

# The Role of Biofuel in Energy Sector

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## 1. Definition

Biofuel can be broadly defined as solid, liquid, or gas fuel consisting of, or derived from biomass. Biomass can also be used directly for heating or power: this is commonly called biomass fuel. Biofuel is considered a means of reducing greenhouse gas emissions and increasing energy security by providing an alternative to fossil fuels.

According to Article 2 of the Directive 2003/30/EC of the European Parliament and of the Council on the Promotion of the Use of Biofuels or Other Renewable Fuels for Transport, popularly better known as the Biofuels Directive, biofuels cover liquid or gaseous fuel for transport produced from biomass.

## 2. Usage of Biofuel

Biofuels are used globally. Biofuel industries are expanding in Europe, Asia and the Americas. The most common use for biofuels is in automotive transport. Biofuel can be produced from any carbon source that can be replenished rapidly e.g. plants. Many different plants and plant-derived materials are used for biofuel manufacture.

The EU continues its reign as the world's largest biodiesel producer, but nearly two-thirds of the region's installed production capacity is currently idle. According to the European Biodiesel Board, the EU produced approximately 9 million metric tons of biodiesel in 2009, while installed capacity measured nearly 22 million tons. Even with this high ratio of unutilized capacity, the EU produced about 65 percent of the world's biodiesel last year.

Overall, the EU produced 16.6 percent more biodiesel in 2009 than 2008, although not all areas of the region contributed to this increase. While Austria, Belgium, Finland, Italy, Netherlands, Poland and Spain increased production in 2009, production in Germany, Greece and the UK decreased. Currently, the top three biodiesel producing nations in Europe are Germany, France and Spain. Demand for biodiesel is largely driven by its suitability as a substitute for fossil fuels. The biofuel industry is still in its formative stages, but global interest is increasing rapidly. Biofuel is considered an important component of the global strategy to increase energy security by providing an alternative to fossil fuels. It is also believed that the efficient production and use of biofuels as substitutes for fossil



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fuels may reduce greenhouse gas emission. In addition, the growing use of biofuel carries positive geo-political ramifications including the reduction of dependencies on countries with oil reserves and the introduction of new countries as energy-producers.

According to the report of Reuters Exxon Mobil declared that it opened a greenhouse facility to grow and test algae, the next step for its nascent biofuels program. Researchers from Exxon Mobil and its partner Synthetic Genomics will use the facility to test whether large-scale quantities of affordable fuel can be produced from algae. Exxon said on 2009 it would invest \$600 million over the next five to six years attempting to develop biofuel from algae. If research milestones are successfully met Exxon declared it will spend more than the \$600 million over the next decade, \$300 million of which will be allocated to Synthetic Genomics Inc. Exxon's biofuel investment represents a tiny portion of the oil company's spending, which is set for \$32 billion for just 2010. That figure includes the budget of XTO Energy Inc., a natural-gas company the oil major acquired.

### 3. Programs

Political bodies are beginning to note the advantages of biofuel and move to incentivise the industry's development. Japan and Brazil have embarked on a joint effort to increase Brazilian ethanol and biodiesel production for the Japanese market. The United States, Canada, India and Thailand all have programs to replace a portion of their gasoline consumption with biofuels and other countries are considering such initiatives. Several governments are exploring ways to accelerate the development of biofuels with various development schemes including favourable tax treatments.

### 4. The Legal Background in the EC

As the symbol of recognition of biofuels' importance in energy sector, the European Union has passed the aforementioned Biofuels Directive. This Directive sets forth that the European Council meeting at Gothenburg on 15 and 16 June 2001 agreed on a Community strategy for sustainable development consisting in a set of measures which include the development of biofuels.

The Directive also called for an intermediate target of 2 % by 31 December 2005. The target of 5,75% is to be met by 31 December 2010. The percentages are calculated on the basis of energy content of the fuel and apply to petrol and diesel fuel for transport purposes placed on the markets of member states. Member states are encouraged to take on national "indicative" targets in conformity with the overall target.

Pursuant to the communication from the Commission to the Council and the European Parliament (the title is Renewable Energy Road Map Renewable energies in the 21st century: building a more sustainable future; hereinafter referred to as Communication) the biofuels are the only available large scale substitute for petrol and diesel in transport.

The Communication declares that the indicative targets set by Member States for 2005 were less ambitious, equating to an EU share of 1.4%. The share achieved was even lower, at 1%. In addition to the cost factor, there are three main reasons for the slow progress. First, appropriate support systems were not in place in most Member States. Second, fuel suppliers have been reluctant to use bioethanol (which accounted for only 20% of total biofuel consumption) because they already have an excess of petrol, and the blending of bioethanol with petrol makes this worse. Third, the EU regulatory framework for biofuels is underdeveloped, particularly in relation to the need for Member States to translate their objectives into action.

The Communication lays down that the minimum target for biofuels for 2020 should, on the basis of conservative assumptions, related to the availability of sustainably produced feedstocks, car engine and biofuel production technologies, be fixed at 10% of overall consumption of petrol and diesel in transport.

According to Directive 2009/30/EC of the European Parliament and of the Council of 23 April 2009 amending Directive 98/70/EC as regards the specification of petrol, diesel and gas-oil and introducing a mechanism to monitor and reduce greenhouse gas emissions and amending Council Directive 1999/32/EC as regards the specification of fuel used by inland waterway vessels and repealing Directive 93/12/EEC the incentives provided for in this Directive will encourage increased production of biofuels worldwide. Where biofuels are made from raw material produced within the Community, they should also



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comply with Community environmental requirements for agriculture, including requirements for the protection of the quality of groundwater and surface water, and with social requirements.

Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC lays down that the European Council of March 2007 reaffirmed the Community's commitment to the Community-wide development of energy from renewable sources beyond 2010. It endorsed a mandatory target of a 20 % share of energy from renewable sources in overall Community energy consumption by 2020 and a mandatory 10 % minimum target to be achieved by all Member States for the share of biofuels in transport petrol and diesel consumption by 2020, to be introduced in a cost-effective way.

### 5. The Legislation in Hungary

Hungary is also moving into research and development for biofuels. Nowadays in Hungary the driver can refuel bioethanol (E85) at more than 10 petrol stations. Furthermore, a Fagen/ICM corn ethanol plant began constructions at this time in Hungary. Budapest-based Pannonia Ethanol Zrt., a company developed by Ethanol Europe, has contracted with the U.S. team to build an American-style corn ethanol plant along the Danube River about 50 miles from Budapest at Dunaföldvár. The 50 MMgy plant being built adjacent to a Cargill grain handling facility is expected to be completed in mid-2012.

In accordance with the EC law the Hungarian Government Resolution No. 2233/2004. (IX.22.) the reference value for the EC targets shall be 0,4-0,6 % calculated on the basis of energy content, of all petrol and diesel for transport purposes placed on their markets by 31 December 2005. The target of 2 % is to be met by 31 December 2010.

In harmony with the Biofuels Directive the Hungarian Government Decree No. 138/2009. (VI.30.) contains definitions in this subject and regulates the relevant topics.

There are also additional pieces of regulations of lower level, such as a decree by the Ministry of Agriculture and Rural Development. The aim of the decree is that the volume of production of biofuel should be grown for the purpose of building new plants. The measure of the subvention is between EUR 60,000,- and EUR 1,000,000,-.

### 6. Summary

In our opinion biofuels can provide lots of environmental benefits, including reduction of greenhouse gas emissions, reduction of fossil fuel use, increased national energy security, increased rural development and a sustainable fuel supply for the future.

However, biofuels have limitations. The feedstocks for biofuel production must be replaced rapidly and biofuel production processes must be designed and implemented so as to supply the maximum amount of fuel at the cheapest cost, while providing maximum environmental benefits. Broadly speaking, first generation biofuel production processes cannot supply us with more than a few percent of our energy requirements sustainably.

Due to rising demand for biofuels, farmers worldwide have an increased economic incentive to grow crops for biofuel production instead of food production. Without political intervention, this could lead to reduced food production and increased food prices and inflation. The impacts of this would be greatest on poorer countries or countries that rely on imported food for their subsistence.

These factors should jointly be taken into consideration when future programs, initiatives and legislation are adopted on supporting the sustainable development and the protection of next generations not only from environmental aspects but also from cultural, political and industrial viewpoints.