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European Union Biofuels Policy and Agriculture: An Overview

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Summary

Several different economic and environmental forces have converged in recent years to generate growing interest in alternate sources of energy, including biofuels, within the European Union (EU). The European Commission (EC) is using both legislation and formal directives to promote biofuel production and use within the EU. However, EU biofuel production is impeded by its high production costs relative to fossil fuels. To date, the most important biofuel produced in the EU has been biodiesel with an 80% share of biofuel production in 2004. Bioethanol has accounted for the remainder. The major feedstock for EU biodiesel production is rapeseed oil, while bioethanol is generally produced using a combination of sugar beets and wheat.

U.S. policymakers are closely watching EU biofuel developments, particularly for any successful policy choices that might work in the United States. In addition, both the production and use of biofuels have important long-run implications for EU agricultural production and trade. This report briefly introduces some of the more salient agricultural policies and issues related to EU biofuel production and use. This report will be updated as events warrant.

Introduction

Various policy goals — reducing greenhouse gas emissions, boosting the decarbonization of transport fuels, diversifying fuel supply sources and developing long-term replacements for fossil oil while diversifying income and employment in rural areas — have motivated the European Union (EU) to promote the production and use of biofuels (i.e., transport fuels produced from renewable organic materials).

Between 1985 and 2004, road transportation (i.e., cars and trucks) fuel consumption in Western Europe (primarily the EU) grew by nearly 50%. By 2000 the then EU-15 was importing 75% of its petroleum needs with expectations for this import dependence to

continue to grow into the future.¹ In 2004, Western Europe consumed over 270 million metric tons (MMT), or approximately 89 billion gallons, of road transportation fuel — 60% as diesel fuel and 40% as gasoline.² (By comparison, U.S. fuel use was 177.6 billion gallons in 2004.) Petroleum accounts for about 98% of EU transport fuels; biofuels comprise slightly more than 1%. Based on a 2001 forecast, the European Commission (EC) expects vehicle fuel use in the EU to reach 325 MMT by 2020. In addition, under the Kyoto Protocol the EU has committed to an 8% reduction of carbon dioxide (CO₂) emissions by the end of 2012.³ Various analyses have suggested that both biodiesel and bioethanol produce substantially less CO₂ emissions (depending on the particular feedstock) than their fossil fuel counterparts. With these facts in mind, in 2005 the EC set a goal of replacing 20% of conventional motor fuels with alternate fuels (e.g., biofuels, natural gas, and hydrogen fuels) by 2020.

EU Biofuels Production

The EU produced an estimated 768 million gallons of biofuel in 2004 (**Table 1**) compared with U.S. biofuel production of 3.4 billion gallons (mostly ethanol).⁴ Biodiesel accounted for nearly 80% of EU biofuel production. Germany produced over half of the EU's biodiesel. France and Italy are also important biodiesel producers, while Spain is the EU's leading bioethanol producer.

The supply of feedstocks is crucial to the success of the EU's biofuel strategy because they represent the primary cost component in the biofuel production process. The major feedstock for EU biodiesel production has been rapeseed oil, although almost any vegetable oil or animal fat (including restaurant deep-fry grease) is viable. In 2004, EU biodiesel production used about 4.1 MMT of rapeseed, or 27%, of a record EU crop of 15.3 MMT.⁵ In 2004, the EU harvested oilseeds on an estimated 7.5 million hectares of which 60% was rapeseed, 29% sunflowerseed, and 4% soybeans.

EU bioethanol is generally produced using a combination of sugar beets and wheat. In 2004, EU bioethanol production used 1.2 MMT of cereals out of total EU production of over 289 MMT of grains and 1 MMT of sugar beets out of 123.5 MMT of sugar beet production. In the long run, abundant domestic supplies and production potential for cereals and sugar beets suggest that bioethanol production likely has greater potential in the EU than does biodiesel. However, high-production costs of EU-produced biofuels (due primarily to high-priced internal feedstocks) relative to fossil fuels remain a major impediment to market-based expansion of EU biofuel production, particularly for

¹ EC, *The European Union's oil supply situation (Oct. 2000) and outlines of a strategy for the future*, at [http://europa.eu.int/comm/energy/oil/index_en.htm].

² L'institut Français du Pétrol, *Panorama 2005*, "Road Transport Fuel in Europe: the Explosion of Demand for Diesel Fuel," available at [<http://www.ifp.fr/IFP/en/ifp/ab.htm>].

³ Renewable Energy Access; "Legislation to Spur European Biofuels Market," Oct. 18, 2005.

⁴ For more information on U.S. agriculture-based biofuel production, see CRS Report RL32712 *Agriculture-based Renewable Energy Production*.

⁵ EU feedstock levels are from EC Memo/06/65, Brussels, 8 Feb. 2006. EU production data for wheat, rapeseed, and vegetable oil are from USDA, FAS, *PSD database*, Feb. 9, 2006; sugar beets are from USDA, FAS, GAIN Report No. E35080, Apr. 4, 2005.

bioethanol. According to the EC, EU-produced biodiesel breaks even at oil prices of around €60 (\$71.60) per barrel, while bioethanol becomes competitive with oil prices of about €90 (\$107.37) per barrel.⁶ During February 2006, a barrel of oil — Europe Brent spot price FOB — was quoted at \$60.73/barrel.⁷

Table 1. EU Biofuel Production by Member State, by Fuel Type

Country	Biodiesel			Ethanol			Total		
	2002	2003	2004	2002	2003	2004	2002	2003	2004
Million gallons									
Germany	141	224	324	0	0	7	141	224	330
France	114	112	109	30	27	34	145	139	143
Italy	66	85	100	0	0	0	66	85	100
Spain	0	2	4	59	53	65	59	55	69
Denmark	3	13	22	0	0	0	3	13	22
Czech Republic	22	22	19	2	0	0	23	22	19
Austria	8	10	18	0	0	0	8	10	18
Sweden	0	0	0	17	17	17	17	18	18
Poland	0	0	0	22	20	12	22	20	12
United Kingdom	1	3	3	0	0	0	1	3	3
Slovak Republic	0	0	5	0	0	0	0	0	5
Lithuania	0	0	2	0	0	0	0	0	2
Intervention Stocks ^a	0	0	0	0	23	29	0	23	29
Total	355	470	604	130	141	164	484	612	768

Source: EurObserver, No. 167, May-June 2005; as reproduced from EC Memo/06/65, Brussels, 8 Feb. 2006. Note: Conversions to million gallons from 1,000 metric tons undertaken by CRS.

a. Under the CAP, the EU is obligated to purchase, at intervention prices, many qualifying crops offered by farmers and traders who are unable to sell at a higher price on the private market.

EU Policy Measures Affecting Biofuels Production and Use

The EU's Common Agricultural Policy (CAP). EU crop production patterns have traditionally been heavily influenced by the CAP with its high support prices, planting restrictions, intervention buying, stock management, and rigid border controls. International trade agreements have also been influential on cropping decisions. Reforms enacted since 2003 have removed many of the previous distortions in EU commodity markets. However, EU policies and programs remain important in providing support for the agricultural sector. Presently, the CAP includes rules on agricultural land use, as well as a special payment for the production of crops dedicated to biofuels.

Blair House Restrictions. The 1992 Blair House Memorandum of Understanding⁸ (Blair House Agreement) between the United States and the EU helped to resolve a mutual dispute over EU domestic support programs that impaired U.S. access

⁶ EC, "An EU Strategy for Biofuels," Com(2006) 34, p. 5. Note: on Mar. 13, 2006, a Euro (€) was trading for \$1.193, Pacific Exchange Rate Service, Univ of B.C. at [<http://fx.sauder.ubc.ca/>].

⁷ U.S. Dept. Of Energy, Energy Information Administration, at [<http://www.eia.doe.gov/>].

⁸ For more information on the Blair House MOU see USDA, FAS, U.S. Mission to the European Union, at [<http://useu.usmission.gov/agri/oilseeds.html>].

to the EU oilseed markets and thus facilitated completion of the Uruguay Round Agreement for agriculture. Specifically, the Blair House Agreement limits the amount of EU oilseed production for food on non-set-aside land, and for non-food (i.e., industrial or energy) purposes on set-aside land. Set-aside-based oilseed production is restricted to roughly 0.7 million hectares (MHA).⁹ However, the EC believes that, pursuant to CAP reforms undertaken in 2003, it is no longer subject to the Blair House limitations on oilseed production.¹⁰ In 2005, rapeseed production intended for use as biodiesel feedstock was grown on 1.8 MHA including 0.9 MHA of set aside.

CAP Land Use Rules. Under the CAP, EU farmers are required to set aside 10% of their land to qualify for other CAP benefits. Participating farmers receive a set-aside compensation payment.¹¹ In addition, EU farmers are allowed to plant oilseeds on the set-aside land (subject to Blair House Agreement limitations) as long as it is contracted solely for the production of biodiesel or other industrial products and not sold into either food or feed markets.

Energy Crop Payments. In 2003, a new round of CAP reforms established a special aid for energy crops grown on non-set-aside land. Energy crops — those grown for the production of biofuels or for use as biomass in the production of electric and thermal energy — were eligible for a premium of €45 per hectare. To establish a budgetary ceiling on such outlays, the energy payments were to be restricted to a maximum guaranteed area of 1.5 MHA.¹² If fully implemented on 1.5 MHA, the program would cost €67.5 million. In 2005, an estimated 0.5 MHA received the energy crop payment.

Sugar Sector Reform. On February 20, 2006, the EU adopted significant reform measures for its sugar sector including a 36% cut in the internal sugar support price, elimination of the intervention system of sugar purchases, and partial sugar production quota buyback. The sugar reforms could impact biofuel feedstock availability since they substantially reduce internal sugar beet production incentives.¹³ However, much of the potential decline in sugar production could be offset by a drop in EU sugar exports which are restricted to not more than 1.273 MMT annually (compared with an estimated 7.1 MMT in 2005/06). In addition, two reform provisions are likely to positively impact the availability of sugar beets as a biofuel feedstock: first, sugar beet production now qualifies for both set-aside payments when grown as a non-food crop and for the energy crop aid of €45/HA on non-set-aside area; and second, sugar used for the production of bioethanol

⁹ Set-aside oilseed production is limited to a volume that, after crushing, would produce a quantity of protein meal no greater than 1 MMT of soybean meal equivalents or about 0.7 MHA; based on the following assumptions: rapeseed is the primary oilseed grown on eligible set-aside land; average rapeseed yield is 3.1 metric tons (mt) per hectare; average protein-meal extraction rate is 58%; and 1.28 mt of rapeseed meal equals 1 mt of soybean meal.

¹⁰ USDA, FAS, GAIN Report No. E35172, Sept. 9, 2005.

¹¹ Council Regulation (EC) No. 1251/1999, Article 6(1), May 17, 1999.

¹² Council Regulation (EC) No. 1782/2003, Title IV, Chapter 5, "Aid for Energy Crops," Sept. 29, 2003, p.29 (O.J. L270, 21/10/2003).

¹³ For more information, see the USDA, FAS, GAIN Report No. E35225, *EU Agrees Sugar Reform*, Nov. 30, 2005.

will be excluded from sugar production quotas. Despite the reforms, the EU's internal sugar prices are expected to remain substantially above international market prices thus preserving it as an expensive feedstock.

EC Directives. In recent years the EC has attempted to focus increasing attention on the development of the EU biofuels sector.¹⁴ Three principal legislative directives governing biofuels use, taxation, and quality have been issued recently by the EC to guide Member State agriculture-based renewable energy production.

Biofuels Use Directive. In 2003, the EC established a goal of deriving at least 2% of EU transportation fuel from biofuels by the end of 2005, then growing the biofuels share by 0.75% annually until December 31, 2010, when it would reach 5.75%.¹⁵ However, the biofuels goal is not mandatory and individual Member States are free to establish higher standards. As a result, the degree of participation varies substantially across EU Member States. Because the targets are not mandatory, no penalty for noncompliance is involved; however, Member States are expected to report annually those measures undertaken to aid compliance as well as on the sales of both total transport fuel and the share of biofuels. Despite various State and EU-wide policies designed to support biofuels production, the EU biofuels goal of 2% by 2005 was not achieved. Instead, it appears that biofuels attained an EU-wide share of only about 1.4% of transport fuels.

Energy Taxation Directive. In 2003, the EU's framework for the taxation of energy products and electricity was amended to allow Member States to grant tax reductions and/or exemptions in favor of renewable fuels under certain conditions.¹⁶ However, to minimize the tax revenue loss for Member States, the final tax on biofuels intended for transport use may not be less than 50% of the normal excise duty.

Fuel Quality Directive. In 2003, the EU's environmental specifications for market fuels was amended to establish specifications for petrol and diesel. The new specifications encompassed the incorporation of biofuels. The European Committee for Standardization (CEN) has set limits on biodiesel blending to no more than a 5% share by volume (or 4.6% in energy terms) for technical reasons.¹⁷ As a result, this appears to be an issue that the EC will need to resolve to achieve its goal of a 5.75% share of transport fuel by 2010.

EU Biofuels Trade

Biomass productivity — whether sugar cane for bioethanol or palm oil for biodiesel — is highest in tropical environments. As a result, biofuel production costs are relatively lower in a number of developing countries, most notably ethanol production in Brazil. However, global trade in biofuels remains fairly small relative to both biofuel demand as well as to traditional fossil fuel trade. In 2004, the EU imported nearly 825,000 gallons

¹⁴ For example, see EC Directives “A Biomass Action Plan,” Com(2005) 628, and “An EU Strategy for Biofuels,” Com(2006) 34, at [http://europa.eu.int/comm/agriculture/biomass/biofuel/index_en.htm].

¹⁵ Council Directive 2003/30/EC of 8 May 2003 (O.J. L123, 17/5/2003).

¹⁶ Council Directive 2003/96/EC of 27 October 2003 (O.J. L283, 31/10/2003).

¹⁷ Standard EN 590 as discussed in EC Memo/06/65, Brussels, 8 Feb. 2006.

of bioethanol.¹⁸ About 36% of this volume was imported as normal Most-Favored Nation (MFN) trade and subject to import duties of €10.2/hectoliter (€0.39/gallon) on denatured alcohol (HS Code 220720) and €19.2/hectoliter (€0.73/gallon) on undenatured alcohol (HS Code 220710). Brazil is the largest ethanol exporter to the EU with all of its exports made as MFN. During the 2002-04 period, 25% of EU ethanol imports were from Brazil.

During the 2002-04 period, about 64% of EU ethanol imports entered under preferential trade arrangements including the Generalized System of Preferences (GSP), the Cotonou Agreement (ACP), Everything But Arms (EBA) initiative, and others. Pakistan, with a 20% share of EU ethanol imports, is the largest ethanol exporter under preferential trade arrangements. Other ethanol exporting countries that benefit from EU trade preferences include Guatemala, Peru, Bolivia, Ecuador, Nicaragua, and Panama (unlimited duty-free access accorded under special drug diversion programs); Ukraine and South Africa (GSP); the Democratic Republic of Congo (EBA); Swaziland and Zimbabwe (ACP); Egypt (Euro-Mediterranean Agreement); and Norway (special quota).

EU imports of biodiesel are subject to an *ad valorem* duty of 6.5%. Since biodiesel production outside of the EU is still limited there has been no significant external trade in biodiesel. However, to relax pressure on rapeseed oil production, biodiesel producers have begun sourcing feedstocks from foreign sources. Since 1999, EU imports of palm oil (primarily from Malaysia) have more than doubled to 4.5 MMT in 2005 (representing 18% of world palm oil imports).

Policy Summary

Although the various EU-wide policies discussed above encourage common goals across Member States, there exists considerable State-level variation in terms of the degree of participation in biofuel requirements, incentives, production, and use. In addition, EU oilseed production remains constrained by suitable land and growing conditions, as well as high domestic costs of feedstocks relative to foreign producers. As a result, trade of both biofuels and biofuel feedstocks is likely to play an increasingly important role in the EU in the future.

For More Information

European Commission, Energy, *New and Renewable Energies*, available at [http://europa.eu.int/comm/energy/res/index_en.htm].

European Biodiesel Board — a non-profit organization established in January 1997 to promote the use of biodiesel in the EU, at the same time, grouping the major EU biodiesel producers. For more information see [<http://www.ebb-eu.org/>].

European Biomass Industry Association — an international nonprofit association that supports European biomass industries, at [<http://p9719.typo3server.info/97.0.html>].

USDA, FAS, U.S. Mission to the European Union, “Biofuels,” available at [<http://useu.usmission.gov/agri/Biofuels.htm>].

¹⁸ EC, “An EU Strategy for Biofuels,” Com(2006) 34, Annex V.