,800	8,740	10,463	11,650	12,430	12,770
Ending Stocks	-	-	970	710	470	500	535
Production Capacity (Conventional Fuel)							
No. of Biorefineries	119	186	234	243	256	255	256
Capacity	5,806	11,474	16,747	20,890	21,610	22,100	22,250
Production Capacity (Advanced Fuel)							
No. of Biorefineries	0	0	0	0	0	1	1
Capacity	0	0	0	0	0	15	15

Source: EU FAS Posts 1 MT = 1,136 liters

Production Capacity

In the EU, the years of rapid expansion of biodiesel production capacity seem to be over. From 2006 to 2009 production capacity increased by 360 percent, followed by a comparatively small increase in 2010 of just three percent. For 2011 and 2012, further marginal increases of two and one percent are forecast. France, Portugal, and Spain reported the largest production capacity increases in 2010. The Spanish capacity increased despite the fact that in Spain the use rate remains below thirty percent of the total installed capacity. The Benelux, Sweden and Hungary are forecasting the largest increases for 2011.

The waning interest in investing in biodiesel capacity is a result of difficult market conditions and persistent over capacity. Comparatively low crude oil prices, high vegetable oil prices, increasing imports, and the financial crisis resulted in a difficult market for biodiesel from 2008 onwards. As a result, use of capacity dropped from 68 percent in 2007 to a mere 44 percent in 2009, where it kept lingering since. Already in 2007 and 2008, first cases of companies closing their operation or declaring insolvency occurred in the U.K., Austria, and Germany. This development continued and spread to the Benelux in 2009, and Italy in 2010. In addition, a number of plants all over the EU temporarily stopped production. Under the current market conditions with high imports, high feedstock prices and only limited projected increase in consumption it is questionable that the EU biodiesel market can support all existing production capacity and many projects that were planned under different conditions were delayed or stopped altogether. Even with the projected increase in EU biodiesel consumption through mandates, one can expect to see a number of plants closing their operation or even having to file for bankruptcy in the coming years.

The structure of the biodiesel sector is very diverse and plant sizes range from an annual capacity of 2,000 MT owned by a group of farmers to 600,000 MT owned by a large multi-national company.

Production

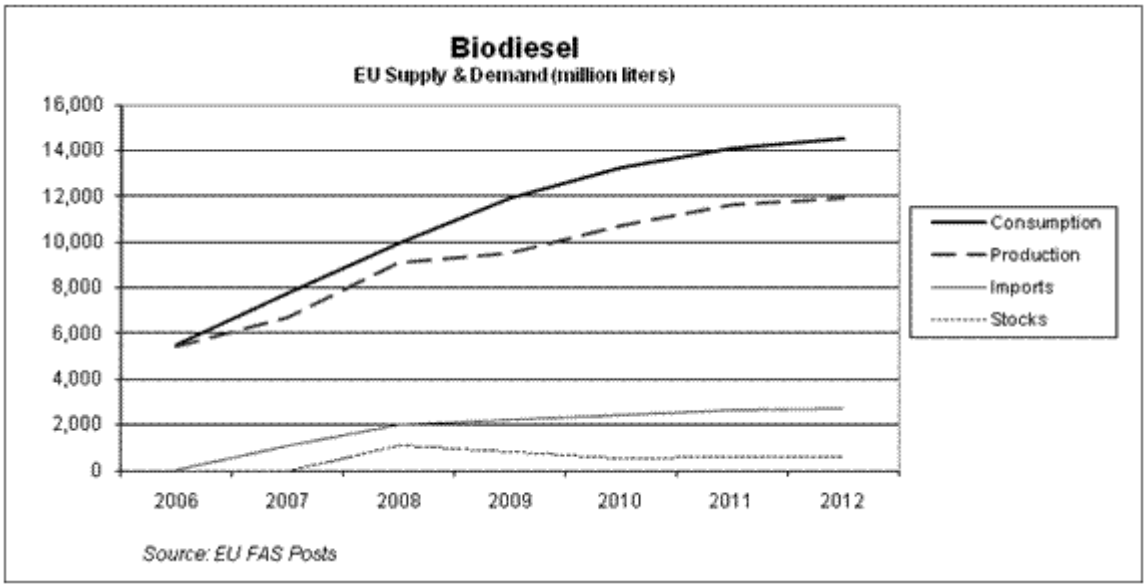
In 2010, biodiesel production continued to increase and was 13 percent higher than in 2009. However, due to large stocks, high feedstock prices and competition from cheaper imported biodiesel, the increase was lower than in previous years and lower than the increase in consumption (18 percent). For 2011, a further production increase is projected and prompted by Member State biodiesel use mandates.

In 2006, the top three producing Member States (Germany, France, and Italy) together accounted for 75 percent of the EU's biodiesel production. In 2010, the share of the top three producing Member States (Germany, France, and Spain) dropped to 60 percent. This is a clear indication that the production of biodiesel is gradually increasing in the other Member States, as they are increasing their domestic production to meet the various domestic biofuel mandates.

About 1 million MT of glycerin are forecast to be produced as a direct co-product of biodiesel in 2011. In addition, protein meals are generated as indirect by-products of biodiesel feedstock (vegetable oil) production.

EU Biodiesel Production – Main Producers (million liters)							
Calendar Year	**2006 [r]**	**2007 [r]**	**2008[r]**	**2009[r]**	**2010[e]**	**2011[f]**	**2012[f]**
Germany	2,730	3,280	3,250	2,600	2,830	2,610	2,610
France	650	1,310	2,370	2,610	2,500	2,500	2,500
Spain	140	170	280	700	1,260	1,360	1,530
Benelux	50	290	430	840	910	1,140	1,360
Italy	680	530	760	680	680	680	990
Poland	100	60	310	420	490	510	570
Others	1,060	1,030	1,680	1,910	2,220	3,050	2,660
Total	**5,410**	**6,670**	**9,080**	**9,485**	**10,680**	**11,655**	**11,930**

Source: EU FAS posts



Feedstock Use

Rapeseed oil forms the major feedstock in the EU and accounts for two thirds of total input. The use of soybean and palm oil is limited by the EU biodiesel standard DIN EN 14214. Soybean-based biodiesel does not comply with the iodine value prescribed by this standard (the iodine value functions as a measure for oxidation stability). Palm oil-based biodiesel reportedly does not provide enough winter stability in northern Europe. However, it is possible to meet the standard by using a feedstock mix of rapeseed oil, soybean oil, and palm oil. The vast majority of soybean oil is used in Spain, France, and Italy. Other virgin vegetable oil includes cottonseed oil (mostly used in Greece) and unspecified vegetable oil. Recycled vegetable oils and animal fat are not as popular feedstock as vegetable oils, however, their use is increasing as they form a cheaper alternative feedstock. Pine oil and wood are other new and alternative feedstocks that are used in Sweden.

Feedstock Used for Biodiesel Production (1,000 MT)							
Calendar Year	**2006[r]**	**2007[r]**	**2008[r]**	**2009[r]**	**2010[e]**	**2011[f]**	**2012[f]**
Rapeseed oil	3,900	4,250	5,360	5,900	6,300	6,700	6,720
Soybean oil	380	680	960	800	1,000	1,080	1,140
Palm oil	120	240	590	650	850	910	960
Sunflower oil	10	70	110	100	110	120	120
Other veg. oils	230	300	290	380	430	490	490
Recycled veg. oils	70	200	330	310	420	550	560
Animal fats	50	140	360	340	390	460	470
Other	-	-	-	-	10	50	160
Total	**4,760**	**5,880**	**8,000**	**8,480**	**9,510**	**10,350**	**10,550**

Note: Data for feedstock use is not available. The figures above represent estimates by EU FAS posts.

At least 1.5 million MT of the vegetable oil is imported (palm oil, soybean oil, and to a lesser extent rapeseed oil) and an unquantifiable share of the domestically produced feedstock is crushed from imported oilseeds (soybeans and rapeseed). The 6.7 MMT of rapeseed oil feedstock projected for 2011 translates into required 17 MMT of rapeseed and generates about 10 MMT of rapeseed meal

as by-product, most of which is produced in the EU. Similarly, the 1.08 MMT soybean oil will have to be crushed from 5.4 MMT of soybeans and generate about 4.3 MMT soybean meal; roughly half and half inside and outside of the EU.

Consumption

In 2010, Germany, France, Italy, Spain, and the Netherlands were the largest biodiesel consumers in the EU. For 2011 and 2012, EU consumption is forecast to further increase by seven and three percent, respectively, driven almost exclusively by Member State mandates and to a lesser extent by tax incentives. Increases are projected, most prominently, in Spain, Italy, the Czech Republic, France, and Poland.

Germany is an exception to the overall trend of increasing consumption. Since 2006, Germany has been in the process of transferring support from tax incentives to mandates and is gradually increasing the energy tax on pure biodiesel (B100). As a result, since 2009, the majority of biodiesel consumption is mandate driven, as B100 outside the mandate is no longer competitive with fossil diesel. In addition, the introduction of E10 to the German market in spring 2011 increased the potential for bioethanol use to fill the mandates. The projected lower biodiesel consumption in Germany is also expected to put France in the pole position as the largest EU biodiesel market for the first time in 2011.

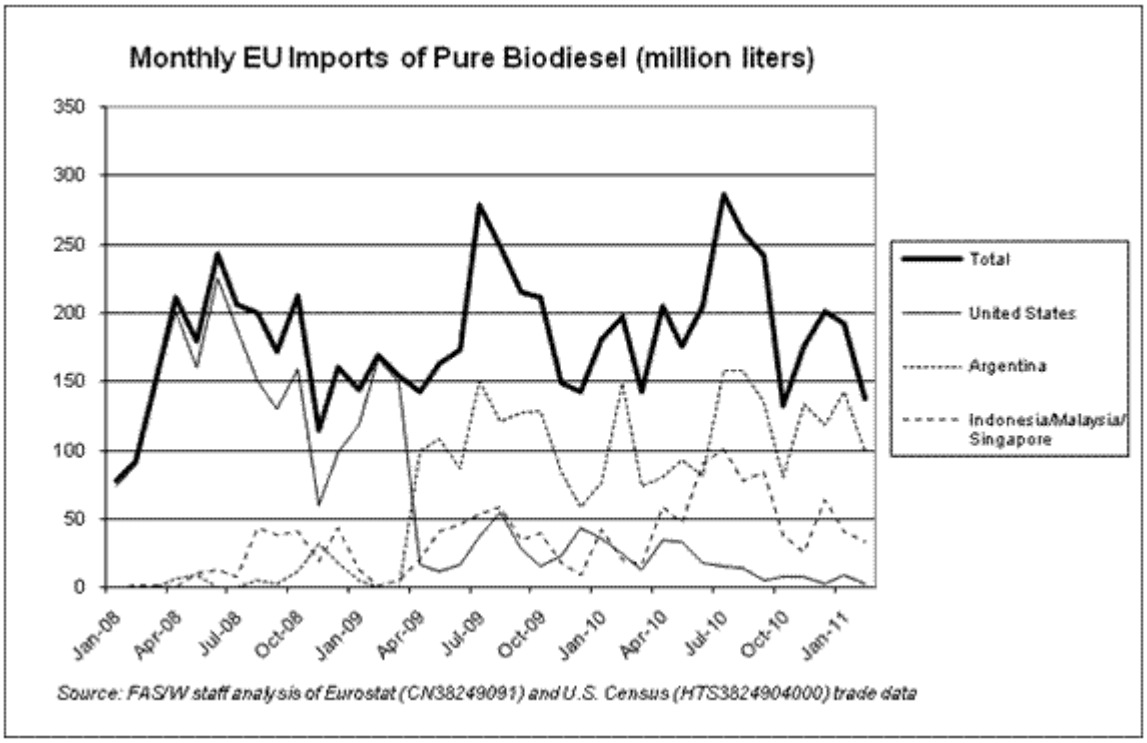
Biodiesel Consumption – Major Consumers (million liters)							
Calendar Year	**2006 [r]**	**2007 [r]**	**2008[r]**	**2009[r]**	**2010[e]**	**2011[f]**	**2012[f]**
France	720	1,480	2,390	2,620	2,620	2,780	2,840
Germany	3,270	3,560	3,060	2,860	2,930	2,500	2,270
Italy	250	230	800	1,310	1,620	187	2,050
Spain	70	330	590	1,170	1,550	1,900	2,030
Poland	20	40	550	600	720	850	910
Benelux	30	420	410	650	760	780	830
United Kingdom	250	470	510	560	680	740	770
Austria	370	420	460	590	600	610	610
Portugal	90	170	170	280	420	420	420
Czech Republic	30	40	100	150	190	370	370
Others	380	569	890	1,130	1,150	2,983	1,410
Total	**5,480**	**7,730**	**9,930**	**11,920**	**13,240**	**14,120**	**14,510**

Source: EU FAS posts

Trade

As expected, the introduction of countervailing (CV) and anti-dumping (AD) duties on U.S. exports of biodiesel to the EU by the EC in March 2009 dramatically reduced EU biodiesel imports from the United States. Imports of U.S. origin B99 virtually ceased, while U.S. biodiesel continued to be imported (albeit is much smaller amounts) in the form of B19 (or slightly lower blends - CV and AD duties only applied to biodiesel and blends with more than 20 percent biodiesel content (B20)). Hopes by the EU domestic biodiesel industry that this would reduce the pressure on the market were only partially fulfilled as the void was filled with increased biodiesel imports from Argentina, and to a lesser extent from Indonesia, Malaysia, and Canada (see graph below). On May 5, 2011, the EU extended the CV and AD duties to imports from all but two suppliers in Canada and all U.S. origin biodiesel, irrespective of blending ratio. This will likely further reduce imports from the United States.

Biodiesel exports from Argentina benefit from differential export taxes that are lower for biodiesel exports than for the export of soybeans and soybean oil. Consequently, Argentina is expected to remain a strong competitor for EU domestically produced biodiesel.



Note: Includes imports of biodiesel blends converted to B100 equivalent

In Romania, effective October 25, 2010, Government Decision 829/2010 introduced new requirements for biofuels. According to its provisions, biofuels can be introduced on the market only if they comply with the following conditions:

1. come from raw materials harvested in an EU agricultural area, obtained through technologies which comply with the good agricultural and environment conditions (GAEC),
2. lead to a reduction of minimum 35% of the CO_2 emissions compared to the conventional fuel, and
3. comply with the technical specifications imposed by the EU regarding the social and environment provisions.

In practice, these provisions have since November 2010 denied entrance of feedstock (including oilseeds for crushing) and final products from third countries. Currently there is a proposal to repeal Government Decision 829/2010, which is expected to be approved in the second quarter of 2011.

Stocks

Reliable data for biodiesel stocks are not available. The numbers in the PSD above are based on the following assumptions: In 2006 and 2007, most biodiesel was used as B100 and consumed

shortly after its production. Commercial stocks are estimated to have been fairly small and are included in the consumption figure. In 2008, blending started to play a bigger role and stocks were held by traders, blenders, and the minerals oil industry.

In 2008, the import of B99 substantially increased and prompted the EC to start an anti-dumping investigation. In anticipation of the EU imposing anti-dumping and countervailing duties on biodiesel imports from the United States, European traders and mineral oil industry accumulated large stocks at the end of 2008. These were partially reduced in 2009. In 2010 and 2011, stocks are expected fall to the assumed average level. In the absence of reliable data, it is assumed that average stocks amount to the equivalent of two weeks supply of consumption.

Sustainability Criteria may change sourcing patterns

The EU sustainability criteria that are part of the EU climate change package (see policy section) are expected to go into effect at different times in the various Member States. Germany and Austria were the first Member States to require sustainability certification starting January 2011, for all biofuel that is produced from biomass harvested after 2009. This means that feedstock from the 2010 harvest is already affected. Other Member States are taking longer for the implementation but will have to follow suit eventually. As a result, nearly all German rapeseed production is going into biodiesel, while rapeseed oil for food use is crushed from imported rapeseed (from other EU member states or the Ukraine) that does not have an sustainability certificate. In the long run, sustainability rules are expected to favor the use of feedstock that is certified to be sustainable according to an EU-accredited system. As the criteria are also applied to imports, this could cause changes in the sourcing pattern of EU biodiesel and feedstock importers.

Advanced Biofuels

For reporting purposes, advanced biofuels, or next generation biofuels, are biofuels beyond the conventional sugar, starch, vegetable and animal fat-based biofuels now produced commercially. Advanced biofuels can be derived from non-food, energy crops or agricultural, forestry and municipal wastes. Advanced biofuels include (cellulosic) ethanol, butanol, methanol, and dimethyl ether (DME), Fischer-Tropsch diesel, drop in fuels, and biofuels made from algae.

In the RED (Renewable Energy Directive 2009/28/EC, see policy section of this report), second generation biofuels receive double credit. This means that biofuels made out of ligno-cellulosic, non-food cellulosic, waste and residue materials will count double towards the ten percent target for renewable energy in transport in 2020. In the EU, the commercialization of advanced biofuel production is in general lagging the developments in the United States. Biorefineries are, however, an important feature of the Bio-energy European Industrial Initiative (BEII), one of the six industrial initiatives of the European Strategic Energy Technology (SET) Plan. The objective is that by 2020 at least 14 percent of the EU energy mix will be bio-energy. The European Commission (EC) has drawn up Technology Roadmaps for the period 2010-2020 for the implementation. The BEII proposes to build about thirty plants across Europe to take full account of differing geographical and climate conditions and logistical constraints. The total public and private investment needed in Europe over the next ten years is estimated at 9 billion Euro.

The technology objectives of the BEII are:

1. Commercialization of the most promising technologies.
2. Optimize biomass feedstock availability.

3. Develop an R&D program to support the bioenergy industry beyond 2020.

According to scientists, the technology is available but feedstock logistics and policy incentives are not yet put in place. The EC and private sector believe that the realization of commercial and thus profitable production of advanced biofuels will take at least five years. First generation biofuels production will need to generate cash flow for the private industry and develop the market for biofuels. In the National Renewable Energy Action Plans of the EU Member States, the contribution of advanced biofuels (biofuels conform Article 21.2 of the RED) is expected to grow between 2010 and 2020 but the share remains limited at about seven percent in 2020 (see GAIN Report NL0028). There are six advanced biofuel plants operational at demo scale in the EU (see table below). In addition to these demo scale plants, extensive research is conducted in several EU Member States, for instance.

Advanced Biofuels Plants in the EU					
Country	**Process**	**Biofuel**	**Feedstock**	**Capacity (million liters per year)**	**Year of opening**
Thermochemical					
Sweden	G/OS	DME	Black liquor	2	2010
Finland	G/FT	BtL	Forestry products	N.A.	2009
Germany	G/FT	BtL	Wood Waste	18	2011
Biochemical					
Sweden	HL/F	Ethanol	Forestry products	0.15	2005
Spain	HL/F	Ethanol	Barley straw	5	2008
Denmark	HL/F	Ethanol	Wheat straw	5	2010

Source: EU FAS Posts G=gasification, OS=oxygenate synthesis, FT=Fischer Tropsch synthesis, HL=hydrolysis, F=fermentation, DME=Dimethyl Ether, BtL = Biomass to Liquid

Thermochemical processes

Sweden: In Piteå in northern Sweden, the company Chemrec produces synthesis gas from black liquor (a by-product of paper production) at its pilot gasification plant. Since the summer of 2010, the syngas is further transformed into DME (Dimethyl Ether) through the process of oxygenate synthesis. The capacity of the pilot plant is 4 MT of DME per day. The Chemrec gasification technology will be implemented in a new industrial-scale demonstration plant at Domsjö Fabriker biorefinery for production of about 100,000 MT of DME and 140,000 MT of methanol per year. In February 2011, the EC approved a Euro 55 million R&D grant awarded by the Swedish Energy Agency for the construction of this industrial scale demonstration plant.

Finland: In 2009, Neste Oil and Stora Enso opened a demonstration plant in Varkaus for biomass to liquids production utilizing forestry residues. A 50/50 joint venture NSE Biofuels OY, has been established first to develop technology and later to produce on commercial-scale biodiesel. The demonstration facility at Stora Enso's Varakus mill includes a 12 MW gasifier. The demonstration process units will cover all stages, including drying of biomass, gasification, gas cleaning and testing of Fischer-Tropsch catalysts. NSE Biofuels OY is now looking for sites for a unit capable of producing approximately 200,000 MT of renewable diesel per year from wood biomass.

Germany: In cooperation with the automobile makers Volkswagen and Daimler, the Choren Industries Company has developed a process for gasification of biomass as feedstock for the

production of BtL. Choren has erected a pilot plant with a production capacity of 15,000 MT of BtL in Freiberg. Production will reportedly start at the end of 2011. Fast growing wood will be used as feedstock. The fuels will be marketed under the brand name SunDiesel®. An alternative project for the research and production of BtL fuels is run by the Karlsruhe Institute for Technology (KIT). It is known as the Bioliq® project. KIT works on processes to convert crop residues and wood residues into diesel and gasoline fuels. The bioliq process allows the physical separation of the pyrolysis from the rest of the process. This means that feedstock can be converted into pyrolysis oil in decentralized plants which is then shipped to a central plant for final conversion. This helps to reduce volume and costs for feedstock transport.

Biochemical processes

Sweden: Due to its vast forestry resources, Sweden has a long history of processing cellulosic raw materials from forestry products. SEKAB is one of the world's leaders in the developing technologies for production of ethanol from cellulose. The company's pilot plant in Örnsköldsvik in northern Sweden has been in continuous operation, producing ethanol from forestry waste products, since 2005. The pilot plant produces 300-400 liters of ethanol per day from a feedstock input of 2 MT of dry biomass. The plant is designed for a two-step dilute acid hydrolysis process and a combination with enzyme hydrolysis. The feedstock is wood chips from pine trees, but other raw materials from sugarcane, wheat, corn, energy grass and recycled waste are also of future interest for the project.

Spain: Abengoa Bioenergy has built a demonstration plant in Babilafuente (Salamanca). The plant construction was completed in December 2008 and it has been operating since September 2009. This plant has a 5 million liter/year production capacity, and uses wheat and barley straw as feedstock. The process is based on enzymatic hydrolysis. This second generation plant is located inside the grain facility Biocarburantes de Castilla y León in Babilafuente, so both facilities share services and process chains. Abengoa intends to put this technology into practice on a commercial scale at the plant that it will construct in Hugoton, Kansas (United States), which will have an annual capacity of 100 million liters/year.

Denmark: Inbicon's demonstration plant in Kalundborg is using wheat straw to produce bioethanol. The volume of feedstock used is about 30,000 MT per year for the production of 5.4 million liters ethanol. Novozymes and Danisco are supplying enzymes for the plant. The plant is reportedly the largest cellulosic ethanol demonstration plant in Europe. Inbicon's parent company is Dong Energy, one of the leading energy groups in Northern Europe. In addition to ethanol, the plant is expected to produce 13,000 MT of lignin pellets, which will be supplied to the Dong Energy power plant to replace coal and 11,000 MT of C5 molasses for animal feed.

United Kingdom: In November 2009, BP and DuPont announced the formation of Kingston Research Ltd and the establishment of an advanced biofuels research centre in Hull for demonstration of biobutanol technology, which is expected to be operational in June 2011. The first commercial-scale biobutanol facility is expected to begin operating in 2013.

Biomass for Heat and Power

Wood-based biomass is the main source for bioenergy in Europe, followed by waste and

agricultural-based biomass. Most of the biomass is used for heat, and to a lesser extent, in combined heat and power (CHP) applications.

Primary Energy Production of Solid Biomass in the EU, in Mtoe						
Calendar Year	**2007**	**2008**	**2009**	**2010***	**2011***	**2012***
Wood	28,200	29,132	29,800	30,100	30,700	31,200
Wood Waste	21,872	23,481	24,000	24,200	24,800	25,300
Black Liquor	9,401	9,095	10,000	10,200	10,500	11,000
Organic mat. and waste	7,715	8,550	9,000	9,500	10,000	10,500
Total	67,188	70,258	72,800	74,000	76,000	78,000

Source: Eurobserver Solid Biomass Barometer 2009, Nov. 2010 * FAS Europe estimates

The European Commission expects heat and power from biomass to play an important role in the European energy market in meeting the 20% target for renewable use by 2020 and in the future reduction of CO_2 emissions in Europe. Based on the Renewable Energy Action Plans (NREAPs) submitted by the Member States to the European Commission, focus is on biomass for electricity rather than biomass for heating. According to the Action Plans, biomass heat production will reach 88.8 Mtoe in 2020 (compared to 63.8 Mtoe in 2008), which is much lower than the 124 Mtoe projected by the European Biomass Association (AEBIOM).

The heating and cooling sector is responsible for almost 50% of Europe's energy demand, and thus, development of this sector will be most important in order to reach the energy targets. According to the Commission's analysis based on the NREAPs, the modest growth in renewable heating and cooling in the past can be explained by the absence of an adequate support framework in most Member States. This will clearly change in the next years following the inclusion of the heating and cooling sector in the new EU renewable energy framework. Member States are already planning reforms to their grants, feed in tariff regimes or other instruments in the heating sector and development and investments in Europe's biomass pellet industry and biomass boiler and co-firing plant technology can already be seen.

The Eurobserver Biomass Barometer reports that biomass-based electric power production in the EU has tripled since 2001, from 20.3 TWh in 2001 to 62.2 TWh in 2009. The reason for the increase of biomass electricity production is primarily the development of cogeneration plants. Today, combined generation of heat and power plants provides 62.5% of all electricity produced from solid biomass.

Almost half of EU's biomass electricity production is concentrated in three countries; Germany, Sweden and Finland. In Germany, a new law promoting heat production from renewable energies came into force on January 1, 2009. The law obliges owners of new buildings to cover part of their heat demand from renewable energy including a compulsory 50% to be covered by heating appliances using biomass fuels. The most important policy instrument in promoting renewable electricity production in Sweden is the electricity certificate system that was introduced in 2003. The objective of the electricity certificate system is to increase the production of renewable electricity with 25 TWh by year 2020 compared to year 2002. In Sweden, district heating accounts for about 40% of the heating market. Finland's electricity production reached 10.1 TWh in 2009, of which cogeneration plants delivered 84.1%.

Pellets

Wood pellets use in the EU-27 mainly occurs in Sweden, Denmark, the Netherlands, Belgium, Germany, Austria and Italy, but additional pellet markets are emerging across Europe. With the Member States' ambitious policy objectives to increase the share of renewable energy sources in the electricity and heating sector, pellets are becoming increasingly important.

Europe is the world's largest wood pellet market, with annual consumption of about 10 MMT of pellets per year. Currently, there are about 670 pellet plants and the number is increasing. According to the European Biomass Association, several experts expect a tenfold increase in the market within 10 years, from roughly 10 MMT in 2010 to up to 100 MMT in 2020.

The pellet industry will be facing many challenges in order to provide for further market growth in Europe. The major raw material for pellets has traditionally been sawdust and by-products from sawmills. With the increasing competition for the sawdust resources, a broader sustainable raw material basis is becoming necessary. There is already today an increased interest in forest residues and wood waste that can be pelletized alongside traditional feedstock. Also, agricultural products and residues such as straw, hay or other energy crops are being tested. The issue of pellet raw material supply, quality standards and the pricing will be crucial for future market development.

Differences in production and consumption characterize the European pellet market. Markets such as Belgium, the Netherlands and Poland are dominated by large-scale power plants and in the United Kingdom by large co-fired power plants. Medium scale consumers using wood pellets for district heating and also for larger CHP plants are found in Sweden and Denmark as well as bulk pellets for households. In Austria and Germany, pellets are predominantly delivered in bulk and used in small-scale private residential and industrial boilers for heating. Small-scale residential consumers that use bagged wood pellets in stoves for heating can be found in Italy, France, Bulgaria and Hungary.

Production, Consumption and Trade

EU Wood Pellets Trade (1,000 MT)							
Calendar Year	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Production	3,520	5,800	6,300	8,500	9,300	9,650	10,500
Imports	n/a	n/a	n/a	1,765	2,523	3,250	4,650
Exports	n/a	n/a	n/a	57	54	100	150
Consumption	4,700	6,100	7,100	9,800	11,000	13,000	15,000

Source: Post Estimates, Aembio, Pelletsatlas

In the past few years, the demand for pellets has outpaced domestic production in Europe. This has resulted in increased imports from North America. In 2010, U.S. wood pellets exports to the EU amounted to 735,000 MT, which is approximately 30% of the Extra-EU import share. Significant exporters of pellets to the EU are Canada, United States and Russia.

Main Suppliers of Wood Pellets to EU (1,000 MT)

Calendar Year	2009	2010
Canada	520	927
United States	535	736
Russia	379	396
Croatia	72	95
Belarus	75	90
Australia	9	63
Ukraine	30	57
Bosnia & Herzegovina	54	44
Other	58	153
Total	**1,765**	**2,523**

Source: World Trade Atlas. HS Code: 44013020

Sweden and Germany are the largest pellets producers in Europe, both producing about 1.6 MMT. While Germany is largely self-sufficient with an annual consumption of about 1.1 MMT, Sweden imports wood pellets in order to meet the domestic demand of about 2.2 MMT. Other markets that depend to a large extent on the import of wood pellets are Denmark, the Netherlands and Italy. In many of the producing countries, such as the Baltic countries, the pellet production mainly depends on export opportunities.

Main EU Importers of Wood Pellets (1,000 MT)				
	Total Imports[a]		Imports from U.S.	
Calendar Year	2009	2010	2009	2010
Denmark	734	1,550	0	80
Netherlands	960	936	313	318
Italy	472	816	0	4
Sweden	537	694	30	49
United Kingdom	45	551	0	188
Belgium	453	330	185	85
Austria	204	285	0	0
Germany	71	255	0	11
Other	474	533	0	0
Total EU27	**3,950**	**5,950**	**528**	**735**

(a) Includes EU intra-trade. Source: World Trade Atlas.
HS Code: 44013020

Main EU Exporters of Wood Pellets (1,000 MT)		
	Total Exports[a]	
Calendar Year	2009	2010

Germany	740	710
Latvia	482	590
Portugal	311	550
Austria	361	493
Estonia	354	391
France	202	230
Lithuania	247	213
Finland	136	191
Other	617	882
Total EU27	**3,450**	**4,250**

(a) Includes EU intra-trade. Source: World Trade Atlas.
HS Code: 44013020

Biogas

The biogas sector is very diverse across Europe. Depending on national priorities, i.e. whether biogas production is primarily seen as a means of waste management, as a means of generating renewable energy, or a combination of the two, countries have structured their financial incentives (or the lack thereof) to favor different feedstocks.

According to the 2010 Eurobserv'ER Barometer, Germany and the UK, the two largest biogas producers in the EU represent the two ends of the scale. Germany generates 85 percent of its biogas from agricultural crops while the UK along with Finland, Latvia, and Estonia rely entirely on landfill and sewage sludge gas. All other countries use a variety of feedstock combinations.

Biogas for Heat and Electricity in the EU (Ktoe)							
Calendar Year	**2006**	**2007**	**2008**	**2009**	**2010[f]**	**2011[f]**	**2012[f]**
Field Crops/Manure/ municipal waste	1,331	3,504	4,155	4,341	4,700	5,000	5,500
Landfill	2,007	2,795	2,891	3,002	3,050	3,100	3,150
Sewage Sludge	868	925	953	1,004	1,050	1,100	1,150
Total	4,899	7,224	7,999	8,346	8,800	9,200	9,800

f = Forecast EU FAS Posts Source: Eurobserv'ER, Barometer 2008, 2009, and 2010
http://www.eurobserv-er.org/pdf/baro200b.pdf

European farmers are increasingly investing in biogas digesters on their farms to convert agricultural crops, manure and other farm and food industry residues into methane gas. The leader in this production segment is Germany with about 6,000 plants of various sizes in operation in 2010. The incentive for farmers in Germany to invest in biogas digesters is a guaranteed feed-in price for the generated electricity which is considerably higher than that of electricity generated from fossil fuels, natural gas coal or nuclear sources.

As biogas production has already reached a considerable level requiring about 800,000 hectares of cropland in Germany (compared to about 3.3 million hectares for wheat production), environmental NGOs, organic farm organizations, and livestock farmers are increasingly expressing concerns that this production sector represents unfair competition to conventional food and feed producing farmers. Farm land prices in the neighborhood of biogas producing farmers are said to rise faster than in other agricultural regions. Similar criticism has not yet been reported from other EU countries.

As a new development, biogas plants are co-located with other biofuel plants and use residues from bioethanol production (Germany) or glycerine from biodiesel production (Benelux).

The majority of the biogas is used to generate electricity and/or heat. Here the trend is toward co-generation plants, which produce electricity and capture the process heat at the same time. The heat can be supplied to nearby buildings or sold to district heating systems.

A growing number of large scale operations are purifying the biogas to bio-methane before it enters into the natural gas grid. The use of purified biogas as transportation fuel is still marginal in most EU countries with the exception of Sweden, where a remarkable 36 percent of the biogas was used for vehicle fuel or fed into the gas distribution net in 2009. At the end of 2010, there were over 32,000 gas vehicles in Sweden and 125 public filling stations. Many Swedish communities choose biogas to run local buses and distribution vehicles. However, there is currently an uncertainty among private green car owners who are still awaiting news on the flex-fuel incentives after 2012.

Country	No. of biogas plants	Feedstock
Austria	344	Manure, corn silage, agricultural waste
Belgium	40	Manure, corn silage, agricultural and food waste
Czech Republic	160	Corn silage, grains, manure
Denmark	81	Manure
Finland	60	Municipal waste
Germany	6,000	Corn and rye silage, grains, manure, waste, sugar beets
Hungary	23	Manure, sewage sludge, food industry waste
Italy	273	Manure, agri-food industry by products, waste waters, OFSUW
Netherlands	100	Manure, corn silage, agricultural and food waste
Poland	157 (thereof 11 using agricultural feedstocks)	Manure, corn silage, grains, straw, waste
Portugal	100	Landfill gas, OFSUW
Slovakia	12	Corn silage, plant residues
Spain	94	Landfill collections, agro-industrial waste, sewage sludge, OFSUW
Sweden	230	Waste materials, manure, crops
United Kingdom	55	Food waste, brewery waste, OFSUW, animal slurry and manure

OFSUW = organic fraction of solid urban waste. Source: EU FAS Posts

Notes on Statistical Data

Bioethanol

Production capacity, production and consumption figures are based on statistics of Eurostat, the European Renewable Ethanol Association (ePURE) and FAS Posts. FAS Posts based their estimates on figures of national industry organizations and government sources. Ethyl tert-butyl ether (ETBE) is not included in ethanol production, but is included in the consumption figures. ETBE is predominantly consumed in France, Spain, the Netherlands and Poland.

Bioethanol import figures during 2006-2009 are based on estimates of ePURE. Other trade figures are based on Global Trade Atlas (GTA) data, which are sourced from EU Member State customs data, and the U.S. Bureau of Census. As the EU has no Harmonized System (HS) code for bioethanol, trade numbers are difficult to assess. Bioethanol trade numbers in this report include ethanol trade under HS code 2207 and HS code 29091910 (ETBE, 45 percent ethanol). The estimation of the EU import figures after 2009 is based on the ethanol exports from Brazil and the United States to the EU, and EU imports from other destinations. Furthermore, it is assumed that the increase of EU ethanol imports since 2002 is entirely attributed to expanding bioethanol imports.

Feedstock and co-product figures: Official data for feedstock use is scarcely made available by industry and government sources. The figures in this report represent FAS Posts estimates of the percentage of bioethanol (MT) produced by feedstock (MT). The conversion factors used are; wheat: 0.31; corn: 0.32; barley and rye: 0.19; and sugar beet: 0.075 (source: USDA publication "The Economic Feasibility of Ethanol Production from Sugar in the U.S."). The applied conversion factor for the production of DDG is 0.37 across all grains (source EBIO).

Biodiesel

Production and consumption figures are based on statistics of the European Biodiesel Board (EBB) and adjusted by EU FAS Posts using additional information obtained from national industry organizations and government sources.

Trade figures are based on Global Trade Atlas (GTA) data, which are sourced from EU Member State customs data, and the U.S. Bureau of Census, and adjusted for U.S. exports of biodiesel blends. A specific customs code for pure biodiesel (B100) and biodiesel blends down to B96.5 (3824 90 91) was first introduced in the EU in January 2008. Prior to this date, biodiesel entering the EU was subsumed under the CN code 38 24 90 98 (other chemicals). CN stands for "Combined Nomenclature" and is the equivalent of the "Harmonized System" used in the United States. Therefore, biodiesel imports prior to 2008 are estimated based on industry information. The U.S. Bureau of the Census introduced HTS export code 3824 90 4030 in January 2011 which exclusively covers pure biodiesel (B100) and biodiesel blends above B30.

Feedstock and co-product figures: Data for feedstock use is not available. The figures in this report represent estimates by EU FAS posts.

Abbreviations and definitions used in this report

Benelux = Belgium, the Netherlands and Luxembourg
Biodiesel = Fatty acid methyl ester produced from agricultural feedstock (vegetable oils, animal fat, recycled cooking oils) used as transport fuel to substitute for petroleum

diesel
Bioethanol = Ethanol produced from agricultural feedstock used as transport fuel
BtL = Biomass to Liquid
Bxxx = Blend of mineral diesel and biodiesel with the number indicating the percentage of biodiesel in the blend, e.g. B100 equals 100% biodiesel, while B5 equals 5% biodiesel and 95% conventional diesel.
CEN = European Committee for Standardization (Comité Européen de Normalisation)
DDG = Distillers Dried Grains
EBB = European Biodiesel Board
Exxx = Blend of mineral gasoline and bioethanol with the number indicating the percentage of bioethanol in the blend, e.g. E10 equals 10% bioethanol and 90% conventional gasoline.
GHG = greenhouse gas
GJ = Gigajoule = 1,000,000,000 Joule or 1 million KJ
Ha = Hectares, 1 hectare = 2.471 acres
HS = Harmonized System of tariff codes
Ktoe = 1000 MT of oil equivalent = 41,868 GJ = 11.63 GWh
MJ = Megajoule
MMT = Million metric tons
MS = Member State(s) of the EU
MT = Metric ton (1,000 kg)
Mtoe = Million tons of oil equivalent
MWh = Mega Watt hours = 1,000 Kilo Watt hours (KWh)
MY = Marketing Year
NMS = New Member State(s) = Countries that joined the EU in/after 2004
PVO = Pure vegetable oil used as transport fuel
RME = Rapeseed Methyl Ester
Toe = Tons of oil equivalent = 41,868 MJ = 11.63 MWh
TWh = Tera Watt hours = 1 billion Kilo Watt hours (KWh)
USD = U.S. Dollar

Energy content and Conversion rates [2] :

Gasoline =	43.10	MJ/kg = 43.1 GJ/MT
Ethanol =	26.90	MJ/kg
Diesel =	42.80	MJ/kg
Biodiesel =	37.50	MJ/kg
Pure vegetable oil =	34.60	MJ/kg
BtL =	33.50	MJ/kg

1 Toe = 41.87 GJ

1 MT Gasoline =	1,342	Liters =	1.03	Toe
1 MT Ethanol =	1,267	Liters =	0.64	Toe
1 MT Diesel =	1,195	Liters =	1.02	Toe
1 MT Biodiesel =	1,136	Liters =	0.90	Toe
1 MT Pure veg Oil =	1,087	Liters =	0.83	Toe
1 MT BtL =	1,316	Liters =	0.80	Toe

[2] Based on information from:
Massachusetts Institute of Technology (MIT) http://web.mit.edu/mit_energy/resources/factsheets/UnitsAndConversions.pdf
,
- German Federal Agency for Renewable Resources (FNR)

Related Reports from USEU Brussels and MS Posts in the EU

Related reports from FAS Post in the European Union:

Country	Title	Date
EU-27	Industrial uses of sugar from sugar beet increasing in the EU	05/18/11
EU-27	Sugar Annual Report	05/04/11
EU-27	Grain and Feed Annual Report	04/27/11
EU-27	Oilseeds and Products Annual Report	04/12/11
Germany	FAQs on Biofuel Sustainability Certification in Germany	04/08/11
EU-27	Transposition of the RED into National Legislation	02/18/11
Germany	Germany adjusts accounting period for sustainable biofuel	12/21/10
EU-27	Brief Analysis of the EU National Plans	12/21/10
France	France's Strategy to Implement Renewable Energy Directive	12/13/10
EU-27	Increased Domestic Soybean and Soybean Meal Production	12/03/10
Germany	Introduction of E10 may curb biodiesel consumption in Germany	11/12/10
Hungary	Bill on Bio-fuels Approved by Parliament	11/08/10
Germany	Germany Extends Transition Period - POS Required for 2010 Harvest	07/15/10
France	First Generation Biofuels Gain Credibility- Next Generation Projects	05/31/10
EU-27	Grain and Feed Annual	05/01/10
EU-27	Sugar Annual	04/29/10
EU-27	Oilseeds and Products Annual	04/26/10
Germany	Status of Biomass Sustainability Certification in Germany	03/12/10
Denmark	Biorefinery and Biogas Tour	02/18/10
Denmark	Dane launches Low-Cost 2nd Generation Ethanol Enzyme	02/18/10

The GAIN Reports can be downloaded from the following FAS website:

http://gain.fas.usda.gov/Pages/Default.aspx