

White Paper

THE BIOFUELS SECTOR IN POLAND

F R O S T & S U L L I V A N

In cooperation with



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About This Document

The following whitepaper outlines the key findings of a study conducted by Frost & Sullivan for the Polish Information and Foreign Investment Agency (PAIIZ) on the biofuels sector in Poland. It focuses on the major trends and developments in the biofuels sector, on the market drivers and restraints, EU and national legislation and the potential of the market.

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Executive Summary

This white paper offers a top-level introduction to the biomass sector in Poland, and in-depthly examines the country's liquid biofuels potential in the European context. The first part of the document characterises the biomass energy resources in the EU and particularly in Poland. It also presents a general overview of solid, gas and liquid biofuels. Subsequently, it narrows down the topic only to liquid biofuels, which, in the light of current legislation, are expected to provide promising business growth opportunities. Afterward, the document indicates the driving and constraining forces, which have the key impact on the biofuel market in Poland.

In general, while EU member states seek a solution to meet their emission-reduction goals and lessen their dependence on imported energy sources, biofuels are gaining increasing attention as an environmentally friendly answer to the Community's concerns.

Without a doubt, Poland has the potential to become one of the leading countries within the EU, with regard to biofuels production. Having an area of 18.3 million ha devoted to agricultural production and 8.9 million ha of forest area, Poland presents biomass opportunities from agricultural residues, harvesting or processing, wood and wood wastes from forestry and industry in addition to important prospects for energy crops grown specifically for energy applications. As a result, the new capacities in the country are being installed, mainly encouraged by the incipient growth of domestic consumption.

The biofuels sector in Poland is mainly driven by the European incentives and directives aiming at considerably increasing biofuels production and use. Along with other European states, Poland has to increase the use of renewable energy in transport to 5.75 per cent by 2010 - a goal established in the Biofuels Directive of 2003. Furthermore, according to recent European regulations, the mandatory target for 2020 has been set at a minimum level of 10 per cent biofuel component in transportation fuels.

Resultantly, biofuels are rooting firmly in Poland and are expected to play a significant role in the country's energy sector, help to deliver the renewable promise and pave the way for other renewable energy sources in the future. At present, a favourable political and economic climate exists not only in Poland but throughout the EU, which will lead to a dynamic upsurge in the production and use of biofuels. Therefore, as the biofuel sector is gaining increasing attention, the market is expected to witness strong growth and will present a number of opportunities over the medium to long term.

1. Biomass

1.1. Biomass in the European Context

Biomass was identified as an energy source many years ago, and has been in extensive use for the last few decades. Of late, despite not being a new sector, biomass has attained renewed attention, especially in the European Union, which is looking for green energy solutions.

Frost & Sullivan's analysis based on EU energy data reveals that biomass share in the EU-27 primary energy production has reached 10 per cent in 2006. While other energy sources, such as coal, oil, and gas, saw their shares slightly decreasing over the period of 2001-2006, biomass was one of the growing electricity sources in Europe. Based on a mature technology, biomass sector is positioned to continue expanding its share in primary electricity production. The main advantage of biomass, over other renewable energy sources, is a stable power supply that is suitable for base-load service. Furthermore, life-cycle net carbon emissions per unit of 'bio-electricity' are below 10 per cent of the emissions from fossil fuel-based electricity. This leads many to accept biomass as 'carbon-neutral' energy source.

Importantly, when compared to other renewable technologies, biomass as an energy-generation concept utilises a wide range of feedstock - from wood, municipal waste, industrial waste and agricultural residue to wood pellets and energy crops. Since biomass for energy includes a number of different materials, there is diversity in the properties of the raw materials used, hence there are various conversion technologies applied.

While other sources of biomass are gaining in popularity, wood and wood wastes are a prime biomass source at present, accounting for about 70 per cent of overall biomass utilised in the EU. Hence, the biomass industry has initially flourished in the countries with large domestic wood and paper industries like Finland and Sweden.

However, as urban and industrial waste disposal is increasing in scale and becomes more expensive due to increased landfill taxes and bans of certain waste streams from landfill sites, many waste management companies and investors are looking for the ways to turn landfills into gold mines.

At the same time, technology developers are working hard to offer new and more efficient ways to utilise the waste and convert it into something valuable. Biogas is one of the products, which could provide a source of renewable energy from organic waste materials for a small labour input.

Most of biomass is nowadays used for heat and power generation. At present, biomass co-firing (combustion) is the most cost effective use of biomass for power generation. The efficiency can reach up to 45 per cent. When used in CHP (combined heat and power) production plants the efficiency may increase to 85-90 per cent. Biomass integrated gasification is close to its full commercialisation and integrated gasification combined cycles are already in use in some countries. Anaerobic digestion is expanding and bio-refineries may lead to cost-competitive production of biofuels and

electricity. Co-firing could remain a dominant technology for several more years, however, gasification and other methods of biomass utilisation could expand significantly in the medium to long-term period.

Nevertheless, in the future, biomass is expected to be the key pillar of the renewable energy source in Europe, and will play a special role in fulfilling the 20 per cent target set for renewable energy by 2020. At present, the main drivers for biomass use in Europe are the reduction of carbon dioxide emission as well as the variety of existing biomass raw materials and different technologies, which enable the conversion of biomass to heat, fuel or electricity. Furthermore, the improved security of supply offered by biomass is an important factor that drives the market. As a result, it is important to evaluate biomass as a significant energy source in order to develop a better understanding of the comprehensive use of bioenergy in the European Union.

1.2. Biomass Energy Resource Potential in Poland

Poland is one of the EU's leading member countries in terms of potential for biomass energy. The biomass sector occupies a dominant position among other renewable energy sources and, unquestionably, is one of the state's most promising assets.

Poland is one of the top European countries with the largest biomass resources. There are noteworthy opportunities for biomass technology in the forestry, wood processing and agriculture sectors. Other sources of green energy in the country, like wind and geothermal energy, are also important, but together provide a few percent of the potential. Frost & Sullivan estimates that at present, almost 90 per cent of the renewable energy production in Poland is attributed to biomass¹. This amounts to over 211PJ per annum. Consequently, biomass, along with hydropower, emerges as a basic renewable energy source in the country and is not only beginning to play a crucial role in satisfying Poland's energy needs, but will persist to be a primary energy source over the medium and long term.

Current and future prospects for biomass in Poland are very optimistic, mainly because around 60 per cent of its land is devoted to agricultural production. Furthermore, forest area amounts to more than 28 per cent of the country, and is estimated to increase to 33 per cent by 2025.

At present, most of Poland's biomass is used for local and district heating, hence only a small per cent is allocated for power generation. The common fuel used is wood pieces, sawdust and wood shavings. Cogeneration (CHP) plants using organic waste from pulp and paper operations as well as straw and wood-fired (i.e. wooden pellets) heating plants are also in operation.

Nonetheless, there is increasing interest in electricity production from biomass. Its popularity is on the rise, and the utilisation of biomass in existing coal-fired power

¹ Frost & Sullivan's analysis reveals that biomass has the largest share of the renewable energy production in Poland and currently accounts for about 90 per cent. According to statistical data, biomass amounted to 91.2 per cent while hydropower amounted to 3.5 per cent of the total renewable energy produced in Poland in 2006.

stations is a solution to achieve the internationally agreed targets of the renewable energy sources share in power generation for Poland. To meet EU obligations, a considerable increase in capacity for small biomass boilers, wood-fired heating plants, wood-fired CHP and straw-fired heating plants has to be implemented.

Another green alternative that has been developing rapidly is biogas. Its current production accounts for a very small share in the total renewable energy production in Poland. Despite this, biogas production has already exhibited immense potential, especially as an electricity-generation fuel, and will grow in importance in the near future. As a result, energy production projects from the biogas generated from wastewater treatment plants, agricultural and livestock activities and landfills are being developed.

Importantly, the Polish authorities are strongly interested in developing biogas plants in the country. According to the government, by 2020 every borough in Poland should have, at least, one agricultural biogas plant producing electricity and heat. The power output of each unit should range from 0.7 to 3.0 MW - a total of 2 to 3 thousand MW. Raw material for the production of biogas energy plants should be various energy crops (mostly maize) and agricultural waste. Some experts believe that biomass could supply up to 30 per cent more energy than now, but for this purpose, many new biogas plants should be built - even these relatively small entities with lower output range.

Moreover, liquid biofuels appear to be the front-runner in the green energy race. Presently, first-generation biofuels are mainly used as biocomponents to vehicle fuels produced from crude oil. Bioethanol (a supplement to gasoline) and biodiesel (a supplement to diesel fuel) are the most frequently used biocomponents. These biofuels are usually derived from sugar, starch, vegetable oil or animal fats using conventional technology. At the present time, biofuels are contributing only a small share of around 3.4 per cent to the total primary production of renewable energy in Poland.

It is sometimes suggested that, given some of the risks associated with current biofuel technologies, the main attention should be given to develop and commercialise the second generation biofuels. It is certainly the case that new biofuel technologies are extremely promising. Second generation biofuels use non-food plant materials such as wheat straw, sugar cane bagasse, native grasses, plantation waste, wood and cotton trash as their feedstock. Also, second generation biofuels are expected to be more sustainable, deliver better GHG savings, and provide scope for a bio-refinery approach producing a wide range of industrial products from renewable sources. Internationally there is significant funding being put into these technologies, from basic research and development through to pilot and commercial scale plants.

With an attention placed on carbon savings and sustainability credentials, second generation biofuels are set to become an attractive investment proposition in Poland, as a few companies are interested in investing this new and promising segment. Despite the fact that extensive research is being conducted, it is expected that the second generation biofuels will not be available in significant commercial quantities for 5-10 years.

2. Liquid Biofuels Market - Overview

2.1 Liquid Biofuels in the European Context

According to a report from the Economic Research Services division of the US Department of Agriculture (USDA) global biofuel production tripled from 4.8 billion gallons in 2000 to 16.0 billion gallons in 2007, however, it still accounts for less than 3 per cent of the global transportation fuel supply. At present, the global biofuels market comprises 85 per cent bioethanol and 15 per cent biodiesel. The former is produced and consumed mainly in Brazil and North America, whereas the European Union is the world's largest producer of biodiesel, by far, and this fuel represents around three-fourths of the EU biofuels market. Total EU-27 biodiesel production in 2007 was more than 5.7 million metric tonnes - an increase of 16.8 per cent from 4.9 million tonnes in 2006. However, between various EU member states, there are significant differences in terms of production volume and the proportion of biodiesel and bioethanol usage. Presently, the large-scale production of biofuels is concentrated in a few countries. Germany, France, Spain, Italy and Sweden cover more than 80 per cent of the total biofuels production.

Biofuels are the subject of wide-ranging political and societal debate within the European Union, due to the two most important problems that Europe is currently facing. The two key issues are environment protection (principally from climate change) and energy independency and security. Consequently, biofuels appear as a reasonable answer to those problems.

Firstly, biofuels are the only direct, available on a large scale, substitute for oil in transportation. Most of the oil consumed in the European Union is mainly imported from politically unstable parts of the world (according to a recent analysis by Transport and Environment, for the first time, EU member countries are spending more than €1 billion on imported oil everyday, which is four times more than in 2003) and, certainly, biofuels can considerably decrease oil import dependency and make a crucial contribution to the EU's energy independence and security of supplies. Biofuels also have the potential to reduce greenhouse gas (carbon dioxide in particular) emission. As part of the Kyoto Agreement, the EU committed to reducing its carbon dioxide emission by 8 per cent between 2008 and 2012. The life cycle analysis (LCA) approach to the overall atmospheric carbon dioxide contribution of a fuel suggests that biodiesel produces much less carbon dioxide than mineral diesel. This has provided the main incentive in persuading individual governments and the European Commission as well to support the development of the biofuels market as an important contribution to meeting their overall emission targets.

As a result of the increased production and consumption of biofuels, the European Directive aims for biofuels to represent 5.75 per cent of all road transportation fuel consumption by 2010, which will probably induce further growth in the short term. Furthermore, in March 2007, European leaders committed to raising the share of biofuels in transport from the current level of around 2 per cent to 10 per cent by 2020. Therefore, the EU biofuels market is expected to witness strong growth and will present a number of opportunities over the medium to long term in the European member states.

Interestingly, of late, the European Union is likely to impose duties on US biodiesel imports. The argument is the result of complaints of European biodiesel producers. Many of them have been badly affected by the rapid expansion of shipments of cheaper US biofuel, which have benefited from substantial subsidies when blended with mineral diesel in the U.S. Resultantly, the European Commission launched an ‘anti-dumping’ investigation. Contrary, the U.S. biodiesel industry has accused European producers of double standards for protesting against subsidised fuel while importing it at the same time, and the US National Biodiesel Board has rejected all allegations in a letter to the EC underlying that the current EU’s biodiesel industry poorer output is based on overinvestment in capacity, inflated feedstock prices and the elimination of a tax incentive for biodiesel in Germany. In general, we have the beginnings of a conflict between two trade protectionisms, and as the EU will undoubtedly protect its companies, it will be very interesting to see how the landscape develops in the upcoming years.

2.2 Liquid Biofuels Market Size in Poland

Over the last few years, Poland has witnessed an increasing interest for biofuels production and utilisation. Importantly, the country has developed its own production and consumption structure as well as a tradition in using biofuels. While the production of biofuels is almost evenly split between bioethanol and biodiesel, consumption is very much in favour of bioethanol. In 2007, the consumption of bioethanol contributed the major share, of around 66 per cent, of the total biofuels consumption.

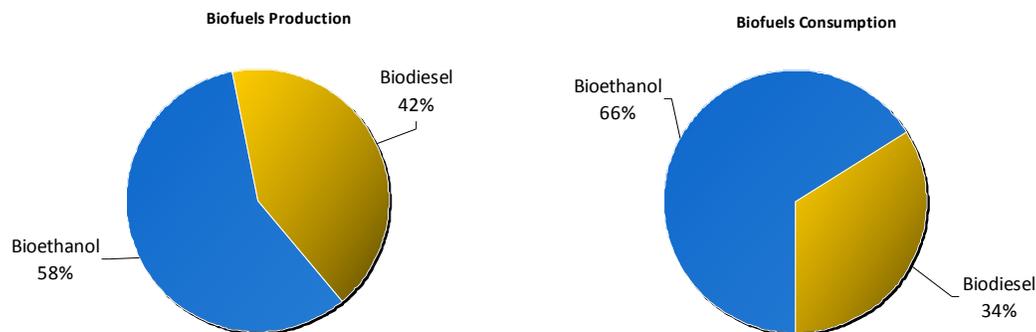


Figure 1: Structure of Biofuels Production and Consumption in 2007

Source: Frost & Sullivan

Poland has experienced a significant rise in biofuels production. Since 2005, production has increased by more than 1.5 times, and the bioethanol production increased the most significantly. In 2007, 229,225 tonnes of biofuels were produced in Poland, up by around 10 per cent from 2006. Growth rates of the production have presently slowed down because many Polish biofuel companies stopped production as a response to postponed subsidies by the government and cuts in tax incentives.

A large part of the Polish biofuels production was exported, particularly to Germany and biodiesel was the main component of the export. In 2007, 60 per cent of the biodiesel production was exported, while only 30 per cent of bioethanol was sold to neighbouring markets.

Poland has not only become a key exporter of biofuels, but has also experienced a considerable rise in domestic consumption. Since 2005, the country's consumption of biofuels has increased by more than two times. In 2007, there were 150,176 tonnes of biofuels in the market, representing a 20 per cent growth rate in comparison to 2006. The largest share of the consumption was attributed to bioethanol, as a large portion of biodiesel was sold in other markets. However, biodiesel consumption is still increasing in Poland, at impressive growth rates. It almost doubled in 2006 in comparison to 2005, and continues to show strong growth rates, surpassing the rates of total biofuel consumption.

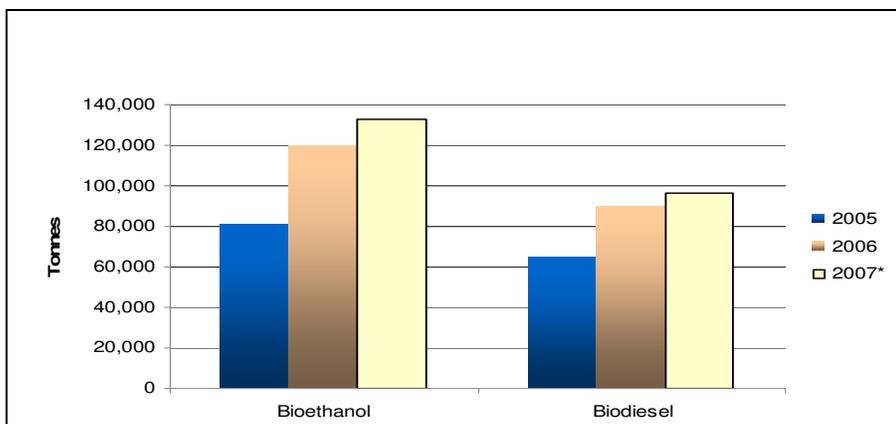


Figure 1: Bioethanol and Biodiesel Production Trends

Source: National Statistics and Frost & Sullivan Analysis, *Frost & Sullivan Estimate

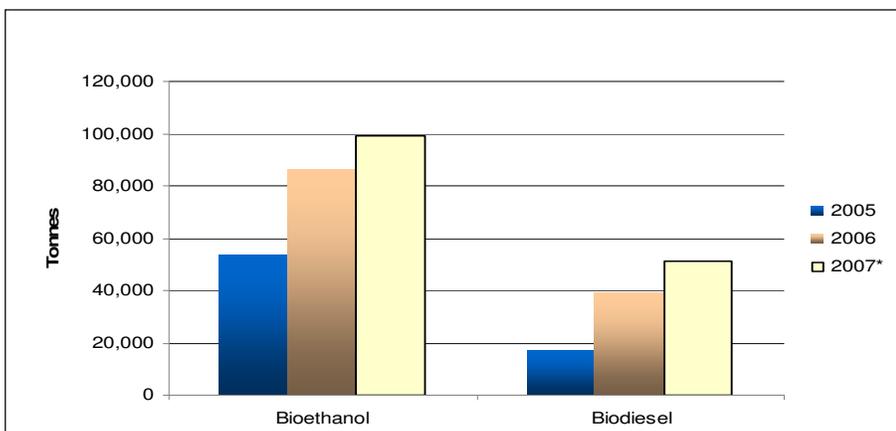


Figure 1: Bioethanol and Biodiesel Consumption Trends

Source: National Statistics and Frost & Sullivan Analysis, *Frost & Sullivan Estimate

With the emphasis on biofuels in the European Union, the Polish biofuels market looks to hold immense potential. Similar to other member states, Poland is obliged to reduce its greenhouse gases (GHG) emission, and gradually move its transport system to eco-friendly alternatives. This task is feasible, as the country has enough raw materials to produce biofuels. Moreover, biofuel usage in engines and boilers is both economical and safe. Biofuels also reduce the demand for conventional gasoline and fuel blends, hence making a crucial contribution to Poland's energy independence and security of supplies.

Frost & Sullivan expects that the Polish biofuels market will experience a tremendous growth in coming years. This will be driven by a new requirement - Polish fuel producers are obliged to add environment-friendly components to gasoline and diesel fuel. Biocomponents have to account for at least 3.45 per cent of each litre of gasoline or diesel fuel.

The Polish biofuels market is highly concentrated with only a few major participants that dominate the market. The most prominent companies include Akwawit-Brasco, Rafineria Trzebinia, Elstar Oils, Lotos Biopaliwa and Solvent Wistol. In addition, there are a few newcomers such as J&S, Petroestry and Biopal.

2.2.1. Bioethanol Market

Bioethanol is the most commonly used biofuel to substitute for gasoline and it can be combined with gasoline in various concentrations (up to pure ethanol - E100). The letter 'E' is used for fuels which contain ethanol. For instance, the term E85 is used to characterise a mixture of 85 per cent biofuel and 15 per cent gasoline.

The ethanol in Poland has traditionally gone to industries other than fuel however, such as drinks and solvents. There are around 100 small agricultural distilleries across the country, which manufacture for local companies. None of these plants will start manufacturing for the fuel market, as fuel ethanol plants use a different and cheaper process. With the right political and financial conditions, some of these plants could invest in plant capital and convert the process to produce fuel ethanol.

Bioethanol was introduced in the Polish petrol fuel sector in the mid 90s. and its production amounted to 132, 950 tonnes in 2007². Most of the existing distilleries are small facilities that produce an average raw alcohol volume of 1 million tons. Only a few of them produce 3 million litres of alcohol/year and decoction. The main raw material for the production of ethanol is rye (70-80 per cent), followed by molasses/sugar beet (10-20 per cent), potatoes (around 5 per cent) and other ingredients (3-4 per cent). According to various analyses, Poland will not face a problem with raw materials for the production of ethanol.

² Frost & Sullivan estimates

In recent times, there has been increasing interest in industrial distilleries producing 100,000 litres of spirit per day, which amounts to more than 30 million litres per year. There are around 20 such distilleries in Poland, and 10 others are under construction³.

Though, fuels are blended at low concentrations with biofuels, the Polish law permits the sale of only two types of high-blend biofuels at gasoline stations to individual customers: diesel with an additional 20 per cent of biocomponents (B20), and biodiesel that is entirely produced from biomass. Still, there are no types of ecological fuels for sale for vehicles with typical gasoline-biofuels engines. Resultantly, the Ministry of Economy has recently announced a draft regulation governing the new standards for high-blend petrol and the first biofuel to gasoline cars is expected to appear at stations in the near future. This particular biofuel will contain 70-85 per cent of bioethanol and 15-30 per cent gasoline. Unfortunately, the new fuel will be of use only to an insignificant number of cars in Poland, as so-called FFV cars (flexible fuel vehicles) represent an extremely small share of the total market. However, in the light of introduction and promotion of the dual-fuel vehicle the bioethanol market is forecast to witness a solid growth.

2.2.2. Biodiesel Market

The production of biodiesel fuel from rape started in Poland in 2004 in Refinery Trzebinia S.A., which is the first company in the country which has launched an industrial installation for production of top quality biodiesel. There are other plants under construction, with a total production capacity of 1,300,000 tons.

The Polish market has suffered due to the nearness of a more profitable German market, which has grown rapidly. The biodiesel produced in Poland has mainly been exported to the German market, due to the higher prices paid for the fuel, mainly as a result of the higher tax rebates available in the German market. Polish producers have been toll manufacturing for German companies, and as a result with the limited plant capacity available in Poland, there has been no fuel to supply to the domestic market.

With the German market in a state of overcapacity, and with the recent tax on biofuels, the Polish market is becoming attractive again. Moreover, Polish refineries are starting to use the biofuel produced at their own facilities to meet blending targets. As Germany has a biofuels mandate, it is also possible that Polish refineries are interested in blending biofuels to enable them to sell the fuel to the German market.

The main suppliers of biodiesel are Refinery Trzebinia, Elstar Oils and Lotos Biopaliwa. An upsurge from the current level will be noticed in the upcoming year.

³ Podlaski Sławomir, *Commercialisation of biofuels in Poland*, Warsaw Agricultural University, Warsaw, Poland

3. Drivers and Restraints in the Polish Liquid Biofuels Market

The Polish biofuels market is affected by a number of market drivers and restraints, as follows:

Market Drivers

- EU and national legislations
- Lower environmental pollution
- Large unexploited bioresources availability
- High mineral oil price
- Greater energy independence
- Use of large agriculture wastelands
- Use of existing infrastructure
- Creation of new jobs in rural regions

Market Restraints

- Biofuels cannot compete with fossil fuels without excise duty reduction
- Lack of consumer awareness limits growth rate
- Competition for land use - food or fuel debate
- Use of fertilisers and pesticides during biofuel lifecycle

3.1 Legal Drivers of Market Growth

Legal Regulations Regarding Biofuels in the EU

Legislation at a global and European level continues to be the main driver in the biofuels market. This has provided the main incentive to increase the EU energy policy targets for biofuels.

EU Incentives and Legislation⁴

- In 2003, the EU approved **Directive 2003/30/EC** for the promotion of the use of biofuels for transport. This directive advises member states to set indicative targets for a minimum proportion of biofuels to be placed in the market. These targets were set at 2 per cent in 2005 and 5.75 per cent in 2010.
- **Directive 2003/96/EC** has restructured the European framework for the taxation of energy products and electricity. Since biofuels are still more expensive than traditional fuels, this directive permits member countries to apply a total or partial exemption of taxation for biofuels.

⁴ EuropaBio, The European Association for Bioindustries, *Biofuels in Europe*, June 2007

- As a result of the high crude prices and the urgency of a new debate on the security of energy supply, the European Commission presented a **Biomass Action Plan** in December 2005, setting out measures to increase the development of biomass energy from wood, wastes and agricultural crops.
- In February 2006, the European Commission published **An EU Strategy for Biofuels**, preparing the ground for a review of the Biofuels Directive, which might include mandatory targets instead of the indicative ones set a few years ago. The aim of the strategy was to further support biofuels in the European Union, to prepare for the large-scale use of biofuels and to explore opportunities for developing countries to build biofuel plants.
- In January 2007, a biofuel progress report presented that, in 2005, biofuels amounted only to 1 per cent of the market, and that the EU will miss its 5.75 per cent target for 2010 by a wide margin. Only two countries (Sweden and Germany) reached the target of 2 per cent by 2005.
- In January 2007, the European Commission proposed its strategic **Energy Policy for Europe**. This proposal was approved by the Heads of Governments during the European Summit in March 2007. The strategic objective is to limit the increase in global average temperature:
 - by raising the share of renewable energy to 20 per cent by 2020
 - by reducing greenhouse gas emission by 20 per cent by 2020 (compared to 1990)
 - by improving energy efficiency by 20 per cent by 2020
 - by increasing the level of biofuels in transport fuel to 10 per cent by 2020
- In January 2008, the European Commission presented its review of the 2003 Biofuels Directive, as part of a broader directive on renewable energy. The directive confirms the 10 per cent target for 2020 and proposes sustainability criteria to prevent mass investments in cheaper but environmentally harmful biofuels.
- In September 2008, the European Parliament's Committee on Industry, Research and Energy backed a report drafted by Luxembourg Green MEP Claude Turmes, which, in general, confirms a binding 10 per cent target for biofuels in transport fuels by 2020, but shifts the focus away from the first generation biofuels. European Union lawmakers decided not only to support the Commission proposal of increasing the level of biofuels in transport fuel, but also to insist that at least 40 per cent of that renewable energy would be from more sustainable sources than traditional biofuels. This share would include hydrogen, electricity and the second generation biofuels. The committee of the European Parliament also decided to set an interim target of 5 per cent by 2015 for renewables in road transport fuel. The adopted report makes no changes to the individual targets set for member states by the Commission in its original proposal.

The REFUEL Project?⁵

The European REFUEL project has been created to develop a biofuels road map until 2030. The two-year project, started in January 2006, is commissioned by the EU in DG-TRENs Intelligent Energy Europe programme. This long-term road map for biofuels will recognise the least-cost biofuel chain options, calculate the benefits they have, outline the technological, legislative and other developments that should take place and assess different policy strategies for implementation.

Given the most recent rapid expansion in the biofuels sector, a focus on the optimal development route of biofuels has become highly relevant. Accordingly, the below-mentioned issues have been indicated for the REFUEL project to deal with:

- An ambitious, yet realistic, target share for biofuels in the fuel mix for European transport by 2030
- Proposing a least-cost biofuel mix to meet this target, also giving further specification of biofuel-related incentives and policies
- Measuring the impact of reaching the agreed target share for the main factors behind biofuels implementation - reducing greenhouse gases (GHG) emission, improving the security of supply and evaluating socioeconomic impacts (especially in agriculture)
- Engaging in discussion with key stakeholders, understanding their needs, the actions required from them, the barriers they will have to meet and the optimal timing of their actions
- Helping to identify the policies needed to accelerate stakeholders, suggesting incentives and reducing barriers

Legal Regulations Regarding Biofuels in Poland

Polish regulations regarding the biofuels market are, basically, a result of European legal incentives. In this regard, the government recently approved additional benefits for biofuels, under its new biofuel support program for 2008 to 2014. In addition to the excise tax benefits announced earlier, a new income tax break and promotional assistance for biofuel use have been included. This is the second time the government has extended support to the biofuel industry, after its earlier support, regrettably, failed to stimulate production and use. Furthermore, the government mandated biofuel use goals of 3.45 per cent of the total transportation fuel use by 2008, and 7.1 per cent by 2013. The new exemption will permit biofuel producers to deduct 19 per cent of the difference between the cost of producing biofuels and the cost of producing crude oil-based fuels from their income tax.

⁵ Report from REFUEL stakeholder workshop, Warsaw, 26 October 2007

In August 2006, the Polish Parliament adopted two crucial acts for the biofuels industry: the **Biocomponents and Liquid Biofuels Act** and the **Fuel Quality Monitoring and Control Act**. These acts ensured the complete transposition of Directive 2003/30/EC into the Polish law. Its most important provisions include the following:⁶

- Enabling farmers to produce liquid biofuels for their own use. In addition, the provision of security for excise duty will no longer be required in the case of pure vegetable oils and esters. The Fuel Quality Monitoring and Control Act mandates that the liquid biofuels produced by farmers, for their own use, meet only minimum quality requirements, crucial for environmental protection. The annual own use production quota is 100 litres per hectare of arable land owned by the farmer.

- The introduction as from 1 January 2008 of a requirement to ensure specified biocomponent participation in the transportation fuels. This requirement has been imposed on businesses producing liquid fuels or liquid biofuels and purchasing them intra-community, for subsequent sale or for their own use. Such businesses are defined as entities implementing the National Indicative Target.

- Polish fuel producers are obliged to add environment-friendly components to gasoline and diesel fuel. Biocomponents have to account for at least 3.45 per cent of each litre of gasoline or diesel fuel.

- The introduction of the concept of 'captive fleet' into Polish law, defined as a group of at least ten vehicles, agricultural tractors or off-road machines, or a group of locomotives or ships equipped with engines able to burn liquid biofuels, owned or used by individuals engaged in business, legal entities or organisations without a legal personality.

National Indicative Targets and their Achievement⁷

Before the enforcement of the Polish Biocomponents and Liquid Biofuels Act in January 2007, National Indicative Targets (on the basis of Directive 2003/30/EC on the promotion of the use of biofuels or other renewable fuels for transport) were implemented by the Polish Minister of Economic Affairs in consultation with interested Ministers.

The National Indicative Targets set in this manner (based on the energy content of transport fuels) were:

- 2005 - 0.50 per cent
- 2006 - 1.50 per cent
- 2007 - 2.30 per cent

⁶ Report to the European Commission for 2006 under Article 4(1) of Directive 2003/30/EC of the European Parliament and of the Council of 8 May 2008 on the promotion of the use of biofuels or other renewable fuels for transport, Poland June 2007

⁷ Multiannual Programme for the Promotion of Biofuels or other Renewable Fuels for 2008 - 2014

The Biocomponents and Liquid Biofuels Act changed the manner in which National Indicative Targets are set. Every three years, the Council of Ministers issues a regulation setting the National Indicative Target for the next six years, taking into account the availability of raw materials and production capacity, the potential of the fuel industry and the relevant EU regulations.

The regulation on the National Indicative Targets for 2008–2013, adopted by the Council of Ministers in June 2007, sets the following National Indicative Targets:

- 2008 - 3.45 per cent
- 2009 - 4.60 per cent
- 2010 - 5.75 per cent
- 2011 - 6.20 per cent
- 2012 - 6.65 per cent
- 2013 - 7.10 per cent

The aforementioned targets arise out of Poland’s obligations as a member of the European Union. Between 2008 and 2010, biocomponent usage have to increase from the target of 2.30 per cent set for 2007 to the target of 5.75 per cent set in Directive 2003/30/EC for 2010. Subsequently, between 2011 and 2013, National Indicative Targets will continue to increase, but at a slower rate.

The current rate of increases of National Indicative Targets during the period, and up to 2020, will make it possible to meet the internationally agreed targets for the next decade. This has been outlined in the Energy Policy for Europe, and further confirmed by the conclusions of the spring session of the European Council in March 2007, that the share of biocomponents in the transport fuels market in each member state have to reach a binding target of 10 per cent in 2020.

Table 1: National Indicative Targets on the Background of Directive 003/30/EC

Year	Utilization Rate
2007	2.30% / 3.50% (Directive 2003/30/EC target)
2008	3.45% / 4.25% (Directive 2003/30/EC target)
2009	4.60% / 5.00% (Directive 2003/30/EC target)
2010	5.75% / 5.75% (Directive 2003/30/EC target)
2011	6.20%
2012	6.65%
2013	7.10%

Source: The Regulation on National Indicative Targets for 2008–2013 and Directive 2003/30/EC

Regrettably, till date, the share of biofuels in the transport fuel market was much below the obligations of Directive 2003/30/EC. Furthermore, even Polish National Indicative Targets have never been achieved in full. However, for the first time, in 2008 and in subsequent years, National Indicative Targets might be fully achieved, regardless of underachievement in the past.

Although the goal for the current year (set at 3.45 per cent) is described as highly ambitious, there are certain conditions for its completion. The rules regarding the development of liquid biofuels are created in such a way that the development takes place mainly on the basis of the biocomponents produced within Poland. Presently, the country's total production capacity has the capability to meet the demand for biocomponents as a result of the National Indicative Target in 2008. Analyses present that the declared production capabilities would even exceed the demand throughout 2008.

The Key Elements of Biofuel Promotion in Poland

In order to achieve the specified targets, significant private investments are required. Nevertheless, the EU and the local government provide adequate financial support to make biofuel projects profitable.

The following is the summary of the financial support and promotion programs available in Poland⁸:

- Exempt from excise duty for ethanol added to petrol and for biodiesel added to diesel fuel
- Between 2007 and 2014, the deduction of 19 per cent of production costs for surplus biofuels over the cost of production of mineral fuel
- Support for energy crop (cereals, potatoes, sugar beet, rape) producers in the form of a subsidy of €45/hectare
- Financial support for the production of biofuels from EU and domestic funds
- Local government support in the form of using biofuels in public transportation
- Exempt from parking fees
- Encouraging the public sector to use biofuel-powered vehicles

3.2 Restraints

Biofuels Cannot Compete with Fossil Fuels without Tax Relief

The price of producing biodiesel is 1.5 to 3 times more than that of producing mineral diesel, depending on the feedstock used and the production process. Due to the high cost of raw materials, this price difference will not change significantly in the near future, meaning that biodiesel will still require a tax reduction in order to be competitively priced when compared to mineral diesel.

Lack of Consumer Awareness Limits Growth Rate

Despite rapid market growth in Poland, biofuels are still far from being called mainstream fuels, and customer awareness about them is still low. As end users are unaware of what biofuels are, and whether they are safe to use in their vehicles, the potential for sales is reduced to a great extent. However, these challenges are

⁸ Podlaski Sławomir, *Commercialisation of biofuels in Poland*, Warsaw Agricultural University, Warsaw, Poland

gradually being overcome, due to the better branding of blended fuels and because fuel producers are marketing their fuel more proactively.

Competition for Land Use - Food or Fuel Debate

A major restraint of biofuels often discussed is the diversion of the agricultural production away from food crops, and replacement of natural ecosystems such as forests, wetlands and pasture land with dedicated bio-energy crops. Recently, world food prices saw a dramatic increase and the trend is expected to continue. Consequently, biofuel demand might make food even more expensive. Subsidies and tariff-protection measures will drive farmers to divert land from food or feed production to the production of energy biomass, thereby increasing food prices.

5. Future Market Potential

Overall, the future potential of biomass in Poland will depend on a number of interrelated drivers, including the high price of crude oil, the availability of feedstock, supportive policies and a mature technology.

Nevertheless, this sector is the most promising renewable source of energy in Poland and should be considered as a strong investment candidate. The best opportunities for biomass have been recognised in forestry, wood processing and agriculture sectors. Definitely, with new biomass utilisation technologies nearing commercial deployment, growing concerns for waste utilisation, backed by domestic and European legislation and fuelled by remarkable natural environmental conditions, biomass is well-placed to continue expanding its share in Poland's energy mix.

The liquid biofuels sector itself presents great perspectives in Poland. This is mainly based on a special attention given to this sector from the EU and the national authorities with the new quotas and obligations set. New targets are expected to drive the domestic demand and increase attractiveness of the market. Therefore, Poland has a potential to not only further increase its exports of biofuels production, but also to expand its domestic consumption.

Frost & Sullivan believes that there is strong future investment potential in the whole sector and biomass is likely to experience a solid growth and will present an array of business opportunities, mainly due to the EU trying to meet its pre-set green policy goals.

About Frost & Sullivan

Frost & Sullivan, a global growth consulting company, has been partnering with clients to support the development of innovative strategies for more than 40 years. The company's industry expertise integrates growth consulting, growth partnership services and corporate management training to identify and develop opportunities. Frost & Sullivan serves an extensive clientele that includes Global 1000 companies, emerging companies and the investment community by providing comprehensive industry coverage that reflects a unique global perspective and combines ongoing analysis of markets, technologies, econometrics and demographics. For more information, visit <http://www.frost.com>

About PAiIZ

The Polish information and Foreign Investment Agency (PAiIZ) has been serving investors for 15 years. Its mission is to increase Foreign Direct Investment (FDI) by encouraging international companies to invest in Poland. It guides investors through all the necessary administrative and legal procedures along the way to setting up their business in Poland.

PAiIZ offers investors:

quick access to comprehensive information about the economic and legal environment, assistance in finding appropriate partners and investment locations and support at every phase of the investment process.

Another one of **PAiIZ's** roles is the creation of positive image of Poland and the promotion of Polish products and services abroad by organizing conferences, visits for foreign journalists and trade missions. **PAiIZ** also promotes Poland's regions. It has established a network of *Regional Investor Assistance Centres* throughout Poland. Their goal is to improve the quality of regional services for investors and to provide access to the most up-to-date information, such as the latest investment offers and regional microeconomic data. These specialized offices are staffed by **PAiIZ** trained employees and financed from local funds.

In order to help support and encourage FDI, the Polish government has passed many new resolutions this year. 90 billion Euro of EU funds has been allocated to Poland for the years 2007-2013. There has never been a better time to invest in Poland.

Come and see for yourselves. We are here to help you!

Contact us to learn more about how your company can profit from the unique business potential of Poland.

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