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## 4. Biodiesel in Argentina – a brief summary

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### 4.1. Introduction

Biofuels are in fashion, especially due to the efforts made by governments to diminish their dependence on fossil fuels and to achieve higher energy security. Several advantages of biofuels can be pointed out when compared to other energy sources. These include lower environmental contamination, sustainability, and opportunities for the growth of rural sectors and regional economies.

For a long time we have enjoyed low prices and high disposability of petrol, which has made us utilize it without much caution and with the expectation that it will never run out.

Now we realize that this behavior has led to a foreseeable shortage in energy substitutes. Currently there is a clear lack of these to amend the energy supply required, and allow us to sustain the aspired growth level.

According to a study of the United Nations Fund for the Food and Agriculture Organization (FAO) and the Economic Commission for Latin America and the Caribbean (CEPAL), the Latin-American countries with the highest potential to produce biofuels are Brazil, Argentina, Peru, Colombia, Bolivia, Paraguay and Uruguay. Apart from Peru, they all offer good conditions for the production of ethanol. Regarding biodiesel, Brazil, Argentina, Peru, Colombia and Peru have the highest capacity potential due to their soybean and oil palm plantations.

### 4.2. Domestic market of biofuels

The activity of crude oil refineries depends directly on domestic demands for fuel. Due to the evolution of the domestic economy and due to changes in demand for different fuels, combined with the increase of heavy stock transports as a result of more industrial and agricultural activity, diesel has had to be, and is still being, partially imported. On the other hand, by-products are sufficiently available, and in some cases they are even exported.

All Argentine distilleries are working at their maximum capacity. Hence, the production of diesel cannot be increased at the moment. Additionally, as oil basins are rather old, the extraction of petroleum with high fractions of diesel could decrease.

Regarding the consumption of fuels in Argentina in the 2nd half of the year 2006 and in the first half of 2007, diesel was the most consumed fuel, followed by gasoline, in which consumption dropped recently, because of the conversion of cars to the use of compressed natural gas (GNC).

#### Fuels Market Consumption (thousands m3)

Diesel Oil	66.7	0.31%
Fuel Oil	2,011.5	9.32%
Gas Oil	4,482.8	67.07%
Gasoline	5,032.5	23.31%

The consumption of diesel is basically concentrated within 6 Argentine provinces, which share 75% of the whole domestic consumption. Furthermore, only 3 of these provinces, Buenos Aires, Santa Fe and Córdoba, account for more than 60% of the total consumption. Geographically the consumption in these provinces is not in correspondence with the locations of major petrol basins in Argentina.

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On the other hand, the characteristics of diesel consumption are similar to those of petrol (gasoline). The provinces of Buenos Aires, Santa Fe, Córdoba and Entre Ríos together account for about half of the national consumption. As with diesel, gasoline production sites are located far away from where consumption is concentrated.

### 4.3. Biofuels

An established and growing type of biofuel is Ethanol. It may be combined with petrol and its proportion in petrol may vary. It can be extracted from sugarcane, from cereals like corn or sorghum, and from other biomasses.

Furthermore, biodiesel has attracted much attention in the last few years. Biodiesel is a liquid fuel which is completely renewable. It can be mixed in any proportion with diesel but it is also possible to combust it directly at 100% instead of diesel. The industrialization and commercialization of biodiesel is generating an entirely new market in Argentina. Technically, biodiesel is Fatty Acid Methyl Ester (FAME). It is obtained by mixing lipids (vegetable oils or animal greases) with alcohol (usually methanol), in the presence of a primary alkaline catalyst (sodium hydroxide). The generation of one liter of biodiesel requires one liter of oil and 0.1 liters of alcohol. This reaction is called transesterification. The result is 1 liter of biodiesel and 0.1 liters of glycerin.

### 4.4. Can biodiesel substitute diesel in the Argentine market?

To answer this question we are forced to rethink the possibilities by calculating the amount of oil required. Locally produced soybean oil will probably be the largest source.

It is estimated, that the volume of diesel consumed by 2010 will amount to about 14,8 million cubic meters. To replace this amount with pure B100 / biodiesel, a sum of 15,1 million cubic meters of oil would be required. Considering a soybean yield of 2,9 tons/ha in the year 2006/07 in Argentina, an area of over 30 million hectares under soybean production would be required. The last growing season had about 16,1 million hectares of arable land stocked with soybean. This supports estimations that biodiesel can become an important supplement of diesel. It will probably not be able to substitute diesel.

The case of only relative replaceability leads to the legal commitment of mixing to a compulsory proportion 95 % diesel to 5 % biodiesel. Under these circumstances only 9,35 % of the total land that was arable in Argentina in the year 2006/07, would be covered with corresponding oilseeds.

The reduction of imported fuels would create great benefits for the national job market and an attractive alternative market for agricultural products.

	B5
m3 Diesel	14.800.000
m3 biodiesel	740.000
m3 oil	755.000
% of oil in soybean	17%
soybean in tons	4.442.000
corteza tons/ha	2,95
necessary has	1.506.000
has 2004 / 2005	16.100.000
% in relation	9,35%

### 4.5. Opportunity for Argentina

Since 2005 diesel must contain more than 2% biofuels, according to the European Union. This fraction grew by 0,75% per annum from the year 2005 onwards and is supposed to meet a proposed level of 5,75% in 2010.

This regulation also poses quite important biodiesel export opportunities for Argentina, since there are several countries

in the EU which have serious deficits in their ability to supply their markets with biodiesel (Spain, Germany, Great Britain, Poland).

The legal obligation to mix diesel with a biodiesel share of 5% leads to a necessary biodiesel supply of 600.000 tons from 2010 onwards. This offers a unique opportunity to install sites which can obtain tax benefits and help to avoid the predicted problematic scenarios with fuel supply. A great economic attraction lies in the possibility of keeping the complete biodiesel production chain within Argentina.

#### 4.6. Law Nr. 26.093 to promote the production and use of biofuels

In April 2006 a law was made public, which promotes all production and use of biofuels. The primary objective of this law is, to encourage a sustainable development and production of biofuels, to bring about the integration of biofuels into our existing energy concept quickly, and to substitute fossil fuels by 5 % within 4 years. To put this law into effect, it is necessary to secure the required volume of biofuel. A fuel substitution of 5% within 3 years requires a rapid realization of production plants with an output of 600.000 tons of biodiesel for diesel and 200.000 tons of ethyl alcohol for petrol.

With the aim to secure this, it is very important that agricultural producers and dealers be arranged. To receive subsidies and other benefits of this new law, market participants must have influential voting rights within agricultural producer businesses.

To place oneself in this new market, PyME businesses must make sure they take early opportunities to secure a share. As it is a new industry, it will become evident to what extent the local economy will benefit and develop. A 20 % national share of the biofuel market is being reserved especially for undertakings which help to develop this economic sector.

The safeguarding of continuous biofuel supplies with sufficient logistics as required, naturally demands sites with capacity and efficiency in accordance with this.

- A ratio of 5% of biofuels is compulsively to be mixed with fossil fuels.
- The market will require at least 600.000 tons of biodiesel and 200.000 tons of bioethanol until the year 2010.
- The law offers tax advantages and other investment incentives to develop this economic sector.

To be able to claim a share of the national budget that allows for the implementation of the required subsidies and other benefits, specific justifying demands will have to be fulfilled for the public.

It is therefore to be considered, that the participation of agricultural producers is to remain in accordance with the constitutional guidelines throughout the public hierarchy.

After meeting primary requirements, in the future it will be necessary to secure fuel supply in order to meet the following targets:

a) Sufficient quality assurance is to be guaranteed through professional equipment. International quality standards are to be met.

cinematic viscosity	from 3,5 to 5 (cst) at 40°C
density	from 0,875 to 0,900 (gr/ml) at 15°C
flash point	minimum 100 °C.
cetane number	minimum 46 / 48
sulphur	maximum 10 ppm (mg/kg)
water and sediments	maximum 0,05% (g/100g)
acid	maximum 0,5 (mg KOH/g)
Glycerin free	maximum 0,02% (g/100g)
Glycerin total	maximum 0,24% (g/100g)
copper laminate corrosion	1 in 3 h at 50 °C
iodine index	maximum 135
Stability of oxidation	minimum 6 hours at 110 °C

b) Reasonable treatment of waste waters in correspondence with specifications that are to be determined in advance of the construction of the site.

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c) Sites are to be registered at the Ministry of Energy. They shall also comply with particulars for distilleries and fuel deposits according to Res 129/2001 Art. 3 – modified with the annex I of Res 419/1998 at the register of laboratory undertakings / biodiesel and involved mixtures

This law creates advantages for investments and taxation for the following cases:

**Investments:**

accelerated VAT (IVA) reimbursements  
accelerated amortization  
proposed exceptions from minimum wage regulations for 3 years

**Taxation:**

tax exemption from ICLG for gasoline and diesel  
tax exemption from petroleum tax / diesel tax  
tax exemption from "hydric tax" for gasoline

The transfer value of biofuels will be defined by a responsible governmental institution to guarantee functionality and profitability.

To achieve reasonable yields, modern technology as well as efficient business processes will be necessary.

## 4.7. Market Potential

- Export Market: Specific governmental preconditions are not required and the market is international. Big corporations are often the owners of plants which have large annual outputs of around 200.000 to 300.000 tons. Such companies are often well financed, internationally orientated, and secure large production capacities.

- Self sufficiency: Agricultural producers are able to become self sufficient producers and users of their own fuel products. This consumption is exempt from taxation. In this case the sale of the product is prohibited.

- There is a lot of technology that enables small agricultural producers to make use of this product in diverse ways.

Market with enhancing advantages: Specific public conditions are necessary. If the quality of the product is ensured, the product is sure to be marketable. This market is not restricted to a certain level of output, but is instead determined by a necessary minimum demand perspective. Much legally fixed support is granted by the state. There is a goal to achieve a ratio of 5 % within fossil fuels by the year 2010.

It is greatly desired officially, that the production remains in the hands of small and medium sized agricultural enterprises.

Law 26.093 sets a foundation for the development of a new, decentralized and expanding energy market supply throughout the nation. Also, new technology and a new financial market is being generated. The public subsidizing program of law 26.093 ensures the sale of 100% of the approved products, as well as their price.