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# 1. Introduction

The market for biofuels has flourished in the past few years as a consequence of the development of renewable energy policies in the European Union and the United States of America.

Argentina is able to become one of the major producers of biofuels worldwide. The biodiesel market especially, promises to bring about investments of up to one billion dollars in this economic sector until the year 2010. Amongst the advantages is a very qualified labor force, and significant agricultural production with a vast capacity to produce oilseeds.

To support foreign investors and corresponding foreign import businesses the German-Argentinian Chamber of Industry and Commerce offers this publication, "Argentina: Key player in the biofuels market".

The intention is to assist this branch of trade, with specialized publications concerning its organisms, institutions, technologies and businesses.

Every one of the following articles conveys an author's vision of the future of this agro-industry in Argentina and highlights his individual specialization and focus.

We thank all participants, including those organizations, institutions, and businesses that enabled the realization of this project and hope that this publication will help investors in Argentina to become one of the key players in the biofuels market as well.

Ludwig Daniel Angeli

Vice-president of the German-Argentinian Chamber of Industry and Commerce  
President of BASF Argentina

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## 2. The development of biofuels in the current context of the Argentine economy

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### 2.1. Introduction

Since the National Investment Development Agency, Prosper.Ar, was founded in October 2006, we have noted a marked interest on the part of both local and foreign investors to explore new opportunities for business and new activities here. In fact, most of the questions from businessmen which we have been answering up until now, – as well as meetings held with investors, – have tended to focus on the scope of investment opportunities offered by different sectors. However these are no longer limited to our traditional productive areas, but include a range of different and innovative activities, some involving skilled labor, others intensive technology, and others the development of know-how.

Sectors as broad and diverse as software, bio-technology, information services, the production of content for TV programs, outsourcing for different services, biofuels and real estate development, to name but a few, have attracted the interest of both local and foreign investors. Such areas have also been the subject of analysis and assessment by our Agency. These innovative sectors are the new actors on the international economic scene and share a very positive spillover, compared with other sectors and activities. Furthermore, although they are still marginal in macroeconomic terms, these activities are a clear indication that we have both the capacity and drive required to move projects forward into new terrain, with greater productive diversification within a structure which creates greater added value.

It is no coincidence that these new projects have come to the fore over the last five years. They are the result of a national economic context which prioritizes productive and innovative activities, ensures that these are profitable, and provides a foreseeable and sustainable macroeconomic framework. There is a dynamic pulse behind demand, five straight years of vigorous growth, solid fundamentals (trade and fiscal balance as well as the prudent accumulation of reserves), a well managed floating exchange regime, strong growth in employment, and a reduction in poverty levels.

This unique economic scenario both underscores and revalues the structural potential of this country: a highly qualified population with one of the highest levels of education in Latin America, being very similar to that of developed countries; a great capacity for creativity, innovation and an entrepreneurial spirit, a vast reserve of natural resources, which has fostered the development of some of the most competitive primary and agricultural activities in the world; a broad technological infrastructure in continual expansion; and a highly diversified productive network which boasts the historic presence of the leading international corporations in the country, working alongside a flexible and competitive SME sector.

This is the framework in which local and foreign businessmen have been taking decisions to expand their capacity, launch new products, and introduce new activities. As a result, the levels of investment have shown a dynamic rate of development, contributing to the process of sustained growth. Internal investment rates in terms of GDP have reached a peak unequalled by any other over the last period of at least 25 years, and are expected to reach 23% of GDP by the end of this year. Foreign Direct Investment (FDI) figures are now in their third year of continuous growth, principally aimed at the productive sector and the expansion of capacity (unlike the mergers and acquisitions activity which characterized FDI during the 1990s). Actually, current FDI values have already surpassed the annual average recorded in the '90s, net of privatizations.

To summarize, the emergence and consolidation of these "new" sectors in Argentina is the direct consequence of a national context which is particularly favorable for the development of investment: one which emphasizes the range of skills and competitive resources on offer in this country. These developments have been taking place in a highly propitious international economic context, at least until mid-2007.

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## 2.2. Why biofuels in Argentina?

Biofuels are an alternative energy source<sup>1</sup> to non-renewable fuels and contribute towards the diversification of the current energy matrix, which is basically made up of fossil fuels.

This phenomenon, which may be observed in most countries, including Argentina, has acquired momentum over the last few years as a consequence of different factors, which range from economic and environmental reasons to social and geo-political ones.

In fact, on one hand, the world economy's own drive to produce goods and services creates ever-growing needs for the generation and distribution of energy. This in turn means improving the efficiency of pre-existing systems and finding new sources of renewable alternative energy, which contribute towards reducing the emissions of pollutant gases.

On the other hand, the world is also experiencing a certain degree of scarcity with regard to fossil fuels. The production of these is regulated by the producers themselves, many of which are to be found in zones of conflict (basically the Middle East) or politically distanced from the larger powers (such as Venezuela, for instance). This has created problems in terms of supply, and in recent years given rise to a scenario of growing international demand, pushing the prices of these fuels to maximum historic levels. As a consequence of the confluence of these different issues, geo-political interest in diversifying the global energy matrix has intensified, with increasing value being placed on the development and consolidation of alternative sources.

Biofuels thus represent a clear opportunity for doing business in Argentina, to supply both domestic and world markets. It should be noted that this interest in biofuels at a global level has consolidated itself into a concrete, foreseeable demand of significant magnitude, which is not confined to developing countries, and which is expected to grow over time. This demand is the result of the commitments that a large number of countries have imposed on themselves over the last few years with the adoption of different laws and/or regulations which foresee a gradual and increasing obligatory assimilation of biofuels (bio-diesel or bioethanol)— in differing proportions— as opposed to fossil fuels.

These regulations represent a captive demand and thus both diminish the uncertainty and increase the profitability of investment projects, independently of the price of oil or gas (or even the value of biofuels themselves). It should be pointed out here that there are few activities in the world for which demand is actually guaranteed by law, decree or any other kind of regulatory measure. This stresses the strategic nature of the generation of biofuels in the current international context.

### Regulations Established in Certain Selected Countries or Regions

Country /Region	Measures
European Union	Establishes graded blend ratios for fuels used for transport purposes: 2% for 2005, 2.75% for 2006, 3.5 for 2007, 4.25% for 2008, 5% for 2009, and 5.75% for 2010, with the aim of raising ratios to 20% by 2020. It is worth noting that transport represents approximately 60% of total fuel consumption.
Brazil	Establishes blend levels of biodiesel: 2% authorized in the 2005-07 period, an obligatory 2% for the 2008-2012 period and an obligatory 5% as from 2013.
U.S.A.	Establishes a consumption target of 28.4 billion liters of biofuels by 2012.
Japan	Establishes an authorized blend ratio of 3% with the goal of reaching 20% by 2030.
Canada	Establishes a blend ratio until 2010 of 10% bioethanol for 45% of the gasoline commercialized at domestic level and 2% for biodiesel as from 2012.

Source: ProsperAr using Worldwatch Institute data, 2006.

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<sup>1</sup> Although biofuels are an alternative energy source, in practice they are –in the best case scenario– an option which lends itself to complementing the majority supply of fossil fuels.

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Argentina offers favorable conditions for the development of biofuels, as it is one of the potential world leaders in terms of both its production and supply. Our country is characterized by vast expanses of land surface apt for agricultural production (some 30 million hectares of cultivated land), and an abundance of high-quality natural resources.

This gives us a number of comparative advantages regarding the production of diversified crops used as raw material for biofuels (basically soy, sunflowers and corn), and the development of other potential alternatives (such as seaweed, wood residue and other crops). We also have highly-qualified resources and professionals specialized in engineering and biotechnology.

Argentina also offers a high market potential for biofuels, as long as a sizeable part of the consumption of fuel for transport purposes is associated with diesel (which can be replaced by biodiesel).

As a result of the combination of its natural wealth and human resources, Argentina has experienced an agricultural revolution over the last 10 years, increasing to a maximum the productivity levels of its main crops. This in turn has allowed us to reach record levels of agricultural production year after year. Today, Argentina is among those countries with the highest figures of productivity in soy, corn, and their derivatives, and is one of the leading world exporters of soy, sunflower, and peanut oil.

From a regional perspective, the development of biofuels positions the Mercosur as a strategic region in the world. Argentina's potential range on offer complements that of Brazil, the leading producer of sugar cane-based bioethanol and one of the countries which has pioneered the development of biofuels. This broad-based offer of resources spread across the region, the complementary capacities existing between countries and, above all, the common interests surrounding this issue, foster favorable conditions for a move in the direction of an aligned and coordinated development of biofuels on a Mercosur scale.

## 2.3. A strategic sector for investment and growth

The public sector has recognized that Argentina possesses many opportunities for the development of biofuels and has provided a regulatory framework to specifically promote this activity. It is worth noting that in Argentina very few production sectors have their own promotional framework<sup>2</sup>. Thus, the national law for the promotion of biofuels should be interpreted as a clear sign of the importance the government is giving to this sector, regardless of how much room for improvement there is within the given framework.

By sanctioning this law, Argentina has joined a group of pioneering countries that are advancing towards a greater institutionalization of the sector, thereby both stimulating domestic production, on one hand<sup>3</sup> and creating an internal market. on the other. From 2010 onwards, it will be obligatory to add 5% of biodiesel to diesel fuels, and the same amount of bioethanol to gasoline; this will, in turn, contribute to reducing pollution levels in the environment. Hence, this law will contribute considerably to promoting investment, production and consumption.

Accordingly, investments of different sizes in the sector are already being carried out in Argentina, and a great many projects are in the offing. Current estimates of investments reach 2.2 million dollars. The largest projects have been undertaken mainly by vegetable oil producing companies, the oil company Repsol YPF, and other companies producing foodstuffs.

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<sup>2</sup> Other sectors with specific regulatory frameworks are: biotechnology, with the sanction of the recent law no. 26.270, software, mining and the forestry industry.

<sup>3</sup> Tax incentives worth noting include: upfront VAT refunds, a fast-track write-off of income tax when acquiring capital assets and infrastructure, exemption from assumed minimum income taxation for the first three years.

Plants under construction and prospective plants	Annual production capacity in tons	Location
AGD/Bunge	200,000	Santa Fe
Vicentin/Glencore	300,000	Santa Fe
Dreyfus	300,000	Santa Fe
Molinos	100,000	Santa Fe
Eurtekian	300,000	Buenos Aires Et Sgo del Estero
Terminal Pto. Rosario	200,000	Santa Fe
Repsol YPF	100,000	Prospective, Santa Fe
Cargill	200,000	Process to be approved, Santa Fe
Grupo San José	100,000	Prospective, San Luis or Salta
FT Holdings	100,000	Prospective.
Capital Group Comm.	100,000	Prospective, Buenos Aires
Bunge	100,000	Prospective
Citrusvil	60,000	Prospective, Santiago del Estero
Cil Global	100,000	Prospective, Corrientes
Total production capacity	2,200,000	

Source: Prosper.Ar, based on data provided by the Agricultural Secretariat, the Chambers of Commerce, and other specialized Media.

## 2.4. And finally...

Argentina is facing a great opportunity to move forward in the development of a project that promises to be highly lucrative. Producing biofuels will allow for an efficient and revalued use of our natural and human resources, as well as other critical capacities.

At Prosper.Ar, the National Investment Development Agency, our aim is to contribute towards positioning biofuels as a strategic sector for investment in Argentina, working as a team and in a coordinated manner with the private sector and public agencies involved in the area.

We have taken the first steps by approaching Chambers of Commerce and business associations in the sector, and establishing cooperation channels with the Secretariat of Agriculture, Cattle-raising, Fishing and Foodstuffs, the Secretariat of Energy and the Export.Ar Foundation, with the aim of working together. The close relationships we have started to build up with these different sectors are key to our main task of supplying information, and answering the queries we receive on a daily basis.

Likewise, we have started working on coordinating efforts that, when it comes to the promotion of biofuels, are already occurring in different provinces throughout the country, by means of the joint teamwork that we have been carrying out within the framework of the Federal Network to Promote Investors.

We have also been promoting biofuels as an attractive sector for investment on our missions abroad, and supplying detailed and up-to-date information to potential Argentine and foreign investors upon request.

And this is just the beginning. We know that there is a lot to do and many challenges to face: we must continue to consolidate the institutionality we have achieved, by analyzing the real potential of the regulatory framework provided, and evaluating possible amendments where necessary. We must also work to empower the public/private sector alliance and foster connections between business, universities and the scientific and technological community; we must find the means to facilitate financing, by coordinating action with multilateral credit agencies, the capitals market and the financial system; we must aim to achieve a relatively balanced participation of small, medium and large-sized enterprises when developing the sector; and finally, we must intensify international and regional cooperation, to make these new projects happen.

In Argentina, our approach to this process highlights biofuels as the strategic sector in our agenda of sustainable economic and environmental development. Hence, promoting the production and use of biofuels that will contribute to environmental sustainability, is not only an ecological necessity, but also a social and economic one to which we must all contribute.

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## 3. Biofuels: a new chapter in the promotion of Argentine exports

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### 3.1. Introduction

The global energy paradigm is immense and in a process of change, mainly as a result of economic, geopolitical and environmental factors. From an economic standpoint, our generation has witnessed the relentless increase in fossil fuel prices. From a geopolitical standpoint, access to oil has become more complex as a consequence of growing instability in extraction areas. And in terms of the environment, oil and coal burning (80% of the world's energy matrix) is one of the main reasons for global warming, due to the emission of greenhouse gases.

Though potentially a substitute for fossil fuels, biofuels are nothing but a complement so far. And although experts claim that with the projected production only 5% of the global energy demand can be met, these fuels are a technologically viable and economically feasible option. One of the most positive aspects of biofuel development is that existing engines or distribution mechanisms do not require major changes to use them, and therefore they will not replace the oil industry but rather complement it. Ultimately, they are an important element in the world's trend towards reducing the use of oil.

In the current scenario Argentina faces one of the most significant opportunities of its recent history. Our country has the full potential to become a key player in international fuel supply: With one of the world's most developed edible oil industries and a thriving agribusiness sector, it can become the "gas station" of the future.

### 3.2. The global scenario: present and future trends

Undoubtedly, the starting point is that today the world depends on oil as a source of energy. With the current consumption levels, this non-renewable resource is expected to last a maximum of five decades. Thus, the search for substitutes is essential. Meanwhile, for economic<sup>1</sup> and environmental<sup>2</sup> reasons, steps are being taken towards the establishment of renewable fuels, although at present, such initiatives are in their infancy.

A large portion of oil reserves are located in areas of growing instability and conflict, and over 80% of the barrels consumed today come from wells that went into production in the seventies. In addition, beyond the economic impact of the above situation, fossil fuel combustion is one of the main causes of global warming. These circumstances combined have put energy production on a path of no return and a new scenario is drawing near.

Biofuels are a growing business. The role of the U.S. and the European Union as consumers of both bioethanol and biodiesel is paramount: the U.S. consumes approximately 43% of the gasoline and 21% of the diesel production worldwide, whereas the European Union uses 14% of the gasoline and 26% of the global diesel production. Other major fuel buyers in the international arena are Japan, China and India.

The United States has embarked on the production of biofuels under the framework of what is known as the "Twenty in ten" plan, intended to reduce oil consumption by 20 percent in 10 years. Given the huge potential in the US for corn production – the raw material from which bioethanol is produced – it may virtually supply itself of this fuel, since it is also the first producer. Nevertheless, in the medium term its enormous automotive industry, fueled by gasoline, will require imports in order to secure supply.

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<sup>1</sup> Its progressive shortage causes its price increase: ten years ago a barrel of oil cost US\$10; at present it costs US\$80 approximately.

<sup>2</sup> Environmental degradation requires a new energy matrix from mankind.

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In turn, the European Union has set equally ambitious goals: 10% biofuel mix by the year 2010 and 20% renewable energy by 2020. Unlike the U.S., the European automotive industry is mostly diesel fueled, and although EU production is considerable, in the medium term it will prove insufficient to meet the demand required to comply with the above objectives.

In Asia the situation is quite different, given its dependence on the external supply of biofuels. China and India are large ethanol producers. However, for food security reasons, the use of renewable energies will depend on imports. In countries such as Japan and Korea, where natural resources are limited, supply will mostly originate abroad. The great exception is South-East Asia, where countries like Indonesia and Malaysia are major producers of palm oil and have a huge potential to produce biodiesel.

This change of paradigm indicates that the agricultural industry is not producing enough, that there is an unmet demand, despite the fact that for many years it was thought that there was an abundance and surplus in developed countries. However, projections for the year 2020 indicate that countries producing vegetable-based fuels will be in a position to multiply their current volume at least by four, which shows that the model is sustainable.

### 3.3. Argentina's international insertion and market access

Argentina is the largest international exporter of vegetable oils and fats; its edible oil industry is amongst the world's most efficient and sophisticated. After the U.S., our country is the largest corn producer-exporter and is among the top three nations in terms of soy harvest and export. Moreover, due to the feasibility and the need to grow alternative energy crops in order to diversify production, castor, jatropha, spurge weed, rape seed (most of them excellent for rotation) and other crops, are being tested.

Over the past few months Argentina has made significant progress towards creating a proper environment for businesses involved in the biofuels value chain: the national government has enacted act N° 26.093, which provides the legal framework (also implemented by most provinces) –; a futures market has been created for vegetable oils; producing facilities have begun exporting their biofuels; and specific budget allocations have been made for research and development, amongst them, the "bio-jet" project, which is aimed at the use of biofuels in the aviation industry<sup>3</sup>.

Biofuels are important for the Argentine economy, and in particular, for foreign trade. Whether it is because they are based on raw materials that the country exports, because they can become industrialized products for export, or because they are fully globalizable goods, Argentine foreign trade can experience a quality leap with this new product. In terms of positioning, Argentina has sent a clear signal of the role it wants to play in the international renewable fuels trade: to move forward towards value added production. A clear example of this is the tax policy: whereas vegetable oils are taxed with 24% and corn with 20%, biofuel export duties amount to 5%, with 2.5% drawbacks for biodiesel and 4% drawbacks for bioethanol.

Unlike other biofuel-producing countries, Argentina has the necessary resources to position itself as a safe and reliable supplier. Whereas current producers will be affected, in the medium term, by the need to increase their production, Argentina has not only the highest food production rate per capital of the world (not jeopardizing national food security), but also one of the largest margins of arable land available. According to private estimates, the domestic demand for biofuels can be met with only 9% of the vegetable oil production and 2% of the corn harvest. This means that, if we manage to integrate the agricultural-industrial-commercial processes, we will be engaged in an essentially international activity.

Regarding integration into the world economy, for Argentina MERCOSUR is the stepping stone for international trade relations. Consequently, Argentina's potential for the production of biofuels is maximized, because its main partners (Brazil, Uruguay and Paraguay<sup>4</sup>) are highly competitive in the agribusiness value chain. A strategic partnership with Brazil allows us to imagine the new ABC: Argentina + Brazil = Fuels (Combustibles, in Spanish) for the Future.

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<sup>3</sup> Only two countries have had successful flights using these fuels, Argentina being one of them.

<sup>4</sup> Venezuela is in the process of acceding to the regional market; its accession has not been ratified by all member countries yet.



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In recent years, MERCOSUR has engaged in negotiations to generate strategic economic partnerships with its main trade partners, especially the European Union, which, as already mentioned, needs to meet ambitious goals regarding fuel restrictions. MERCOSUR in general, and Argentina in particular, can become the EU's strategic allies in achieving its goal, even more so given that the European and Argentine automotive markets are mainly diesel-fueled, thereby providing room for cooperation.

All circumstances indicate that Argentina has been called upon to play a major role in the global biofuels trade: its location in the hemisphere to which all eyes turn in search of new energy, its partnership with Brazil, one of the powers in this sector, the advantage of having Europe as a client with tremendous potential, and its ability to supply other markets, such as North America or Southern Asia. Should we use a photograph to illustrate the great axes of biofuels trade flows worldwide, we would see a great vertical axis of bioethanol between the United States and Brazil and another oblique axis between the European Union and Argentina. Is this a scenario of dichotomies? The answer is an unequivocal no. It is a scenario of diverse markets, complementary productions, and potential alliances to face a new challenging demand that is difficult to meet.

Regarding market access, it is possible to identify a global trend among developing countries: most of them have high import duties, as shown by specific and ad valorem tariffs. In the case of the U.S., import duties on bioethanol amount to US\$ 0.51 per gallon; in the EU, the import tariff for biodiesel is 6.5%.

This situation cannot continue for much longer, and a trend towards these markets opening is expected in the near future, due to the fact that these countries will have to rely on imports as long as the market demands a growing amount of renewable fuels. In addition, since the rules of the game of the international biofuels market are still in the making, each nation's capacity will be a variable to consider for all players involved. Advances will be required in terms of technical regulations and certifications, and Argentina is in a position to successfully provide them.

The World Trade Organization (WTO) classifies tradable goods in agricultural and non-agricultural products. Bioethanol and biodiesel are included in different categories: the former belongs to agricultural goods; the latter, to the non-agricultural market access, or NAMA, in the multilateral organization's terminology. This means, pursuant to the WTO's Agreement on Subsidies and Countervailing Measures, that since biodiesel is a non agricultural good, any direct subsidy on its production is illegal. This grants Argentina substantial comparative advantages in terms of enhancing its competitiveness, such as access to quality raw materials and low costs in the production chain. As the leader in food production, our country is in a position to become a significant player in the international biofuels trade, an advantage that is even greater if we consider that, at least until the end of 2008, it will enjoy the benefit of zero tariff rates in the framework of the Generalized System of Preferences (GSP).

### **3.4. The role of Fundación Export-Ar in the promotion of biofuels**

Fundación Export.Ar has become a fundamental tool for the promotion abroad of strategic sectors with the potential for penetration, by expanding the relationships of over 5,000 national companies with which it cooperates in three stages: the definition of the trade context, the adaptation of companies to that context, and the application of intelligent penetration strategies in the chosen markets.

With the intention of consolidating as a leading agency in trade promotion, its work methodology is constantly aimed towards going beyond export promotion, in order to accomplish what is known as an "extended product". This includes working on the creation of commercial brands, international communication, partnerships with stakeholders, stable relationships with clients and partners in the value chain, and the development of direct distribution channels. In short, it aims towards differentiation in the broadest sense.

Every step taken by Fundación Export.Ar is driven by this philosophy and vision. In line with the growth in Argentine exports (which have doubled in the past five years and are expected to reach US\$ 52.0 billion in 2007), Fundación Export.Ar trade promotion activities have grown in both quality and diversity.

Over 25,000 yearly queries answered with trade information especially prepared for businesses; over a hundred trade promotion activities around the world every year (such as delegations from numerous corporations in more than 50 trade fairs worldwide and the insertion of Argentine products and companies in the most relevant global marketing

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chains); several dozen foreign companies regularly invited to our country to take part in business round tables in order to build strategic supply relations; technical assistance provided in workshops, seminars, working meetings and gatherings attended by about 10,000 entrepreneurs from across the country every year; and programs for the promotion of specific sectors that develop strategic insertion plans in various markets for over twenty sectors of our economy, are all examples of the way we do our job.

Every action and program Fundación Export.Ar has enforced, aims at a modern corporate or industry internationalization. The increasing new forms of access to international markets present a series of choices, new mixed approaches that facilitate a dynamic and flexible display of competitive abilities in changing environments. And they demand, in addition, internationalization, and an ever growing integration into a network of inter-corporate agreements that exists beyond national borders, to enable them to include new cooperation methods in the direct international projection pathways.

In its capacity as an export promotion agency and the foreign trade promotion agency of the Ministry of Foreign Affairs, International Trade and Worship, Fundación Export.Ar perceives the national biofuels production as an important axis in the advancement of the country's exports. Therefore, Fundación Export.Ar promotes this area in the international market through several tools for Argentine companies. The task has thus begun, because when there is an opportunity, there is an answer to provide.



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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

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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.

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## 5. Conflicting demands resulting from bioenergy, ecological sustainability, energy, and food security

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Dwindling fossil energy sources and high international oil and gas prices are turning the increasing employment of renewable energy sources even more attractive. This is not only a matter of simple restructuring and substitution processes in favor of renewable raw materials as this seems to be opportune in economic terms and because of finite fossil energy sources. It concerns also the struggle against the climate change, in particular the worldwide reduction of greenhouse gas emissions and its consequences for the ecological balance on Earth. If and to what extent the growing of energy plants or other kinds of renewable raw materials will prove to be earnestly sustainable, is to be examined case by case in the context of other ecological, social and economic factors.

It should be clear at this point that not each bioenergetic product is automatically to be regarded as sustainable or ecologically positive, only because it has been branded as "bio". If for example a soybean grower in Latin America or elsewhere farms land, which has recently been stripped of its natural forest cover to be converted into arable land, in order to obtain biofuel from soybean oil, then you really have to ask if this is ecologically sustainable. Ecological sustainability is not only defined by simply balancing the capturing and releasing of CO<sub>2</sub>. Being complex environments for flora and fauna, water reservoirs and oxygen providers, natural forests fulfill numerous functions. A more nature-orientated exploitation, such as extensive cattle grazing, selective harvesting, beekeeping, etc. would ensure a sustainable forest management and besides that, forests can be used – at least partially – as leisure and recreation areas. This way, various social and economic factors of sustainability would be considered.

Against this background bioenergy production finds itself in a conflict area involving global energy and food security and the need to observe sustainable development, as it was set in the so called Rio Declaration of 1992 as politically binding aim of the United Nations. Important principles, as the struggle against the climate change, reduction of biological diversity, expansion of deserts and destruction of forests have been agreed at that time.

As the global environmental situation has rather worsened since 1992, the civil society increasingly calls for peremptory action against:

- air- and water pollution,
- the extinction of endangered animal- and plant species,
- the logging of natural forests,

in order to maintain the natural resources of the world for coming generations.

Regarding possible consequences of bioenergy production, the Food and Agriculture Organization of the United Nations (FAO) refers to the following set of problems in its current report (2007, page 36):

*„Bioenergy Development in G8 + 5 Countries (2007; S. 36)*

*Bioenergy can provide dramatic environmental gains but also has the potential to cause great harm if not produced in an appropriate way. ... One of the greatest threats posed by expanding cultivation is the conversion of natural ecosystems. Increased pressure on forests is also a key concern. Clearing forest areas for agricultural purposes causes the obliteration of species and their natural habitats, and leads to the irreversible loss of species, ecosystem functions and services. It also has a dramatic GHG impact. Wide-scale destructions of wildlands can additionally affect the hydrologic cycle and impact the climate by reducing regional rainfall and increasing local temperatures."*

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Due to various development trends and determinant factors there is in fact reason for concern that the extension of bioenergy production will cause further destruction of natural resources in many countries, including South American ones, in case no decisive political counteraction is taken in due course.

If only the global deforestation trend from 1990 to 2005 is regarded in this context (that means, before the beginning of the current bioenergy boom) there is clear evidence that forest destruction has further increased in South America. The annual net deforestation rate moved from -0.44% in 1990 – 2000 to -0.50% in 2000 – 2005 in South America. At the same time it was reduced marginally from -0.22% in 1990 – 2000 to -0.18% in 2000 – 2005 worldwide. All in all South America has deforested a net area of about 4.25 million hectares between 2000 and 2005. That means, only in these five years about 12 % more forests were destroyed than in all of the preceding decade.

Although this trend itself is alarming enough, it is being exacerbated by the fact that the CO<sub>2</sub> share in the atmosphere is increasing. While most areas are being deforested for agronomic and livestock rearing purposes, most of the resulting biomass is simply burned instead of being used in the timber industry or for energy production. About 20 % of global greenhouse gas emissions are being generated by current deforestation.

In the last 10 years – that means, long before the beginning of the bioenergy boom in 2006/7 in Argentina – this country has expanded its arable land mostly at the expense of pastures and naturally forested areas. Between 1996 and 2006 the area of arable land has grown from 23 million to 33 million hectares. According to roughly estimated informal figures from INTA, the Argentine Agricultural Research Institute, 2 million hectares of natural forestry and 8 million hectares of pastures were converted into arable land. At the beginning of 2007 the total area of 279 million hectares of Argentina was utilized as follows, according to rough estimations:

- 97 Mio. ha      pasture/grasslands,
- 53 Mio. ha      other forestry land
- 45 Mio. ha      land not usable for agricultural or forestry purposes
- 33 Mio. ha      arable land
- 32 Mio. ha      natural forests and naturally kept forests
- 19 Mio. ha      protected areas (national parks, provincial nature reserves, etc.)

Deforestation in Argentina, as in other Latin American countries, is motivated almost exclusively by agricultural purposes. According to reports from the foundation "Vida Silvestre", about 250,000 hectares of natural forests are destroyed annually in Argentina, whereby most of this deforestation takes place in the northern provinces of Salta, Formosa, Santiago del Estero, Chaco and Misiones. This means, not only many important habitats of endangered species are being lost, but also very fragile land in semiarid zones is put under cultivation, with yields that were only possible because of above average rainfalls. If these rainfalls fall back to historical averages, most probably such classic crops as soybeans and sunflower seeds in these semiarid border areas will fail. This could cause an abandonment of these areas and leave them exposed to wind and water erosion, sweeping away irreversibly the fertile top soil layers.

The pressure to develop arable land is due to the fact that, through introduction of instant cultivation with genetically modified crops in the second half of the 1990s and a high degree of specialization and mechanisation in Argentine farming, Argentina is able to produce with low costs and has become highly competitive after the massive devaluation of the peso at the beginning of 2002. The growing demand of food and agricultural commodities, especially by Asian emerging countries, which is notorious since 2003/04, has given this evolution a further impulse. But up to date this has nothing to do with production of biofuels.

Pressure to increase arable areas will grow compulsorily even further, as demand for biofuels increases because of the various requirements to mix them with conventional fuels set up by the main consuming regions of the world. For example, the target of the European Union to reach a 10 % biofuel share in overall fuel consumption by 2020, can hardly be met with own production. It will be necessary to additionally import biofuels or commodities to produce it. If in this context no relevant technical progress is achieved (like development of synthetic fuels or yield increases per hectare) and bioenergy production is no longer obliged to meet to sustainability criteria, the current bioenergy boom could backfire. Instead of achieving desirable positive effects (like reduction of dependence of fossil fuels, reduction of greenhouse gases), the overall growing demand for nature areas and cultivation areas for food and energy crops could turn negative for the environment and food production.

According to existing investments and intended investment projects Argentina will easily be able to produce up to 2.2 million metric tons of biodiesel for export in 2010. Local demand will also have to be met as by law it is planned to add 5 % of biofuel

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to conventional fuel as of 2010 (this means, additional 680,000 to 800,000 tonnes of biodiesel and about 200,000 tonnes of bioethanol will be required). For the biodiesel-component this requires a cultivation area of about 6.4 million hectares, assuming soybean average yields of 2.7 metric tons/hectare and a biodiesel production yield of 467 kg/ha. We have to remark at this point, that soybeans have by far the lowest oil yield compared with other oilseed crops, but at the same time they are a provider of valuable protein for the animal food industry. Because of this we cannot solely concentrate on the oil yield some crops may provide, but have to consider the overall applications to calculate the crop profitability. Certainly there is still a lot of research to be done in order to analyse other oil crops like rapeseed (canola), castor-oil plants or jatropha verifying their cost efficiency, agro-climatic applicability and dispose of utilizable by-products to be grown in Argentina.

One may speculate about the reaction in Argentina regarding areas to grow energy crops to meet the demand of biofuels, without forgetting the bioethanol element. Taking into account the ambitious targets regarding biofuels of the main consuming regions, pressure to increase arable areas in Argentina may amount to additional 6/7 million hectares by 2020 on a conservative estimate. And where will these areas come from?

Greater area substitutions favouring agriculture, particularly growing of soybeans, have accelerated since broad introduction of direct sowing using transgenic seeds (mainly RR-soybeans) since the second half of the 1990s, resulting in the displacement of cattle breeding to marginal areas. At present only the Northern regions with major natural forests and a few regions in the West are left to breed and fatten cattle, otherwise only increasing cattle production in feedlots may be an alternative. On the other hand the evolution of worldwide demand on agricultural commodities and food<sup>1</sup> is hinting that there is further market potential, so prices may remain at high level in the middle and long term. Against this background following effects can be anticipated for Argentina:

- ♦ There will be a strong competition in regard of land being used to grow food or energy crops, extensive livestock production will be transferred to marginal areas and intensive livestock breeding will concentrate mainly in the traditional agronomic regions of the Pampa.
- ♦ There will be a further expansion of arable land at expense of forest covered areas and this will depend on soil quality and regional deforestation rules and control.
- ♦ Price increases in fats and oils.
- ♦ Price decreases in soy and rapeseed meals.
- ♦ Arable land will further increase in value.
- ♦ There will be a growing trend in establishing monocultures.
- ♦ There will be a higher risk for biodiversity.

Regarding the aim of the European Union and Germany to increase biofuel production in order to ensure at the same time energy supplies and climate protection, the Federal Ministry for Environment and the Federal Ministry for Food, Agriculture and Consumer Protection, jointly with the German automotive and oil industries, have presented a roadmap for biofuels on November 21st 2007 in Berlin. Central points of this roadmap, which are also relevant for third biofuel supplying countries, such as Argentina (mainly biodiesel) and Brazil (mainly bioethanol), are as follows:

- a) Increased employment of biogenic fuel and blending of biodiesel with fuel oil and bioethanol and bio-ETBE<sup>2</sup> to gasoline;
- b) Boost of the bioenergy targets;
- c) Safeguarding of the sustainability of biofuels and gradual increase of the greenhouse gas efficiency;
- d) Promotion of biofuels of the second generation.

a) In order to reach the blending targets aimed by the EU of 8 % biofuel by 2015 and 10 % by 2020 (relating to the energy equivalent, respectively), in Germany it will be tried to increase the blending limits within the technical possibilities as soon as possible. Blending gasoline from 5 to 10 % vol. is relatively unproblematic. The automotive industry has assured to enable the E10 application on the basis of a national (German) rule. It is aimed to change the EU regulations accordingly. Old vehicles, which do not comply with E10, will be offered a premium brand Super Plus with a blending of maximum 5 % vol. bioethanol or 15 % ETBE (which corresponds to 7 % vol. ethanol). This brand of gasoline should be available at at least 1,000 special petrol stations by 2016. In regard of diesel fuel, the automotive industry will release all cars for B7 (7 % biodiesel) in the short term. Complementary to this there is the aim to allow fulfillment of the rate at the soonest by adding hydrogenated vegetal oils to mineral oil, to achieve a 10 % blending of biofuels composed of 7 % biodiesel and 3 % hydrogenated vegetal oils in the refining process.



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b) Up to date the EU Biofuel Directive provides member countries with indicative (not yet obligatory) targets in regard of increasing the biofuel proportion in the total volume of sales, namely from 2 % in 2005 to 5.75 % in 2010 (in each case relating to the energy equivalent). Within the energy package of the EU Commission of January 10th 2007 it was announced that a mandatory target of a 10 % employment of biodiesel by 2020 would be proposed. This demand was endorsed by the European Council on March 9th 2007, but at the same time it was stated that the commitment would depend on

- the safeguarding of the sustainability of the biofuel production and
- the fact that biofuels of the second generation will be available to the public.

The EU Fuel Directive will have to be modified, to allow according blends and furthermore to allow the employment of synthetic fuels. Gasoline accepts higher bioethanol blends and also E85 is to be considered. To reach an increase of up to 20 % vol. biofuel (instead of 10 %) in the composition of diesel fuel, necessary technical details have to be defined. The Federal Government intends to shape a joint strategy after having heard the concerned parties.

c) The Federal Government intends to honor commitments on behalf of biofuels or to allow tax deductions at the soonest only if it is proven that certain standards regarding sustainable management of arable land while producing the necessary biomass have been accomplished or if certain standards to protect natural habitats have been fulfilled or if energy production has effectively reduced the potential of greenhouse gas emissions. This includes regulations preventing destruction or inhibition of natural habitats which are worth protecting, in order to produce biomass. To ensure that these minimum standards will be honored, national, EU-wide or international certification systems – still to be created – will be applied.

d) Biofuels of the second generation show more advantages regarding environment protection and availability, because much more raw material can be used for their production, as for example straw, chip wood, etc. than in biofuels of the first generation. Tax deductiveness for biofuels of the second generation while honoring commitments to fulfill quotas up to 2015 is a strong incentive to invest in this area. To create more incentives and long-lasting perspectives after 2015, it is planned to evaluate biofuels on behalf of the reduction of greenhouse gas emissions. This means, that biofuels with an important balance in gas reduction will enjoy a more favourable weighting factor than other biofuels.

While evaluating these trends it becomes apparent that Germany and other EU nations will orient themselves to an even stronger protection of ecological resources and sustainability when applying renewable energy sources. Argentina and Brazil, but also other countries with great agricultural potential and considerable land reserves, will have to bear this in mind when planning to increase bioenergy production, particularly biofuels.

To ensure its own energy supply and the protection of natural resources, it would be desirable that Argentina turns stronger to other bioenergies and miscellaneous renewable energies. Taking into account that there is a structural energy supply shortfall, but also a serious waste disposal problem, production of biogas would be an interesting alternative. Greater biodiesel production facilities, and to a lesser extent bioethanol facilities, would be rather oriented to export production. Biogas could instead be produced from biomass of varied sources and deployed as processed natural gas or be transformed into heating, cooling, steam or electric energy. When solving environmental problems, particularly disposal of waste, land reclamation and sewage water restoration in Greater Buenos Aires, the question arises if these projects shouldn't be linked to energy recovery programs, which would provide revenues, needed to finance the expensive recycling processes. In this scenario there is also a big potential to employ biomass, which combined into intelligent projects could prove positive from an environmental or an energy point of view turning the whole affair into a profitable business. This applies for projects like the restoration of the heavily contaminated Riachuelo-Matanza drainage basin or for the organic waste produced by poultry slaughterhouses and meat packing plants, sugar factories, wine and citrus processing plants, etc. German know-how and German technology could certainly prove helpful in the planning and implementing of this kind of projects.

When thinking about diversification of energy supplies and measures to be taken to reduce greenhouse gas emissions, Argentina's overwhelming potential of wind and solar power generation should not be forgotten. In the south of Buenos Aires province and in Patagonia there are wide uninhabited areas with excellent wind conditions for wind energy production. These areas are not suitable for agronomic production, so no biomass can be produced here. Extensive sheep breeding is the main activity in Patagonia and it would be perfectly compatible with the installation and upgrading of wind farms. At least there will be no competition between food and bioenergy producing areas, as it will most probably happen in Central and Northern Argentina. Impairment of natural open spaces or nature tourism would be kept within narrow limits if greater wind farms are planned with foresight, taking into account that there are very wide areas to work on.



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The intensified production of solar power can mainly occur in Northwestern Argentina. This area is one of the world regions with the highest solar radiation intensity. Unfortunately solar power is still –and this applies even for bigger thermal solar facilities – expensive in comparison. There would be additional costs for installation and connection with the power supply system, which may be considerable, if power plants are installed in remote areas like the „Altiplano“.

When stating a final assessment about employment of bioenergy and particularly biofuels, it should be highlighted as main conclusion that expansion of bioenergy production can be carried out consistently with concerns about environment and resource protection and also of regular food supplies. Nevertheless an integral approach is required in order to interlock all ecological, social and economic sustainability aspects on all levels. To stop deforestation in Northern Argentina, induced by pressure for arable lands, at present a natural forest protection law has recently been approved and at the same time a moratorium on deforestation during the transitional stage is tried to be implemented. Still, there is a lack for a coordinated long term land use regulation policy by the Federal Government, which would focus on protection and sustainable employment of natural resources. A definite national strategy and corresponding market conditions to foster renewable energies are also missing. The emphasis shouldn't be put on exporting first generation "biopetrol", but to employ biological remnants and waste material to be recycled as bioenergetic sources and also to exploit other sources of energy, as for example hydrogen, wind and solar power, if a melioration and diversification of the energy supply in the own country is being sought. It seems to be important to elaborate tailor-made solutions for a tangible production and business environment, which would at the same time be ecologically sound and profitable. To jump blindly on the biodiesel or bioethanol train, certainly would be wrong and short-sighted. In the case of bioethanol production, more sophisticated solutions are required. Brazil is at present without doubt the most competitive supplier of bioethanol and in this segment technologically far more advanced than Argentina. But Argentina could nevertheless develop profitable projects after pondering possible energetic applications, environment regulations to be met and commercialization and recovery of by-products.

In the conflict area between growing bioenergy, food and animal feed crops on one side and protection of natural resources on the other one, the clever employment of genetically modified crops could by all means be positive for the environment. For example, by developing genetically modified crops to be cultivated on degraded soils or to be used specifically as bioenergy sources. Just the yield increase through genetic melioration would contribute to reduce the pressure to get lands for agricultural purposes.

Ultimately, the instrument of „Clean Development Mechanism“ stated within the Kyoto protocol could also be applied as a reinforced version for bioenergy projects in Argentina. Permanent reduction of greenhouse gas emissions could be achieved through a glut of renewable energy projects. It is to be seen if and to which extent within the further definition of the Kyoto protocol it will be possible to honour economically the protection of natural forests and the regeneration of degraded forests – in their function of carbon storages – . At least the planned introduction in Germany of sustainability certification of biofuel production (albeit imported goods or national production) will contribute to reorientate on a certain way the need to provide protection of natural resources.

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<sup>1</sup> Rise of world population from currently 6 billion people up to 9.2 billion by 2050; strong GDP growth in Asia and in Latin American emerging countries; increasing urbanization processes which will ultimately result in a greater demand of market suitable foods.

<sup>2</sup> ETBE = Ethyl Tert-Butyl Ether is a high-quality gasoline additive applied mainly to produce gasoline with high octane rating. According to the gasoline DIN EN 228 norm gasolines may contain up to 15 % vol. ETBE.

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## 6 . National program for biofuels

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SECRETARÍA DE AGRICULTURA,  
GANADERÍA, PESCA Y ALIMENTOS

### 6.1. Introduction

The global energy situation shows that the gradual move away from oil and natural gas, or non renewable energy, has already begun. This is explained, among other issues, by the concern to protect and improve the environment, and by the significant rise in oil prices. These aspects favor the development of cleaner and renewable energies. The use of bioenergy generated from biomass for example, which includes biofuels such as biodiesel, ethanol and biogas, is growing and attracting increasing interest worldwide.

Developed countries see the use of biofuels as a way of reducing greenhouse gas (GHG) emissions – mainly from the transport sector – and as an important tool to diversify energy sources. In contrast, developing countries see biofuels as a way to stimulate rural development, create jobs and to receive foreign currencies. However, both groups view the development of biofuels as a way to increase energy security and energy independence.

It is important to emphasize that the total substitution of oil and gas by biofuels is not possible. The use of biofuels has to be seen as a transitional source of energy towards new renewable and clean energies, that will allow a more significant substitution of fossil fuels.

Several countries are developing active policies for the development of biofuels, mainly through the implementation of mandatory blends with fossil fuels. As a result, the use and production of biofuels, such as, biodiesel and bioethanol, is growing significantly.

As an example of this, the European Commission has suggested the use of biofuels in order to ensure and diversify sources of energy, and to reduce CO<sub>2</sub> emissions for ground transportation in Europe. In order to achieve this goal, the Commission has proposed the use of 5.75 % biofuels in total consumption of fuels for ground transportation in 2010, and is committed to encouraging the production and use of biofuels by proposing to set an obligatory minimum target for biofuels of 10% of vehicle fuel by 2020.

The European Commission estimates that almost 20 million tons of biofuels would be needed to achieve the proposed objective in 2010. Also, it has estimated that if European countries want to produce this amount of biofuel locally, they would have to allocate for this 17 million of their 97 million hectares that are suitable for agricultural production.

Hence, the Commission estimates that in order to reach these goals, Europe will have to import biofuels from countries with competitive advantages in the production of these renewable energies. This is particularly true given that the strategy proposed by the EU with regard to biofuels is not to put significant additional pressure on the use of European agricultural land. This approach is in order to avoid a possible increase in domestic prices of those grains destined for energy.

Also, the Commission in 2005 stated its support for the production of biofuels in developing countries with the aim of having sufficient sources of supply.

The generation of biomass to cover the needs of Europe and other regions is a challenge for countries with large extensions

of suitable land for growing energy crops. In this regard, Argentina has exceptional conditions to generate part of the biomass needed to supply the domestic and the international market.

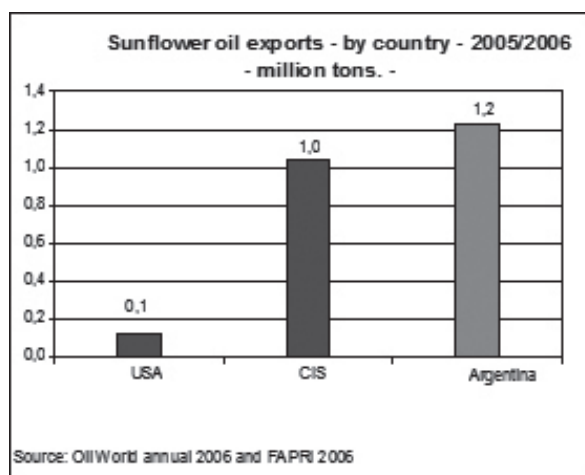
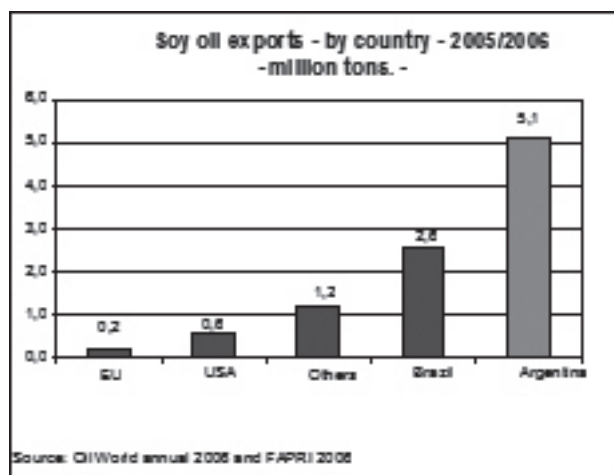
## 6.2. Reasons for the creation of the national program for Argentine biofuels

Argentina has comparative advantages in the production of oil crops. The country possesses large and fertile extensions of land available for oilseed production. It has great flexibility in the implementation of oilseed crops from natural and artificial irrigation. Also, Argentina has a large number of ecosystems that allow for the growth of a diversity of crops.

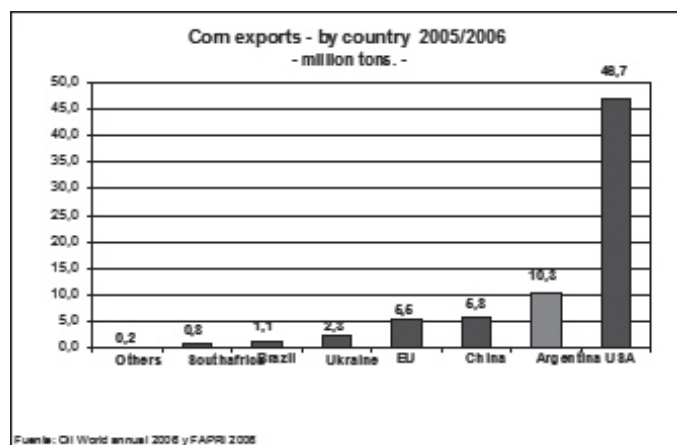
The production of vegetable oils during 2006 reached almost 8.0 million tons. During 2006 the crushing capacity reached 160,000 tons/day, a similar amount to the crushing capacity of the United States.

Soy oil	6,0 Millon Tons
Sunflower oil	1,7 Millon Tons
Others	0,2 Millon Tons

Another characteristic of the oil industry in Argentina is it's export-orientation. It sends more than 90% of its production to the foreign market. The country is one of the main exporters of vegetable oil in the world. Argentina is the world's No. 1 exporter and No. 3 producer of soy oil and the No. 1 exporter and No. 2 producer of sunflower oil in the world.



Also, Argentina is the second largest world exporter of corn, according to statistics of the year 2006.



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The implementation of a biofuel industry in Argentina will provide the possibility to add value to the production of grains and vegetable oils that are already being exported.

Another very important reason for the creation of the national program for biofuels is the favorable environmental impact that the use of this type of renewable energy has. The use of biofuels reduces the emission of carbon dioxide (CO<sub>2</sub>) into the atmosphere, one of the main reasons for the greenhouse effect and global warming. This reason makes biofuel projects eligible to obtain carbon credits according to the Kyoto Protocol, making the biofuels projects more cost-effective.

The national program for biofuels was created in 2004 within the Secretariat of Agriculture, Livestock, Fisheries and Food. The main objectives of the program are:

- To promote the use and production of biofuels as a renewable source of energy.
- To develop regional economies in order to create new and genuine employment.
- To support scientific and technical research in this field.
- To improve the quality of the environment.
- To attract foreign investment for the production of biofuels in Argentina
- It is the main tool for the development of biofuels in Argentina

On April the 19th, 2006, the Argentine Congress approved a law aimed at promoting the use and production of biofuels in the country. The biofuels involved are: biodiesel, bioethanol and biogas.

The main aspects of this law are:

- The law creates a five percent mandatory use of biodiesel and ethanol in all diesel oil and gasoline consumption, from January 1st, 2010.
- It also establishes fiscal incentives for 15 years.
- Tax exemption on "Impuesto a los Combustibles líquidos y gaseosos" (hydrocarbon tax, 20%).
- Tax exemption on "tasa de gasoil" (diesel tax, 20%).
- Tax exemption on " tasa hidrica"( gasoline tax, 19%).
- It creates a National Authority (N.A.) for the evaluation and support of projects for the production of biofuels. The functions of the N.A are, among others:
- To establish quality standards for biofuels
- To establish the criteria for the approval of projects in order to obtain the benefits established in the law
- To manage the subsidies that the National Congress will in time approve
- The law prioritizes projects that accomplish the following criteria:
- Sponsorship of small and medium sized companies
- Ownership by agricultural producers
- Located in regional and rural economies
- Availability of raw materials for biofuel production in Argentina
- Argentine total grain production in 2006/2007 is estimated at 95.0 million tons
- SOY, CORN and WHEAT account for almost 88% of total grain production

Total Grain Production 2006/2007 season:

Grain	Planted area	Production	Share
	million hectares	million tons	%
SOY	16.1	47.6	50%
CORN	3.6	22.0	23%
WHEAT	5.6	14.6	15%
SUNFLOWER	2.4	3.6	4%
SORGHUM	0.7	3.0	3%
OTHERS	3.8	4.2	4%
<b>TOTAL</b>	<b>32.2</b>	<b>95.0</b>	<b>100%</b>

Source: Secretariat of Agriculture, Livestock, Fisheries and Food – Argentina

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With the implementation of the 5% mandatory use of biofuels, 625,000 tons of biodiesel will need to be produced for the first year in which the law is in force. In order to meet this target, the amount of vegetable oil needed will be 650,000 tons.

This represents only 8% of current total vegetable oil production.

In the case of bioethanol, production required for the first year of mandatory use is estimated at 170,000 tons. If we base the production of this biofuel only on corn (this is just to quantify the availability of raw material; in fact, sugar cane also has a great potential for the production of bioethanol in Argentina), the area needed will be 80,000 hectares. This represents only 2% of the total of the current area under crops. Also the quantity of corn needed (550,000 tons) has a very low impact of the current Argentine corn production (2% of total current production).

## 6.3. Conclusions

Argentina has ideal growing conditions for the sustained development of the raw materials needed for the production of biofuels.

Argentina has an immediate availability of the raw material needed to cover the 5% stipulated by law for all gasoline and diesel consumption.

Argentina would become one of the major producers of biofuels worldwide.

From an economic and social point of view, the development of the Argentine biofuels industry will:

- Create a new industry in our country, creating jobs and opening up new markets for agricultural production.
- Add value to grain and vegetable oil production.
- Allow the development of energy crops in marginal areas and contribute to improving the quality of life of the population.
- Have a favorable impact on the environment.

The main challenges ahead are:

- To monitor, on a permanent basis, issues related to quality, safety, and environmental aspects for the sustainable production of biofuels, in order to fulfill international commitments associated with the enhancement and preservation of the environment.
- To promote research and development, in order to reduce the production cost of biofuels, and to make more efficient use of the biomass produced. The future of biofuels is strongly linked to the progress that can be achieved in the development of first-class technologies.
- To develop efficient logistics of distribution and trade, in order to improve the competitiveness of biofuels compared with fossil fuels.
- To encourage the use of biotechnology in the development of new varieties of feedstocks for the production of biofuels.
- To take steps to identify financial funds, within multilateral credit organizations, the capital market and the financial system, for the construction of biofuels plants.
- To encourage cooperation between countries in the region, in order to access new foreign markets.
- To promote projects that are work labour intensive and have a high impact for regional economic and agricultural development.
- To support the interaction between private and public companies, scientific and technological organizations, and public organizations.
- To become one of the main producers and exporters of biofuels worldwide, adding value to current agricultural exports.

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## 7. Biofuels and the brand "Argentina"

By Benjamin B. von der Becke  
Coordinator of the Country Brand Strategy – Argentina (\*)  
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At the beginning of the 20th century, while Rudolf Diesel was developing the diesel engine in Germany, Argentina was establishing itself as one of the major grain producers in the world. Since then, Argentina's first country brand has been known as the "breadbasket of the world".

From the beginning, Rudolf Diesel considered the possibility of running engines from vegetable oils. This vision gained a new dimension of economic relevance due to the diverse problems in availability, politics, and environment issues related to fossil oils. 100 Years after its invention, the diesel engine is to be run with biological oils again, and Argentina is one of the agricultural producers with the highest potential in the worldwide biofuel market.

Many international analysts foretell decades of great exporting activity for Argentina as a result of the requirements to substitute energy in the main powers of the West, and the increasing food demands of the most populated Asian countries.

Nowadays, it's necessary to develop a clearer conscience for this challenge in order to integrate the small group of nations that will lead this critical sector. This sector has to create and develop renewable and clean power plants.

Progress in the application of biofuels must be considered and analyzed carefully.

All the country's economic sectors must take the application of biofuels into account. The question of energy sources is at the top of the international interlinked list of the most significant problems. The pros and cons of decisions must be weighed up to take on the challenges arising from the question: Cereals for food or cereals for energy? Beyond the answers that exist (considering its own ecological issues), there is another fundamental issue that should not be neglected: The strategy to develop the brand "Argentina". Our country has fertile earth for the development of biofuels. It is not only the main world-wide vegetable oil exporter, but also has extraordinary technological and scientific capacities.

Argentina can become a vanguard space for the investigation and development of substitutes for conventional power plants. Numerous public and private investment-initiatives already exist which focus on biogas, wind energy and tidal power, just to mention a few.

We aim towards adding value to our products,, at positioning the country within the group of expert-participants in this market, and developing innovative processes with strong human resources, because innovation is the -key to competitiveness in the present global economy.

In the case of biofuels, Germany is a good example, as it assembles the development, production and running of technology for optimal utilization of arable crops in industrial processes the most efficiently. It should be emphasized, that the quicker the launch of biofuel production is, in small- and medium-sized businesses, the better it will be for Argentina to participate amongst the top players in this market. It should be considered, that there is no region in Argentina that can not in some way contribute to biofuel production through the supply of vegetable biomass (i.e.: soy, sunflower, peanuts, rapeseed, palm oil, linseed, safflower oil, e.t.c.) for biodiesel- and, for example, corn, for bio ethanol-production.

A favorable answer to the increasing world-wide demand for alternative energy is the development of an inter-sectorial framework. The promotion of new national but internationally competitive brands in the private sector is to be developed under the umbrella of the new brand "Argentina".

With the capacity of its people, the immensity of its territory, and its variety of climates and resources, Argentina must present itself with its differentiated potentials in these times that are presently being transformed by new technologies.

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(\*) Country Brand Strategy (CBS)

Coordinated by the Secretary of Tourism and the Secretary of Media in coordination with the Ministry of Foreign Affairs, which gathers more than 70 Associations and Organizations that represent every sector of production, services, sciences and culture in the country. The brand "Argentina" creates strategic actions to contribute towards the best positioning of Argentina in the world.

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## 8. Buenos Aires... a strategic destination for biofuels industry investments

By Debora Giorgi

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Ministerio de la  
**Producción**



Gobierno de la  
**Provincia**  
de Buenos Aires

### 8.1. Introduction

The World is undergoing major transformation, with far-reaching changes in production and trading patterns. In an international context in which oil supplies approach their peak globally, and energy security becomes a major goal, developing regions like Buenos Aires have much to gain by supporting strategies around prospects for renewable energies and biofuels.

In that sense, as you'll soon discover, our province has great potential to share with you, from its economic strength and diversity, to the richness and quality of its natural resources, which provide comparative advantages in the development of activities related to those resources.

The existence of extended space, full of high quality natural resources and excellent environmental conditions, is undoubtedly an important factor in attracting investment towards the production of biofuels. As it will be seen moreover, our territory is not only important due to the availability of resources here, but also due to the conditions in which the exploitation of such resources is possible.

Furthermore the government of the province of Buenos Aires considers biofuels a priority because of their multiple benefits. Taking that into account Congress enacted law 13.719 which implements a regime for the promotion of production of biofuels in the province.

An investment in Buenos Aires takes place in a environment of growth, competitiveness, and productivity; we invite you to take part.. We hope to offer our experience and knowledge of the region when it's time for your company to make investment decisions.

Welcome to Buenos Aires. We hope to share our huge potential for the production of biofuels with you.

### 8.2. About Buenos Aires

#### *Its location and geography*

Buenos Aires province is part of the Pampeana region. It has an area of 307,571 km<sup>2</sup>, which is similar to some European countries such as Germany (357 thousand km<sup>2</sup>), and Italy (301 thousand km<sup>2</sup>). It is Argentina's largest province and represents 11% of the national continental territory.

It has excellent soil, fine weather, and a strategic location in the south of America. These characteristics have been of vital importance for the province to become, as time went by, the most important area, regarding economic activity and human settlement in Argentina.

From a geographical point of view, the Pampeana plain is predominant, presenting a slight graduation towards the Argentinean sea. The plain is interrupted by two small mountain ranges with rugged peaks: Tandilia, at an altitude of 500 meters above sea level, and Ventania, at 1,100 meters. Its geographic situation, with an extensive coastline and easy access to the Atlantic, make it an ideal gateway for the development of an important port structure, with storage systems in Bahía Blanca, Mar del Plata, Necochea and Quequén, and fluvial ports in Río de la Plata and Paraná, for different uses. The province infrastructure guarantees the producers a platform from which their products can reach the world.

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### *Its people*

Buenos Aires is the most populated jurisdiction of Argentina. In 2001, according to the National Population and Housing Census, there were 13,827,203 people living in the province. The current population is estimated in 14.5 million, which represents 38.1% of the national population.

Buenos Aires's educational indicators are the highest in Latin America, in all of the educational levels considered, resulting in better quality human resources. The province has 4.5 million students from the first level to the highest. Illiteracy is 1.6%, in contrast to an average of 11% in Latin America. Apart from that, the net enrolment-rate at the secondary level is 85%, in contrast to the regional average of 67%. The best relative position also includes enrolment at university and tertiary levels, where Argentina and Buenos Aires register the highest levels in the region.

### *Its economy*

With a US\$ 88 billion product, the province represents 35,5% of the national GDP. It is the provincial jurisdiction which presents the highest relative weight and productive diversification in Argentina. Buenos Aires exports reach 17.7 billion dollars. It generates four out of every ten dollars Argentina obtains from foreign markets.

Similarly, the province has played and still plays a main role in the expansion process that Argentina is going through, which started at the end of 2002. Since then, Buenos Aires registers an average annual growth rate close to 10.5%, much higher than the world and regional average, and is still growing for the fifth year in a row, surpassing its historical tendency.

## **8.3. The structure and outlook for the Buenos Aires biofuels industry**

### *Agricultural sector*

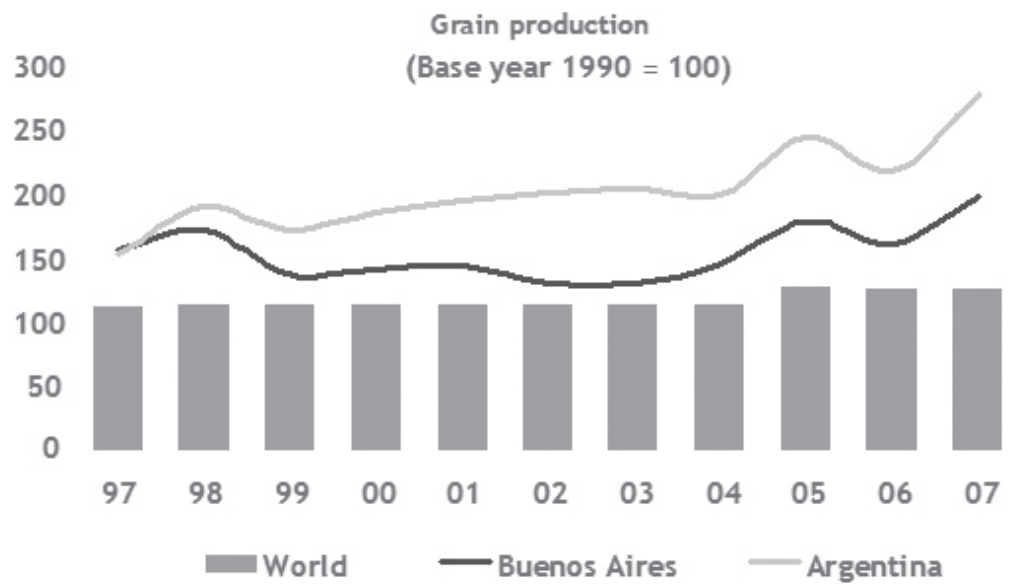
Local agribusiness is supported by many natural advantages. Diverse soil types and different climates across a vast landmass allow diverse crops to be grown from large-scale cropping and grazing. Counter-seasonal production in comparison with the northern-hemisphere means, that companies can produce throughout the year.

At the same time, leveraging these natural resources, our farmers have been working in partnership with some of the world's best R&D organisations to develop new crops, processes, and technologies, to suit Buenos Aires's growing conditions and to keep Argentina at the cutting edge of innovation. Developed and applied technologies support Argentina's long-term competitiveness. There is a wide range from breeding programs for improved genetics to advanced farm management and innovative and intelligent storage and transport solutions.

### *A sector with results presented as follows:*

- Agricultural production in Buenos Aires increased by 97% between 1990–2007. During those years, the cultivated area expanded by 12%, showing significant yield progress (at the same time the world's agricultural production increased by 26%).
- A unique aspect of the situation in Argentina, compared to other large potential agricultural producers, is the relatively small share of domestic consumption. Nowadays Argentina represents 3,9% of the world's grain production, and 0.6% of the world's population. This creates a tremendous opportunity for export expansion.
- In 2007, grain production in Argentina totaled 95 million metric tons, which is a record level. Buenos Aires accounts for 35% of Argentine production.
- The yields of Argentina and particularly of Buenos Aires, are doing well in comparison with other major grain producers in the world.
- Argentina has become the world's largest exporter of soy and sunflower oil and the second largest exporter of corn. Furthermore it is one of the world's five largest producers of grains and vegetable oil. Argentina's domestic consumption is only 6% of total vegetable oil production.
- According to the last National Census of Agriculture in Buenos Aires, there are 50,620 farming-businesses covering a total surface of 25.8 million hectares. 42.5% of this arable land is used for crop growing, while the rest of the land is used for cattle raising, forestry, rural dwellings, and storage establishments. The greatest part of the cultivated area corresponds to oilseed crops such as soy and sunflower, and cereals such as maize and wheat. These crops, taken together, represent 62% of the agricultural production area.
- According to the last National Census of Agriculture in Buenos Aires, there are 50,620 farming-businesses covering a total surface of 25.8 million hectares. 42.5% of this arable land is used for crop growing, while the rest of the land is used for

cattle raising, forestry, rural dwellings, and storage establishments. The greatest part of the cultivated area corresponds to oilseed crops such as soy and sunflower, and cereals such as maize and wheat. These crops, taken together, represent 62% of the agricultural production area.



Source: United States Department of Agriculture (USDA) and Secretariat of Agriculture, Argentina (SAGPyA)

Source: Food and Agriculture Organization of the United Nations (FAO).



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## 8.4. Outlook for the biofuels industry

Biofuel production is expected to show a strong upward tendency in coming years. It is driven especially by federal and provincial policies aimed at promoting biofuel use and competitive advantages for production in Buenos Aires to satisfy international demand.

Production is possible in a complete cycle (harvest – seed pressing – production of biodiesel) and this reduces costs and intermediaries. The marketing of by-products (expeller of soybean, sunflower, etc. as a base for balanced cattle food/ glycerol of 90% purity) constitutes an incidental, profitable business, and allows for the diversification of risk.

Many foreign and local world class companies are developing or analyzing business plans for this sector in the province. Argentina is on the verge of vast investment in biofuels that to merely fulfil the mandatory blending will require US\$ 300 million in disbursements. With the implementation of the 5% mandatory use of biofuels by the year 2010, the production required to serve the Argentinean market will be 175,000 tons of ethanol and 625,000 tons of biodiesel.

Buenos Aires has an immediate availability of the raw material needed to cover the requirements of the local market, and is also becoming one of the major exporters of biofuels worldwide. Nowadays 7 million metric tons of grains with the potential for the production of biofuels are exported without industrial transformation process.

As the raw material is readily available and globally cost competitive, most of the investments will be oriented towards enlarging milling and storage capacities and building the biofuels plants. Nevertheless, in order to allow the development of energy crops in marginal areas with favourable access to maritime port facilities, investments in the agriculture sector are also expected.

## 8.5. Legal framework

At the same time that biofuels projects are benefited by the incentives granted by the Federal Government under law 26.093, the provincial Congress has enacted law 13.719, in order to promote biofuels production in Buenos Aires. Provincial promotion is focused towards two main fields:

- A favourable tax treatment under a fiscal stability scheme (a 10 or 15 year provincial tax exemption depending on the production destination -export oriented projects or local market oriented projects-).
- The promotion of the cultivation of a variety of oilseeds, including newer varieties that cannot therefore be viewed as competing with foodstuffs.

## 8.6. Why Buenos Aires?

*From the demand side*

- Increasing global demand for renewable fuel sources, which can diversify the current energy matrix, as well as be environmentally friendly.
- Proximity to a regional market composed of 377 million consumers (South America)
- Possibility of implementing CDM projects.

*From the supply side*

- Worldwide importance of grains production in both Argentina and Buenos Aires, with the capacity of enlarging production by introducing marginal agricultural areas.
- Excellent yields resulting in low production costs.
- The provincial endowment of infrastructure guarantees the producers a platform from which their products can be globally delivered.
- Use of by-products and/or waste in cattle activities.
- Government boost (existence of a national and provincial promotion regime for the sector).

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## 9. Cordoba is the pioneer in research and development of biofuel

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Apart from being a pioneer, Cordoba is meant to be the main protagonist regarding the research, development and production of biofuel in Argentina.

Local entrepreneurs and scientists, especially from the National Technological University of Villa Maria, have been doing research in different productive alternatives in this subject for more than 20 years.

In the mid 80s this drive was fostered by the development of technological advances together with the full capacity of the Cordobes field, and the support of our local government. This has resulted in record crops year after year.

In the last five years, the quantity of soya and wheat has doubled in ton productive quantities, which means that today, Cordoba is the market leader in these crops totalling 13.1 m and 8.2 m tons respectively for the 2006/7 crops.

Soya and wheat are the most important crops, which shows the strategic decision Governor Dr. Jose Manuel de la Sota made in relation to the possibility of launching Cordoba into the biotechnological era of biofuel.

The Federal Law passed in April 2006 greatly contributes towards consolidating this process. Thanks to this, the state has created a system of promotion and regulation for the production and sustainable consumption of biofuel. Similarly, this law makes it compulsory by 2010 that all liquid fuels which are traded in this country such as naphtha and petrol to be mixed with bioethanol and biodiesel respectively in a percentage of no less than 5%, to be measured over the total quantity of the final product.

To fulfil this requirement Argentina will need to meet the demand of the internal market of not only 600 million tons of biodiesel but also 160 tons of ethanol.

This challenge has renewed the Government's conviction and doubled its efforts to lead a series of actions, including the following:

- In mid 2006, the "Secretary of Industry and Trade of the Ministry of Provincial Production", sponsored the agricultural producers and investors to set up a business chamber to be formed by people interested in the development of this activity. This chamber had obtained legal status in November of that year. From that moment on, the chamber gets together monthly to have an active participation from its public and private sector representatives.
- In June 2007, based on law N° 9397, the province adhered to the national law n 26.093 and declared of public interest the promotion of production, process and sustainable consumption of biofuel. Likewise, it also established that all the agreed projects passed by the "Enforced Authority" aimed at the production, process and consumption of biofuel by third parties shall be excluded for 15 years from paying the following taxes:

1. gross income
2. production, industrialization and storage
3. sealing of acts, agreements and transactions which have as subject matter this product.

Besides fostering this system, it is also stated that projects of biofuel shall benefit from the Promotion Program and the industrial development law (N° 9121). That is to say that apart from all the tax exemptions there will be other benefits such as job posts, cut downs in the consumption of energy, and loan support by the Official Bank at a subsidized rate.

- The Provincial Development Program of biofuel was formally submitted on 1st August, 2007. In this program the strategy for the sustainable development of this sector was set down by the government and the industries which belong to the Chamber

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The main objective is to back up the establishment of a chain of factories located strategically within our own province, to produce and market biofuel.

In the short term, this program that was designed and announced by Adriana Nazario the accountant for the Ministry of Production and Labor", envisages the establishment of 16 oil factories ready to supply a biodiesel plant with a production capacity of 60.000 tn/year, which equals 60 m liters of petrol.

It is worth mentioning that most of these companies already exist and that they are already producing, and will be able to continue to do so in the future. Most of them have the benefits provided by the Provincial Law of Industrial Promotion. Moreover, there already are interested investors for the immediate building of the previously mentioned biofuel plant.

Furthermore, in the case of alcohol fuels development, the government has backed up a mating project which gathers together 30 agricultural corn producers located in the south of the province. From this production, 140000 tons a year will be assigned to the project and they will invest 30 million dollars to build a new plant.

By 2012, the provincial strategy is to make Cordoba an important landmark for the National Energetic Matrix with 3 Biodiesel plants for the quota, and with a minimum of 40 oil factories to supply them. Therefore, 150 tn/year is expected to be produced, which is to say 150.000.000 m liters of biodiesel and an additional 50 m liters of alcohol fuels per year with the development of the bioethanol plant. This represents more than 20% of the needs of the whole national market according to law 26.093.

The total investment needed to fulfill the objectives is around 100 m dollars. It is estimated that in 5 years time this activity will generate 7250 direct and indirect new job posts and furthermore, a multiplying effect in various regions of the inner part of our province. Obviously the government through the Cordoba Province Bank and other credit entities is studying different possibilities of funding.

Last but not least, it is important to mention that as regards to added value on its own, the province shall be benefited with more than 120 m dollars. This figure, which results from a simple comparison between the current options based on the selling of cereal through Rosario Port to be industrialized and exported, is approximately 210 m dollars, with 330 m of the same currency from new job posts and the development of infinite commercial activities and related services.

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## 10. Argentina, an alternative to produce biofuels

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### 10.1. Introduction

In recent years biofuels have arrived as a new actor in international agricultural markets. Their growth is linked to the increasing awareness of the environmental damage caused by the current fossil fuel-based energy system and rising fossil fuel prices. Governments in the whole world have taken several actions to promote production, and the enforcement of mixtures etc. Biomass-based energy is a promising alternative to fossil fuels because of the versatility of its use (e.g., heating, electricity production, and transportation), and its potential for greatly decreasing greenhouse gas emissions

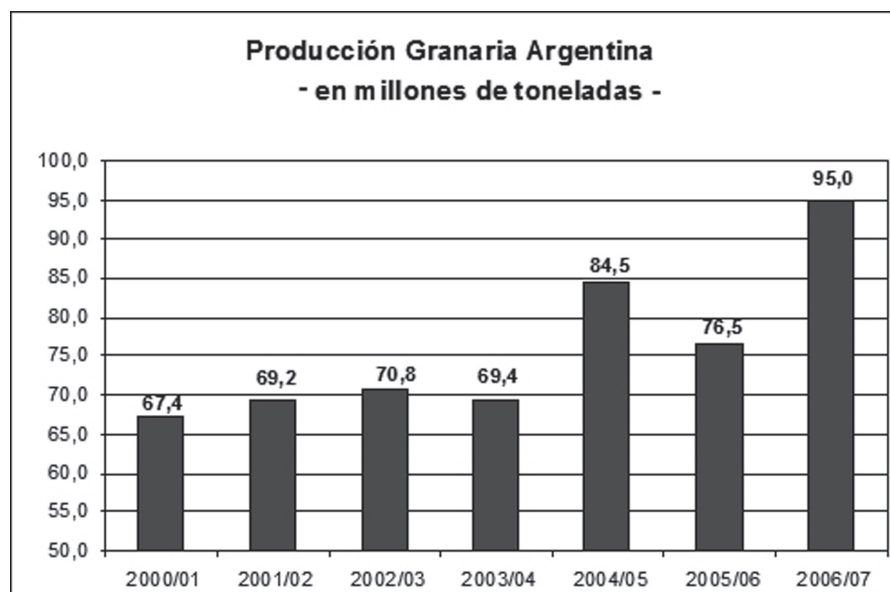
In this context Argentina has an important role to play, since while some of the biomass in demand to fulfil the new needs of the US and the EU can be made available locally, in developed countries competition for land puts additional pressure on their already very high prices, causing the production cost of bio-energy to be too high to be competitive with fossil fuels or other renewables. In Argentina on the other hand, due primarily to lower land and labor costs, and a highly efficient and low energy intensive agriculture, bio-energy production costs are lower, with a substantial bio-energy potential. Environmental impacts of long distance bio-energy transportation are relatively small because transport-related energy consumption is small.

Located in the southern cone of Latin America, Argentina is the second largest country in Latin America with a total land area of 273 million hectares, stretching from the Tropic of Capricorn in the north to the southern tip of the continent. The country is divided into 23 provinces. Agriculture plays an important and increasing role in the economy, representing more than 50% of all export income. The fertile plains of the center and the northeast of the country, including the humid pampas along the coast and the dry pampas in the west and south, represent the core of Argentina's agricultural production (80% of all agricultural crop production and 75% of the national livestock production takes place in this region). In recent years however, agriculture (primarily soybean production) has extended into less fertile and more remote areas of the northeast and northwest of Argentina, and has also driven livestock production into less fertile lands, because soybean production has generated more income than other crops or livestock. The increase in international markets and competition for land has also pushed up land prices, an impact that will also have consequences for energy crop production.

Argentina's agricultural crop production is highly developed: genetically modified (GM) crops are common, especially for soybean production, where 90% of the total production comes from GM soybeans; application of direct seeding and no-till cropping systems has risen over the past 15 years to become the dominant production system for more than 70 %; fertilizer input has increased (although still significantly lower than in North America or Europe due to Argentina's very fertile agricultural land). Of the 273 million hectares of land, Argentina has 128 million hectares of agricultural land, of which 99 million are permanent pastures, 28 million are arable land, and 1 million are permanent crops.

Given this situation, international trade of biomass and biomass-based energy carriers is an interesting option for Argentina, and big investments are under way to increase local biodiesel production to a high rate. In parallel with the growth of international trade in bio-energy, associated points of concern are also being studied. In particular, the sustainability of internationally traded bio-energy is being widely discussed, including the economic viability, environmental friendliness, and social adequacy of each part of the bio-energy chain: production, distribution and consumption. In Argentina an increase in the international commodity prices associated with this new demand is imposing great pressure on agricultural frontier expansion, especially in the northern part of the country, together with an intensification of agriculture in the central farming area of the country. This is increasing food production efficiency so that less land is needed to produce the same amount of food. This is possible through the application of more efficient agricultural production systems, as new genetics, precision farming with high tech farm machinery, and no till among others. Yields and overall grain production have been increasing steadily, reaching 95 million tons, reaching 95 million tons.

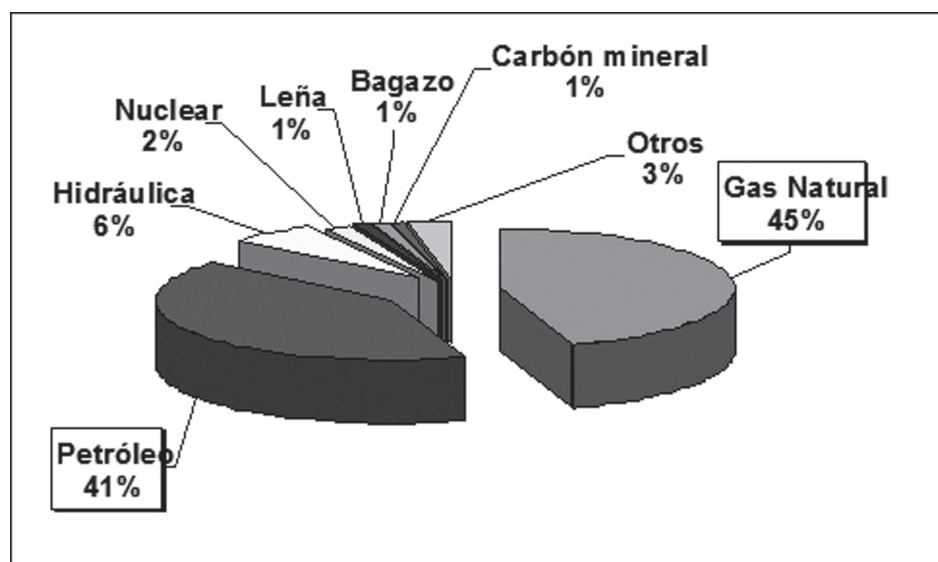




## 10.2. Energy sector

Looking at the energy sector, Argentina is heavily dependent on petrol derived products, at 86 %. In regards to the local transport sector around 55 % of the total vehicle consumption is diesel, while only 20 % is petrol. Although refineries in Argentina currently operate at full capacity and are trying to maximize diesel output, around 3 % of the annual consumption has to be imported. This number is increasing in order to cope with the high rate of growth of the economy, which is bringing more pressure onto the system. Reserves estimates for gas and petrol range from between 12 and 15 years. The diesel market will remain strong as the country traffic network relies heavily on diesel powered long distance truck transport, passenger transport and also agricultural farming equipment. This entire situation compels the growth of local biodiesel production. With the domination of oil crops in the country, Argentina is one of the top three producers and exporters of vegetable oil, and the strong industry network linked to this production favours biodiesel production.

Diesel prices in Argentina (like other fossil-fuel prices) are abnormally low. Indeed the domestic prices are not aligned to the international prices, because of Argentina's auto-supply capacity and the tax that applies to exports. Low internal prices are not a desirable situation for the promotion of new fuels, and do not internalize the externalities that fossil fuels generate throughout their life cycle. In the near future this government policy to decrease the pressure of internal inflation has to change in order to increase investments in new wells and comply with an increasing proportion of imported energy purchased at international market prices.





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### 10.3. Legislation

There are two federal laws that promote alternative fuels. The first one promotes and regulates the biofuels production in the country. This law establishes a mandatory blending in petrol and diesel with ethanol and biodiesel in 2010 (of 5 %). This production will be strongly regulated by the federal government in order to promote small and medium scale facilities, owned primarily by farmers or regional governments, that need development. There are several incentives to be implemented but there is no certainty on the final price at which biofuels will be purchased for blending needs. This aspect is delaying new investments oriented towards the internal market, and the incentive mechanism currently appears too weak to strengthen the role of small and medium sized enterprises. High investment costs and perceived risk prevail in Argentina. People also still have a significant mistrust and disbelief in politics.

Federal law 26190 stipulates for 2010 a participation in electricity production of 8 % from renewable sources. Biofuels could have a share in this production. In this case again, purchasing prices of electric energy produced is the principal factor to be considered in the different available alternatives.

In regards to quality standards, there is a new norm from the secretary of energy that includes diesel, petrol and biodiesel, which states a few important parameters to be fulfilled by biodiesel producers. The national standard organization IRAM has also worked on a local version of the international biodiesel standard, with a mixture of American and European parameters.

### 10.4. Present situation

There are very big export oriented plants already in construction and operation. These facilities will increase the local capacity of production and exports in the next year with conservative numbers stating a total capacity of 1.5 million tons per year. If all investments under study are considered, this capacity could nearly double. The production is concentrated mainly near Rosario city over the Parana highway, where the major Argentinean soybean processing capacity is concentrated (150.000 Tons per day). Investments for local supply are slower due to more uncertainties in this market.

There are research projects on biofuels launched by INTA and universities that are looking for alternative crops to be promoted and established in different regions of the country. In regards to local capacity, there is experience in small and medium scale biodiesel plants with a great dispersion between technology forwarders. In large scale plants there is an integration between international providers and local contractors.

In regards to ethanol, there are plans to improve the already established capacity and increase its capability in order to process local corn production (Province of Tucuman). Other plans are being studied in different parts of the country with little practical progress of implementation. All cases are considering vertical integration and intensive use of coproducts.

### 10.5. Conclusions

Argentina is becoming an important player in international biofuels markets and has significant capacity to increase production in the near future. The extent of the participation and expansion of this new market is not clear, since it depends on several governmental actions throughout the world. The final balance and behaviour of agricultural and energy markets is also a mystery, since there is no literature or economic history to study.

Looking at small and medium scale production, there is a need to address this new activity by looking at the several products to be produced, such as protein concentrates, and their potential role in generating animal protein of high value, as the country needs to improve its capacity of local conversion of agricultural products in order to export products of higher prices.

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## 11. Biofuels: The future is today

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### 11.1. Biofuels

Biofuels are products used for combustion in engines or heaters, obtained from the processing of different biomass elements. The three most common types are biodiesel, ethanol and biogas.

Biodiesel is a renewable fuel substitute for oil, produced by the Transesterification of (new or used) vegetable oils or animal fat with a light alcohol (methanol, ethanol, butane), in the presence of a catalyst.

The ASTM (American Society for Testing and Materials) defines biodiesel as "mono-alkyl esters of long chain fatty acids derived from vegetable oils or animal fats, for use in diesel engines".

For example, the conversion rule is 1.03 tons of crude vegetable oil for each ton of biodiesel, leaving glycerol and fatty acids as by-products. If glycerol is refined, glycerine of pharmaceutical quality in a quantity near 9% of the total biodiesel is obtained.

It can be used purely or in diverse cuts, although the most popular use is in a 5% cut ("B5").

Ethanol is another renewable fuel substitute of petroleum fuel or gasoline, produced from the fermentation and distillation of sugar cane or sugar beet, or the saccharification, fermentation, and distillation of cereals or lignocellulosic raw materials. This is ethyl alcohol, obtained from the process of isotropic fermentation, conveniently purified to comply with a quality standard, compatible with the requests of makers of Otto Cycle engines.

The conversion rule is 20 tons of sugar cane for each ton of alcohol (remaining bagasse as by-product valuable in the cogeneration of electric power and CO<sub>2</sub>), or even, 3.5 tons of cereals for each ton of alcohol (remaining as by-products, grains and distilled dry soluble –DDGS– and CO<sub>2</sub>).

Hydrated product can be used pure –with a purity of 95.8 °– whenever vehicles have their engines adapted to such end, as occurs with part of Brazil's automotive fleet. But the world tends to use anhydrous ethanol, which can be cut with fuels; this can also be verified in Brazil –where the cut of ethanol approaches 24% of fuels, representing gasoline C–, as in the United States, for example. The use of anhydrous ethanol at 5% will be normal in the European Union. Other countries have established different cut programs. For example Colombia has established the obligatory use of ethanol at 10% in cuts with fuels.

### 11.2. Biofuels and the new energy paradigm

Biofuels occupy a prominent place between transitional clean energies. The main ones are biodiesel, ethanol and biogas, produced from agricultural, agribusiness or biomass raw materials in general; they constitute a sustainable production alternative in the medium and long term.

The most developed countries of the world have implemented and are perfecting active politics on biofuels to face the new energy paradigm.

The environmental conscience is very strong in the majority of those countries and everyday demands regarding air quality grow, hence the development of sustainable clean energies has a privileged place on the political agenda.

Biofuels are considered environmentally friendly. Although they generate emissions of different gases when they combust, they are produced from renewable sources; production plants of energetic raw materials have already participated in the

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photosynthesis process, capturing carbon dioxide from the atmosphere, which is freed by biofuels through combustion later on. On the other hand, the rough level of those emissions is very low compared with the ones generated by fossil fuels.

In the end, the global balance is highly positive for biofuels, and this gives conclusive support to the promotion of the obligatory mix with fossil fuels, thereby sensibly increasing their quality.

In comparison with hydrogen, biofuels have an enormous potential for development within the next two decades, since the former is conditioned by its technological production cost, its production cost, and by logistic and security matters. These problems are all of improbable resolution in economic terms during this time. Besides, for biofuels use vehicle conversion is practically not necessary, nor is a change in already installed fuels distribution installations. Consequently there are very significant savings.

Nevertheless, without fiscal incentives it is not possible to build a permanent biofuels offer adjusted to an optimum quality standard.

Some irrational theories maintain that it is not justified to "burn" food for its transformation into biofuels, considering the malnutrition experienced by millions of people. Other irrational theories maintain that in our country's specific case; because it is a world leader in production and export of food per capita, this business should be privileged, because it represents a more attractive business in the short term than that of the biofuels.

In this sense, agricultural commodities are an important source of energy and they present an enormously favourable balance between the energy requests of their production process and the quantity of energy they supply.

The possibility to add to them a new use beyond their traditional eating use, contributes to the expansion of their production limitations (which certainly should be ordered in a framework of absolute respect for a sustainable development of the environment) and represents an incentive for the development of new technologies that favour an increase in productivity, and accordingly of food offer.

On the other hand, market participation expected for biofuels is low, which prevents any negative collateral effects.

Also it should not be disregarded that their production generates very important quantities of by-products, especially worthy for stockbreeding, consequently improving the economic equation with a positive effect over food offer.

In the end, a "wealth effect" is produced on livestock, agricultural and agribusiness sectors, that favours the quality of global life and power of the food offer.

The importance of developing new energy alternatives should not be forgotten, which can mitigate crisis situations such as those experienced a short time ago, and which will also contribute to avoiding a decrease in the activity of all sectors of the economy, particularly those of food industries.

As such, it is apparent that the above-mentioned critics are erroneous.

Beyond relatively favourable prices for biofuels that could eventually be registered in coming years, it should constitute a basic premise that for the protection of the environment –an inalienable right of individuals and one of the fundamental objectives of every public management–, the development of policies for alternative clean energies represent an irreplaceable means of contribution.

### 11.3. Basis for a Biofuels Law

Developed countries succeeded in becoming developed by designing and executing sustainable policies for a long time, which privileged their society's collective welfare through an efficient allocation of scarce resources.

Both economic freedom and the preservation of the environment have constituted, for many years, priority matters in the agenda of the main countries on Earth.

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In this sense, it is indispensable to include a national law that promotes the investigation of biofuels, oleochemical and alcochemical, and the control of their production and commercialization.

This type of law should contribute in turning our country's comparative advantages in biofuels production into competitive advantages.

The protection of the environment should constitute a basic premise – an inalienable right of individuals and one of the fundamental objectives of public management-; As such the development of alternative clean energy policies represents an irreplaceable middle contribution for the achievement of this purpose.

Biofuels will have to compete in an oligopoly market, where the main raw material –i.e. petroleum– already exists.

Therefore, to achieve their development requires the state to smooth out the relative asymmetries with active politics. This has occurred in central countries and we should achieve it as well.

In order to avoid the fiscal costs that the state should assume, to be steered towards people who act outside the law in the future, a specialized authority of application should be created, with the participation of all the areas of State involved.

The promotion of investigation will give technological and scientific expertise to the activity, positioning the sector at the vanguard in the international context, and allowing at the same time, the enormous opportunity represented by the oil-chemical complex to be grasped.

The normalization of quality will provide endorsement of biofuels use in the engines by respective manufacturers.

Alternative cultivation promotion politics, for the production of biofuels that could be promoted, should contemplate especially the existing technological restrictions, the logistic aspects linked to the activity, and the barriers that could exist at the moment of giving them an industrial process, for obtaining oils and oil by-products, alcohols and for the commercialization of these products. Otherwise, the cost-benefit relationship of its implementation, will not be attractive.

Fiscal stability is a fundamental issue in attracting investments. In Argentina this has been provided in other industries, like those of mining exploration, forest activity, wind power, and recently by the promotion of the software industry to name a few.

It is justified for the issue that concerns us, by the fact that as in the activities mentioned, the ripening period of the required investments is extensive and the instability of the domestic tax systems absolute. Besides, the specific weight of taxes over fuels on the final price, to be absorbed in the future by the deductible biofuels, is significant, before an unexpected change of tax politics occurs.

The inapplication of the Liquid Fuels and Gas Tax to biofuels is necessary, and at the same time, indisputable. On one hand, that tribute –apart from its importance in the structure of fiscal incomes– represents from a theoretical point of view, an imposition on the pollution generated by fossil energy sources –not produced in the case of renewable energies–, and on the other hand, its eventual application to biofuels, due to its significant amount, would represent the final filing of any promotion policies. In the same sense, the exemption of biofuels from the Gasoline Tax –for biodiesel– and the Water Infrastructure Fund –for bioethanol– are fundamental.

Consumers do not act collectively, and even less so in countries like ours, where the environmental conscience is not established. Therefore, the price of biofuels should not be too different from that of conventional fuels.

Considering the average cost differences that biofuels register in relation to fossil origin fuels –at least in the short and medium term, in which fossil fuels in Argentina have a very low price compared with that internationally.–, significant fiscal incentives for the production and commercialization of biofuels should be offered to reduce those prices and to allow for the creation of a competitive price, that does not affect the consumer's pocket or index prices.

The obligatory cut of diesel oil and petroleum fuels with biodiesel and ethanol respectively, constitutes an exceptional instrument to make the development of a sustainable market of biofuels in the country possible, and the price variable represents –in the medium term– an efficient economic and technical solution, making petroleum companies comply with

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the increasing restrictions concerning fuels quality standards. It is worthwhile to recall that the aforementioned cut will also be registered in central countries in a very few years.

It is also remarkable that production and commercialization projects of biofuels can qualify for the Clean Development Mechanism established by the Protocol of Kyoto of 1997, which our country joined in the year 2000, and which became effective on February 16, 2005, being converted into International Treaty.

The contributions that each project produces over the certificated base level emissions will have an economic correlative through the so called "Certificates of Emissions Reduction", that the holders of the projects will be able to cash in in institutionalized markets.

The production and commercialization of biofuels has been regulated in Argentina by Law N° 26093 and Decree N° 109/07. Though this regime left many of these premises intact, mainly due to the lack of inclusion of the oil and alchochemical industry, by the absence of fiscal stability, and by the lack of an analytic methodology to prevent the impact on prices of the country's spouts, that the establishment of the obligatory cut will set against general evolution perspectives of the internal prices of fossil fuels,- at the same time , by creating "fiscal quota" (a mechanism that works as a license to operate in the local market and for which an analytic procedure for its granting was not assigned), good perspectives exist, as this legislation is just a starting point and will be modified by the next administration, beginning in 2008.

## 11.4. Evolution of the internal market of liquid fuels

Our country must manage its non renewable resources rationally, avoiding the postponement of productive investments due to the existence of an "energetic risk".

The tax policy must be used as an instrument to promote market balance. Hence, laws 25.596, 26.022 y 26.074 have made progress, temporarily exempting oil imports from tributes in 2002, 2005, 2006 and in 2007, up to a specific volume (in this last case, up to 960,000 cubic metres per year).

This situation is caused by the fact that the refining capacity of petroleum companies in the country is very close to its limit and there is small chance that it will be significantly enlarged, due to market specific features and investment figures in play, as well as the increasing income of heavier crude oil, in a framework of marked imbalance between the internal consumption of fuels and diesel oil.

It is also probable that the establishment of tributes exemptions to operations without any time limits is needed, with a consequential fiscal cost that society should absorb, as otherwise, a strong impact over consumer prices would occur, since liquid fuels' internal prices are managed by the government and their alignment index -contrary to what occurred in the 1990's- is below one.

That is why Argentina should not miss the boat, before the succession of events that announce the final arrival of biofuels.

It will become a priority that after the sanctioning of the Law of Biofuels, of its Statutory Decree and the respective complementary regulations, a serious productive strategy be privileged in the medium and long term, thereby smoothing at least, the uncertainty generated by the legal text, favouring the creation of an upto scale, normalized, and stable biofuels offer for the internal market, and not hindering the construction of a competitive offer to attend the requests of the international trade.

In that sense, we can expect the next administration to send clear signals favouring a fluid process of investments assigned to form the offer in the internal market of biofuels.

For now, the dynamic of this business comes from exports, a sector in which our country has important comparative advantages, due to its huge exportable surplus of agricultural raw materials and agroindustrial products. This area is very dynamic and will register significant levels of investment in the next few years; and the next national government will probably strengthen the policies covering this segment, thereby generating an excellent climate for trade development.

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## 11.5. The possible impact of biofuels on internal economic activity

It is unthinkable that the application of this kind of program will not produce a positive impact in economic activity and employment (just looking at the experiences of the USA and Brazil, for example).

While in Argentina activity in the internal market cannot take off due to the late sanction and regulation of the law of biofuels, the EU-27 promised to use a minimum of 2% biofuels in the total market of transport fuels from 2005, a figure that will increase at a rate of 0.75% per year, until arriving at a total of 5.75% annually in the year 2010 (increasing biofuels demand to 12.98 million cubic metres for biodiesel and 9.1 million cubic metres for ethanol).

Ethanol production in Brazil and the USA represents more than two thirds of the world production, and recent biofuels promotion measures in both countries will impact positively on the production of biodiesel. Between direct and indirect jobs, both generate more than 200,000 jobs in each country.

The contribution to employment generated by PYMES (small and medium size companies) dedicated to the oil and alchochemical activity is very important, and this activity has a great future, which will slowly displace the petrochemical industry.

Thus, there comes the question: are we in a position to waste such a business opportunity, both internally and externally?

Carrying out a simple analysis of the actual market volumes, considering that the internal market for diesel oil was of 12.9 in 2006 and of fossil fuel 4.3 million m3 per year respectively, with a foreseen cumulative increase of 5% per year respectively, the obligatory cut of 5% foreseen in this first year's quarter will generate an annual market of 690,000 tons of biodiesel (equivalent to 711,000 tons of oil, little more than 8% of the national production foreseen for the year 2010, when the cut will be effective) and 208,000 tons of anhydrous ethanol (a figure close to the volume of moisturized ethanol actually produced in Argentina, which is assigned for non flammable uses and comes from 90% sugar cane ). Plus there will be an important increase in consumption of diesel oil to supply the electricity market, of about 2.4 million cubic metres per year. This could generate an additional increase in the internal consumption of biodiesel of 106,000 tons per year.

In the case of anhydrous ethanol, its participation in the internal market could increase to about 83,000 tons per year, every time taking advantage of the predicted fiscal incentives in the bill, in which the ester production for biodiesel destined for the internal market will be done from ethyl alcohol.

In parallel, as long as the internal biofuels offer is consolidated, important opportunities to export to central countries will arise, as has already been mentioned, not only for biodiesel, but also for anhydrous ethanol, pure or as ETBE. Without any doubt, Argentina will become one of the biggest players in the international trade of biofuels, expecting that by 2010, the installed capacity -independent from the internal market- will be of 2.2 biodiesel and 1 million tons of ethanol per year respectively.

In the long term (15 years) the implementation of the biofuels program will lead to an increase in production, until it surpasses 10% of the market share of fuels. Adding these origins to the participation of biomass in the generation of energy in the electricity area and others that are less important, it is probable for the above-mentioned percentage to be also the participation of non hydraulic renewable energies, in the total of our energy.

Thus, discounting the flows of incomes and fiscal expenses at a representative interest rate resulting from a dynamic assessment, it is absolutely impossible that fiscal accounts will end up in the red. An important opportunity has been opened for society as a whole.

## 11.6. Biofuels and the agricultural sector

Biofuels represent an excellent opportunity for the development of a new business for the Argentine agricultural sector, sustainable both from the environmental and agricultural points of view.

The probability of enlarging the agricultural boundary is high, as is the possibility of diversifying crops, beyond traditional ones (considering that there is a great amount of species suitable for generating biofuels, such as rapeseed, castor-tartago-coconut palm-castor, foddered turnip, cynara cardunculus, Jatropha curcas-pinhao manso, palm, coconut palm, and cártamo, etc).

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Very good conditions will be generated by allowing corn to enter the agricultural rotations more frequently, with a consequent benefit for soils, due to additional carbon contribution, levels of CO<sub>2</sub> emissions, and the conservation of the environment in general.

Additional impacts will be experienced by the agricultural economy, due to the interaction between the regional production of biofuels and their proximity demand. There will be less freight to favour livestock activity due to a reduction in the cost of foddered food -by using new by-products- and a strengthening of scale economies, through the creation of new groups of interest to take part in collateral business, which are meant to cut supply prices or reduce certain elements of the so-called "out of the gate cost".

Producers will have the opportunity to get involved as partners of the new undertakings, associated in cooperatives or other partnership figures, or by becoming partners with fossil oil companies or/and oil companies to strengthen the synergies of the business.

Alternatively, they will be able to celebrate strategic agreements with undertakings that would be installed for the supply of cereals and oleaginous, as well as for the consumption of biofuels and by-products, thereby strengthening the benefits of farm exchanges, tolling or other specific instruments.

It will become essential to form an opinion in the agricultural area of the importance of involving oneself in the production of biofuels, to create a credible framework for future investors coming from this area, thereby overcoming the "land – industry" dilemma.

To conclude, we have to emphasize that the development of biofuels originated with agricultural producers, who strengthened it in big countries in Europe and the USA from their cooperatives.

The countryside was historically a great oil company's partnership, but today it can become a great partner. Nord-ETBE Company, from France, between Total Oil company, agroindustrial enterprises and agricultural producers, is an excellent example of this tendency.

An alliance between the agricultural and the petroleum industries was produced with the common goal of building a new area of economy.

It remains then to be expected that this "power of two" in Argentina will appear exactly with that of two of the areas that by their dynamic, are the main actors in the economy, and that now they will flow in accordance with the new energy paradigm.

## 11.7. The industry's status today

In order to talk about biodiesel, we have to first make a review of what is happening regarding vegetable oil supply. The Argentine oil industry is the most efficient in the world. It accounts for a crushing capacity of 157,000 metric tons per day and exports more than a 90% of the oils it produces. This is one of the most relevant factors supporting the strong takeoff of Argentine biodiesel.

Up to the end of September 2007, the Application Authority – which is the National Energy Department – authorized seven industrial plants, which are positioned for exports. These are: Vicentin – plant in Avellaneda, Santa Fe; Derivados San Luis – plant in Villa Mercedes, San Luis; Soy Energy – plant in Villa Astolfi, Buenos Aires; AOM – plant in Pilar, Buenos Aires; Bio Madero – plant in Villa Madero, Buenos Aires; Biodiesel – plant in Sancti Spiritu, Santa Fe; and Renova – plant in San Lorenzo. Altogether, they add an installed capacity of approximately 407,000 tons per year of biodiesel.

In October 2007, two plants will open, with a production of 200,000 metric tons of biodiesel each, one belonging to Renova (partnership formed between Vicentin and Oleaginosa Moreno, the latter from Glencore Group) the other to Ecofuel (partnership formed between Aceitera General Deheza and Bunge). During the next year these plants will open: Unitec Bio (Eurnekian Group), Molinos Río de la Plata, Louis Dreyfus, Patagonia Bioenergía and Explora, among others, taking the installed capacity to 1,700,000 metric tons of biodiesel per year.



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It is to be expected that in the year 2010, that capacity will surpass 2,200,000 metric tons. We will have to add eventually about 800,000 tons per year to the previous figure, for the plants that will supply the demand generated by the obligatory cut of diesel oil with 5% of biodiesel, established by Law 26.093 and DR 109/07. Moreover, similar demand should be expected in order to comply with the cut of fossil fuels with 5% of ethanol, a fact that will summon a production for these purposes of 208,000 metric tons per year.

The export offer mentioned before will place Argentina among the main producers and exporters of biodiesel of the world.

The construction of a biodiesel offer to supply the internal market is much slower, but this situation will probably change in 2008 with the changes we expect the administration to introduce in law 26.093. The main changes should aim to obtain fiscal stability and greater predictability in general (among others, aspects linked to the allocation of the fiscal quota should be corrected, as should the necessary participation of alcohol distilleries next to the sugar industry, the obsession of the price that will govern the operations of the internal market to attend the obligatory cut, eventually the supply from exporters in the case of a deficit in biodiesel offer in the internal market, the allocation of direct subsidies, the investigation and development of matters of alternative energy cultivations, etc.).

To conclude, biofuels represent an excellent opportunity for Argentina, and a solid alternative in the long term for the international business world.



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## 12. Bioenergy: an opportunity to add value and promote development at the local level

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### 12.1. Introduction

A feasible, necessary and virtuous opportunity. That is what bioenergy development means for our country. The necessary conditions are there. The international context is favorable; the need for finding alternative forms of combustion to better preserve the planet is becoming an incentive and the high productivity and efficiency of our agricultural and cattle-raising activities create an excellent starting point. It is up to us, of course, to make the most of these favorable conditions. Not shrillness, but serious and responsible work, by investing in infrastructure and research, having the appropriate legal context, and looking beyond the current situation with analysis of medium and long term projects. Now is the moment.

The world's energy matrix is critical. Not only is it affected by the historical rise in oil prices due to political conflicts, but also by the growing supply restrictions. A limited and non-renewable resource sooner or later runs out and there are consequences involved. This is what is happening, not only here, but in other parts of the world as well. And that is not the end to the story. Oil demand continues to grow as a result of the logics of capitalism and this requires concrete solutions so as to avoid intensifying conflict. Some believe that the future of energy will be connected to hydrogen; some others, to solar energy. Whichever the case, there is no doubt about the fact that fossil fuels are progressively being replaced by renewable sources. It is believed that fuels of vegetable or animal origin will play an essential complementary role in that long replacement process. And our country has the capacity to supply significant and growing amounts of them.

Ecology is also part of the question. Fossil fuels, such as oil, release carbon dioxide into the atmosphere that cause global warming and growing climate changes, which are highly damaging for the future of all species. The use of bioenergy, on the other hand, would constitute an actual partial solution to this problem, since gases recycle in a continuous manner through photosynthesis. In addition, it would contribute to reducing pollution caused by lead, CO, SO<sub>2</sub>, smog and hydrocarbon. It is true: some are already warning us about unwanted collateral effects. The advance of the agricultural frontier to respond to such demand would be the first issue. Out-of-control deforestation and the associated risks would be another. But they can all be avoided by the rational and more responsible use of resources, and by having quality parameters and clear policies for territorial order. None of these are impossible for us to do. In fact, we should have done this a long time ago, even when there was no discussion on the alternative of biofuels.

Some countries are already taking this path and they are avant-garde. Germany invests in serious research and biodiesel production from rapeseed oil. Europe seems to lead this movement but they are not the only ones. Not only because they have benefited from the positive results of this business, but also because of strict community dispositions. For instance, by 2010, 5.75% of fuel should consist of biofuels in all member countries of the Union. A similar case is that of the United States, where it will be mandatory for fuels to have an average of 10% of ethanol, extracted in this case, from corn. In fact, the latest State of the Union Address by President G. Bush estimates consumption of 132 billion tons of corn alcohol by 2017, that is to say, 146% of the current sowed surface in that country. However, there is no need to go so far away to find advances. Brazil has been doing research on bioenergy resources for three decades, is today the largest producer of sugar cane bioethanol (50% of sugar cane is used for this purpose), and is becoming strong in the development of new by-products. These countries are working towards the future and we should follow their steps.

Saying these words time and time again will not be enough. Developing a bioenergy platform in our country constitutes an opportunity beyond being beneficial. The reasons are many. On one hand, there is the actual possibility of applying the comparative advantages and the high productivity of our agricultural and cattle-raising activities to the bioenergy obtaining

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process. The country has the most competitive vegetable oil production industry in the world and we must make the most of it. Also, the possibilities of satisfying additional demand are high. Europe cannot supply itself with its current production levels, and the situation will become worse when new dispositions come into effect. In addition, there is the demand from Japan, China, Korea and India, which will therefore translate into growing importation that our country will have the capacity to satisfy.

Those are not the only benefits. Intensive bioenergy production will help achieve a goal the country has not always been able to achieve in other contexts of growth. That is, it would allow consolidation of a model where agricultural profits can be used to generate genuine employment, with no need to resort to transfers between sectors via distorting taxes. The harvest of grain, oleaginous crops, and sugar cane for example, should be industrialized in the same region where they are produced and so that part of that added value would stay in the local economy. This virtuous cycle can also be created by promoting production cooperatives for the self-consumption of biodiesel or through the diversification of crops resulting from it. The number of benefits is too high not to do anything about it.

Fortunately, the commitment to carry out this project today is greater than rejecting attitudes towards it. Not long ago, the country adopted a national law aimed at promoting biofuels and it states the will of the executive power to create, through its administration, the necessary conditions for investment projects that are already in effect, to become real, and for new ones to come up in the future. Thirteen projects were announced between January 2005 and August 2006, at an estimated investment of 285.5 million dollars. The first biodiesel production plant was opened in October 2007 in San Lorenzo, Santa Fe province. And more are likely to come. It would be great for us to make the most of them, in order to promote development and create work opportunities.

## 12.2. Adding value and promoting local development

To add value: a central question in Argentinean strategies. Something all countries that have decided to walk the path of development know very well. So do we, but we are used to moving back and forward and we know that we could blame our backwardness on our insufficient capacity to hold on to that premise. In this sense, our agricultural and cattle-raising activity has proved to be mature, and it is providing the picture with that "extra element" that is necessary to take huge qualitative steps. A growing investment in technology, a radical reform of sowing systems, and serious investigation are promising items, just like sustained development of a modern and efficient agricultural industry. Those are the steps to take, and at the same time, they are the only way to seize on the opportunities that may come up, and, to build a more integrated and inclusive society.

Bioenergy is an actual possibility for our country, and it's an activity that could produce positive results. The world is moving in that direction, driven by the need to replace, in the medium term, its non-renewable and polluting fuels of fossil origin with other sources of energy that are less harmful and not so causative of conflict. The good news is we have the potential to fulfill this demand and more, and to turn this growing urgency into a profitable business for all. The vegetable oil production complex could very well be a considerable starting point, with its capacity to process 50 million tons of soy per year. It is one of the most efficient and productive ones in the world and it would not cost much to use these advantages in local biodiesel production, since 80% of the cost is vegetable oil. Ethanol production to replace petrol could also be easily carried out. The structure needed to process sugar cane, corn, and other cereals and organic waste requires adequate and continuous investment, but the results are very promising.

It is true that so far, most of the investments that had been planned are in the hands of major players in the sector: vegetable oil producers, stockpiles, and petro-chemistry. This is only natural, especially in the initial stages. They have the capital to do it, and a structure that allows scale-production and protects them from possible risks, with costs that are not too clear yet. But this activity, though in the making, could bring good business opportunities to those in other segments of the sector, to produce smaller volumes which could have considerable quality standards. Of course, there are real intentions for this to happen. Furthermore there is necessarily a responsibility towards this for the benefits this could bring in economic and social terms, by stopping migratory movements in search for work opportunities, and by correcting regional asymmetries. The Biofuels Law seems to be a valid incentive. And more incentives will probably be needed.

To be more specific, bioenergy constitutes, among other things, an inclusive challenge for our country. It would create the necessary conditions to generate several local development poles and it would allow industrialization of primary production at the point of origin. This not only adds value to the relevant region but it helps better distribute profits, which would therefore benefit more players. Let's take the case of soy, for example, which immediately after being harvested, begins its exportation process. This model would allow it to create a new virtuous circle. Its 20% oil would be used to produce biodiesel and the remaining 80% -rich in proteins and the basis of all quality balanced foods- could be used to feed animals and develop, at

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the same time, a very important market for meat and dairies. But soy would not "star" in this business by itself. Bioenergy development could also allow for the diversification of crops, since soy could alternate, depending on the environment, with other crops that are as productive –and sometimes more productive– in terms of oil percentage, such as rapeseed, castor-oil plant, sunflower, or corn. Alternation with corn, as already mentioned, due to the high prices of the product resulting from the high cost of extracting ethanol in the US, also enhances the global sustainability of our production systems, allowing us to drop the single-crop scheme (soy).

Investments in the biofuels business, whether in production plants or in the entire infrastructure associated with the transformation of by-products, generate a highly positive impact on the general economy. This would increase the product and service demand at the local level –that is to say, in the communities–, thereby generating genuine economies at the local as well as at the regional level.

In order to get the biofuel and by-products system started, chemical products, electricity, gas, transport, logistics, and technological and legal services will be required. Thus, it is necessary to create a whole network of players associated with the business system in the fields of biofuel generation, meat, milk, eggs, etc.

The system would not only increase the income of the agricultural and livestock producer, but also create a multiplying effect on the population involved in the biofuels and by-products business. In this sense, it is very important to identify the significance of creating associations amongst biofuel –as well as animal protein– producers.

Northeastern Argentina (NEA) produces over 2 million tons of soy; 1 million tons of corn; and 1 million calves are exported to other regions of the country. On the other hand, the region imports 73 million dollars worth of red meat. Extra-zone importation includes almost all consumed chicken, pork, and dairies. NEA produces between 4.5 and 7% of the red meat in Argentina (depending on the information source), and it consumes 8%. The region registers a per capita annual consumption of 50 kilograms of red meat (2002), acquiring a significant portion of that consumption from other areas. The annual slaughter figures for the region are 650,000 animals, with a very low extraction rate at 19%. While the Pampa Region produces 720,000 tons of meat above its consumption needs, NEA must supply itself from other areas with 148,000 tons per year. The region covers 63% of its consumption with the production of other areas, that is, 116,000 tons of meat, which account for 530,000 heifers. The expansion of agricultural borders and the possibility of intensive cattle-raising activity integration, connected to sugar cane and corn by-products, as well as citric crops, are a sign of the potential growth of the cattle-raising activity in the region and the possibility of reducing the flight of capital out of NEA.

Also, the potential to generate efficient cattle-raising activity, capable of reaching external markets in the medium/long term, becomes evident. Work is already being done on this basis and it seems more relevant in social terms, in accordance with the move away from traditional vegetable oil production.

The case of the project carried out in Añatuya, Santiago del Estero province, is an example of this effort to find alternatives. There is soy there but it is the kind of soy from which less profit is obtained and the locals get less benefit from. Therefore, the local commune is working so that a greater share of the profits stay with the population, and so that production can also be used to develop the fuel the region needs so much. But this option is not only a native gesture of good will. International experience also shows that bioenergy and local development go together. It has happened in Europe and in the United States. In the US, for instance, producer cooperatives have captured most of the added value. This is not a minor issue for a country that ground 50 million tons of corn for ethanol production last year.

Bioenergy production handled by these small or medium sized associations is unlikely to develop enough volume so as to cover exportation quotas, especially in a market growing in demand. Or the local market may turn out to be too big for them. But they can serve a wide regional space in order to decompress fuel supply, and above all, their own needs. By 2010, biodiesel will have a local demand of 632 thousand tons per year; and 160 thousand tons of ethanol; a market worth focusing on, if these segments are allowed to have their share of profits as well.

In order to be able to carry out this strategic proposal for the whole country, we must not forget the significance of working within a clear institutional environment with clear regulations, capable of generating a greater level of certainty. Official incentive will therefore be more than necessary, covering advising, tax incentives and promotion strategies. We must not waste the opportunity biofuels are providing us, to work with the whole society on local and regional primary production territorial restructuring. In this sense, it will be very important to apply a certification system to grain production, in order to make this business environmentally sustainable. But above all, it will be essential for new actors in this to have enough time to consolidate themselves and achieve sustainable growth as well. Hopefully, we will find the way to bring most of it in order, so as to promote development and create new work opportunities.

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## 13. Building the country kernel by kernel

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### 13.1. Introduction

Its multiple uses accompany our daily activities almost unnoticed. From basic foodstuffs to plastics and textiles, total gross sales of the Argentine corn and sorghum industries are more than 6 billion dollars annually. This is not just a figure, hundreds of thousands of Argentines work daily in this sector and are committed to the improvement and development of new products, and to the conquest of new markets. An objective that translates into a higher income for the country and for the well being of all citizens of Argentina.

In this spirit MAIZAR- the Argentine Corn and Sorghum Association- was founded. It calls on all members throughout production, commerce, industry, the feed and food industry and the exports value chain, to promote these crops and to increase the total supply for the value adding industries.

#### *United through Corn and Sorghum*

Unlike many other organizations, that only gather representatives of one activity, MAIZAR reaches people openly and widely. It sets as one of its basic objectives the creation of wealth along the whole corn and sorghum value chain, the search for sustained development of the crop and all its related industries, and the consolidation and increase of our export markets.

This wide view provides an innovative position at a time that presents a tremendous challenge for the Association, since the integration of visions and interests of different industries is what it is all about. This challenge is the key to achieving higher knowledge, value added, larger and better businesses, and more jobs. These are achievements that in the end will contribute to the creation of a more solid and successful value chain, and a better society.

MAIZAR works constantly to make the political and business communities aware of the importance corn and sorghum have in the creation of economic activity, and their capacity to boost value added processes and employment.

### 13.2. The Argentine bioenergy value chain

The world is facing a deep energy matrix restructuring. The central issue focuses on the use of renewable energies to decrease the environmental impact of fossil fuel use. This situation offers Argentina a chance to develop a new value chain, and thus supply domestic and foreign demand with renewable energy on a large scale.

This complex challenge can be approached from two different standpoints:

1) Relying on spontaneous and isolated actions of individual value chain players who invest according to their own individual views.

2) Setting a series of common goals that are taken as one by all value chain participants.

As mentioned above MAIZAR is a non profit organization that coordinates the participants of the corn and sorghum value chains of Argentina. The members are divided into five different sectors.

Based on relationships between value chain participants from the five sectors, a common strategy is agreed on, and this strategic plan is discussed with local, provincial and national authorities, and the different communities involved in its

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development. The attraction of investors, the creation of new jobs, and the opportunity to produce value added products are essential elements of the Argentina we believe in for the future.

MAIZAR set the cornerstone for the ethanol and other renewable energy value chains based on inquiries from members of the Association who, after analyzing the dramatic change on the world's energy matrix, asked MAIZAR to discuss and plan the basic elements of a successful corn and sorghum ethanol development plan.

The debate included all work commissions, and from the conclusions reached, a group of goals were set. These goals intend to include all possible participants in this new value chain, in the belief that with a common vision in mind the potential of this industry will be maximized.

### 13.3. Setting goals

When analyzing the Argentine corn and sorghum situation, one finds that their planted areas have been steadily falling since the 1970's, and for both crops the 2005-2006 season was the lowest in the whole period. (2.4 million hectares for corn and 300 thousand for sorghum). Therefore all participants agreed that for both crops the planted area could be increased by 1.3 million hectares in order to recover part of the area lost.

It is interesting to note that the planting season of 2007-2008 will have an increase of over 1 million hectares already, in comparison to 2005-2006. The corn crop will cover 3.1 million hectares and sorghum over 800 thousand hectares.

The overall potential for the area planted with corn and sorghum in Argentina ranges from between 6.5 and 10 million hectares, as can be seen in different studies by private institutions like Fundacion Producir Conservando, and other academia.

The proposed increase in planted area should generate an extra 10 million tons of corn and sorghum. This additional production can be exported or transformed into a higher value product, for example four million cubic meters of ethanol and 3.5 million tons of Distillers Grains, to be supplied wet or dry to the Argentine cattle, dairy, pork or poultry industries, which are all seeing a strong and steadily growing increase in demand.

The proposition includes the creation of three renewable energy clusters in regions far from the main ports. This will allow crops of marginal regions to conquer markets that would be out of reach, due to high transportation costs.

### 13.4. Actions for each link of the chain

In order to have a coordinated development of an Argentine biofuel and ethanol value chain, and thereby maximize our country's potential as a supplier of renewable energy, a series of key actions are needed:

The scientific and technological sector, public as well as private, should promote research in corn and sorghum crop technology, including biotechnology of plants, bacteria, and enzymes for the industrial process. Cropping techniques are needed to increase the energy balance, green house gas capture, and overall per hectare energy output of these crops.

Research of second generation biofuels, including pyrolysis and other thermochemical technologies, as well as lignocellulosic fermentation and use, must be started. Research into diesel and otto engines' ethanol combustion, and the use of other fuels from these crops and their byproducts must be continued.

In regards to farm supply companies, new types of corn and sorghum are appearing worldwide, and new biotechnological events are cornerstones of new applications in the energy, food, feed and other materials industries.

Therefore if we are facing the start up of a new industry the approval of these technologies is critical, and its paperwork and control is a time consuming and awareness creating task, to be taken by public and private leaders simultaneously.

There is vast opportunity for Argentine engineering and industrial development through the planning and construction of a series of ethanol plants that would transform 10 million tons of corn and sorghum cereal, as well as the stover and straw needed to generate the steam and electricity to power them.



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These large investments should look for optimal locations within communities that appreciate job creation, new investments, and the transformation of agricultural raw material into a higher value product. Agreements between Argentine engineering and industrial technology and the world's leaders is critical to the achievement of world class competitiveness.

Ethanol and other biofuel trade and logistics are becoming a fundamental issue in this new sector. We believe the world's leaders in biofuels trade should know the potential of Argentina as a reliable supplier of ethanol and other bioenergy materials. The continuing work with our Ministry of Foreign Affairs and Agriculture is essential to the achievement of a position in front of today's potential clients. The planning and execution of the adequate logistic infrastructure needs through understanding and massive investments that can only be organized with the support of overseas banks, funds, and firms specializing and interested in the long term development of a supplier of biofuels from Argentina.

Pipes, ports, terminals, biofuel storage facilities, trains, barges and trucks, etc. The creation of futures and options markets also presents an opportunity for an increase and improvement in the Argentine capital market.

#### *An opportunity for farmers and local businesses*

Farmers should promote the construction of ethanol and bioenergy plants owned by associations of farmers, and actively participate in the launch of this new industry. The adoption of crop technologies and the commitment of suppliers to new technologies and new farm supplies, that will increase the competitiveness of corn and sorghum, will help the rebirth of rural areas.

The investments in new ethanol industrial plants, the technology associated with it, and the addition of activities related to its operation, generate a very positive effect on the local, regional, and national economies, that stimulate activities in isolated rural communities, as has been seen in many countries.

The installation of a plant necessarily increases the income of farmers, as the increased demand for their crops is transformed into a higher price for commodities in their place of origin.

MAIZAR has invited several opportunities leaders in the ethanol business from the USA and other countries, to help Argentine farmers understand the role of farmers in transforming their crops into higher value products through bioenergy. US Farmers' coops are a good example of this new reality.

## **13.5. From theory to practice**

To reach this objective we find that it is essential to recognize the importance of regional development and wealth creation close to the original place or region where raw materials originate. Therefore, we are convinced that Argentina can create a biofuels value chain and that all members of our society can be included in, and committed to, its development.

To build a world class value chain, from a long way inland, each actor of every link must be highly competitive and focused on their competitive advantages. However this alone will not assure that the whole chain will be successful. It is also critical to work on a sense of belonging, and a commitment to the common goals of each and every participant, permanently renewing and reviewing the strategy and achievements.

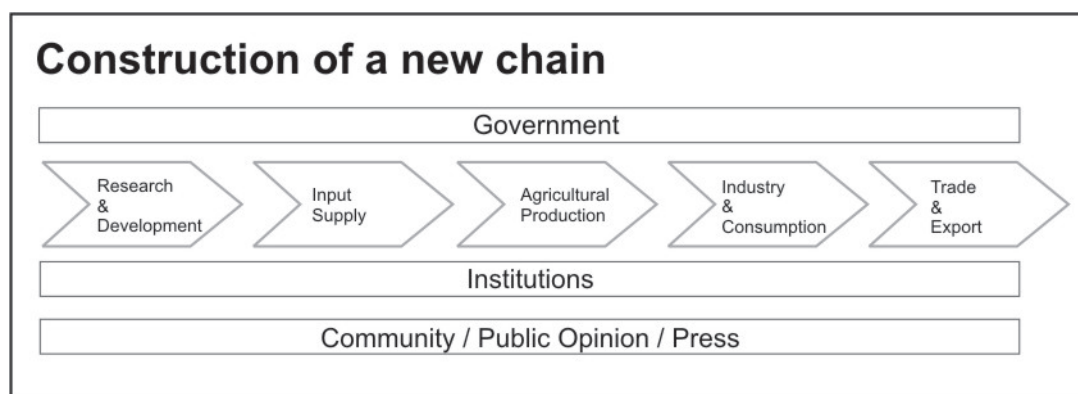
## **13.6. Structure and strategy of a value chain**

Bioenergy can serve to develop and motivate, from the farthest and most isolated regions, to the most central and sophisticated sections of a society.

It is crucial to work with each and every one of the actors in each link of the value chain in order to create a strategic plan that includes all stakeholders, including those who are part of the chain and those who view it or control it from the outside, such as governments and NGOs.

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The following links are proposed in the creation of this new value chain, and other stakeholders are seen in the diagram:



### 13.7. New institutional culture: skills and habits

#### *A - Sense of belonging.*

The only way to plan and create a new reality is by assuring that each actor assumes his role as part of his community, town, etc. Therefore the initial step in the creation of this value chain is to have all actors strongly linked to the reality they live in, and the need to improve it. The idea that solutions belong to the sphere of a higher authority and will "come from above" must be opposed.

This is important in countries like Argentina, that have suffered economic and social crises which have divided communities, and no group wants to be associated with failure or defeat, while most feel that the other group was responsible for the crisis and the impoverishment they suffer.

It is crucial that all sectors be invited on an equal basis. (scientists, farmers, local and multinational businessmen, traders, exporters, industrialists, as well as local, provincial and national government officials, etc.).

#### *B - Dedication and commitment*

Feeling part of one's community is not enough to create a new reality. Therefore each actor must participate in a debate that is indispensable to the planning of the future. One typical indicator is the time dedicated to non profit organizations that propose and commit to the goals the community is setting for the creation of a new value chain.

The goals and objectives set must be internalized and made public, so that each person feels responsible for the achievements of his company, industry, university, research center, etc. Competitiveness of each link of the value chain can be measured through international benchmarking.

#### *C - Conversations and information*

Conversations build possibilities and actions. Work develops within these conversations. Therefore institutions are the result of conversations that have decided and planned how work is being done.

Therefore the more similar the cultural background of people the higher the chance of having everyone understand precisely the same thing. It is absolutely critical that all actors of every link of the value chain understand and interpret the same idea. To obtain this, active listening and comprehension are to be promoted and worked on thoroughly. Speaking the same language is no barrier to misunderstandings and uncoordination.

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#### *D – Negotiation and consensus:*

The ability to listen and express oneself in an environment conducive to good communication creates room that is indispensable for negotiations and coordination. The most challenging task today is to develop an institution in which all actors will feel safe to negotiate ideas and reach consensus.

#### *E – Trust*

Societies with high levels of trust are capable of achieving levels of coordination that lead to the creation of large organizations, and networks of businesses that can be globally competitive. This concept is also applicable to the creation of a new bioenergy value chain.

Trust within a value chain is created by the transmission of coherent, relevant and true information to all actors, and by the fulfillment of the goals and obligations each actor assumes.

#### *F – Continuous improvement*

The hardest achievement of all is motivation for continuous improvement. In many organizations and countries, finding who is guilty is enough, and solutions are never searched for or implemented.

A value chain has no meaning if it is not oriented towards the permanent search for competitiveness through continuous learning and the adaptation of practices and attitudes necessary to face the challenges that change brings along.

#### *G – Entrepreneurial and innovative initiative*

The endless search for opportunities, and the capacity to anticipate what will come, is critical to seizing the new scenarios generated in the modern business world. In many occasions countries like ours have lost opportunities for growth and development, and a lack of preparation was always critical.

Support and coordination between all members of the future value chain must allow the creation of a new culture, based on creativity, and the search for new opportunities and horizons, as opposed to the fear of error and failure.

## **13.8. Conclusion**

MAIZAR works very hard in order to have this vision of a wholly integrated value chain. With an optimistic view of the new paths the world of bioenergy are opening, convinced that Argentina has the people, the resources, and the tools to develop a private-public strategy that will involve our whole society towards a common goal and a new vision of our nation.

We invite you to contact us and find out more about Argentina and opportunities in the bioenergy sector.

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## 14. Overview of the argentinean agroindustrial and soy complex facing the production of biodiesel

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### 14.1. Introduction

The land surface for cultivating soy has grown dramatically between the 1990/91 harvest time and 2001/02 – in Brazil (by 106%), in Argentina (by 170%), and in Paraguay and Bolivia (by 125%). It was in the 2002/03 harvest time that production in those countries surpassed that of the USA for the first time. Demand for soy and its by-products continued to increase, basically because of the entrance of China to demanding markets.

A translocation of the productive world soy area is taking place, USDA's estimations about future progress in 2004 placed Argentina and Brazil with 40 million tons and 73 million tons respectively for 2012. Nevertheless, it was in the 2005/06 crop year that Argentina exceeded 40 million tons, and 46 million tons in the crop year of 2006/07. For 2007/08, USDA foresees a World production of 225.32 million tons of soy.

Apportionment of world production (main soy producing countries)

USA:	71.44 million tons.
Brazil:	61 million tons.
Argentina:	47 million tons.
China:	15.6 million tons.
India:	7.9 million tons.
Paraguay:	6.2 million tons.
Canada:	3.1 million tons.
Other countries will produce	9.81 million tons.

China will continue to be the principal soy importer. It will buy 34,5 million tons from the international market (almost five million more than the amount it imported in 2006/07) The European Union (made up of 27 States) will import around 14.88 million tons, Japan 4,15 million tons, and Mexico 3,95 million tons.

As in the last four years, the major soy exporters in 2007/08 will be Brazil, the USA and Argentina. It is predicted that Brazil will export 29.68 million tons, the USA 27.76 million tons, and that Argentina might exceed 10 million tons of exported soy in the 2007/08 season.

Between the harvest times in 2002/03 and 2006/07, the surface continued to grow. During this period, Argentina achieved an all-time high harvest record for the country, reaching 2990 kg / ha., with a performance of 34.5 hundredweight average in the central soy area and 30 hundredweights/ha in the North West. The lowest performance was seen in the South of Buenos Aires Province, with an average performance of 21 hundredweights.

Brazil and Argentina account for more than 90% of the surface and production of the region. In Argentina, the surface has continued growing, thus reaching 16.2 million ha in 2006/07 and an estimated production of 46.7 million tons.

This performance was achieved with an interplay of very beneficial weather conditions and the application of a better technological package that became established in the last few years. In a great proportion of cases, this was done on soy predecessor, causing mainly a situation of crop only.

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Argentinean provinces sowed in the following ratios over the last five years on average: Córdoba 31%, Santa Fe 30%, Buenos Aires 21%, Entre Ríos 5%, Chaco 3,6%, Santiago del Estero 3,6%, Salta 2,6%, Tucumán 1,6% and the remaining ones 2,4%.

In regards to production, provinces participated in the following way: Córdoba 27.5%, Santa Fe 25.4 %, Buenos Aires 26%, Entre Ríos 7 %, and Chaco 3.4 %, among the most important.

It is estimated that the Argentinean soy complex, in terms of current prices, will account for more than US\$ 13,000 million in exports, thus becoming the largest segment of the Argentinean economy with 43% of agro industrial exports.

## 14.2. Strengths of the soy chain in Argentina

- **High competitiveness in the production of soy:** The average performance is among the largest in the world, and continues growing.
- **For the producer, soy has become "the best choice for growing".** Soy gross margins are higher than those of other crops, using less capital and investment per surface unit.
- **Expansion to all agricultural and cattle farming areas.** This growth fortifies the crop with different ways and competitiveness, as a raw material supplier for the agro-industry.
- **Beneficial weather conditions in new areas.** This contributed to the initial expansion in marginal areas, but the climatic risk must be reduced by applying a technological package adapted to different situations.
- **Full activity for genetic improvement.** The continuous launching of new varieties with a higher performance potential, and the diversity of ripening groups adapted to new handling situations in different ecological areas. We must highlight a considerable delay in the release of new biotechnological events.
- **There is an active participation of institutions and companies in organizing events to spread the news.**
- **Skillful and competitive producers.** Producers are tireless, always eager to get a wider knowledge in order to produce more and better within the difficult macroeconomic conditions of Argentina.
- **Fluent commercialization of transgenic soy.** In spite of external pressure to do otherwise, Argentina did not have, and has not had, any problems in selling its products.
- **Great competitiveness in the industry of industrial soybean processing.** The permanent investments, the modernization of plants, and the strategic location of the agro-industrial pole on the Parana creek, add a determining factor in the local competitiveness of the chain. In the last few years more than US\$ 1,500 million have been invested in new plants and in Rosario's agro-industrial complex. The local crushing capacity is approximately 48 million tons per year.
- **Development of ports and navigable routes.** The privatization of the ports and the dredging of the Parana River were decisive elements in the export logistics. The increase in the river level will encourage this situation even more.
- **Proximity to the production sites of ports and industries.** The processing industry installation was fostered on the Parana coast, but the mediterranean provinces have restrained their investments.
- **Increase in storage capacities in fields.** The distortion with respect to other producing countries has oscillated due to the investments made in new plants and in the use of silo bags.
- **Diversification of soybean oil and flour importing countries.**
- **Increase in relative world prices and domestic devaluation of the dollar.** The joint action of these factors has been decisive in the improvement of the financial situation of the production sector, in the attraction that primary production exerts on investors who are outside the sector, on the capital availability to invest in equipment, machinery and so on, and in contributing to the well-being of the country's inner communities.
- **Independence of the soybean complex, in spite of the changes to the critical economic situation, the domestic policy, and the tax pressure placed on the sector.** Undoubtedly, this is due to the relatively high prices of soy worldwide.
- **Successful campaign on the local consumption of soy by-products.** Although it does not have any effect on the global domestic consumption of the complex, it has helped to put the soybean in regard as one of the local assets for urban communities.
- **Favorable interaction of all the above - mentioned factors.**

## 14.3. Outstanding position in international markets

Being an important part of the local oil industry, it is worth mentioning that the soybean is even more important for being the vegetable protein in which the production of different meats depend, in a genuine export chain. Argentina is the first exporter in the world of soy oil and flour, with 53% and 43% respectively of world trade and with 13% of such grain.

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#### 14.4. Diversified destination of the exported product

The soybean grain is mainly exported to Asia, China being the main market. The strengthening of industry in China has turned that market towards being a greater importer of raw materials. The first major importer is the EU, with 60% of the total, with Asia being the second market with 26%. As regards to oils, Asia takes 69% of the total, followed by the rest of America, with 20%. Nevertheless, given the certain vulnerability of the Chinese market as a main grain importer, the local surpluses are expected to decrease every year.

#### 14.5. Regional concentration of the oil industry

The share of the soybean milling industry in the provinces shows a concentration in the Province of Santa Fe, especially the greater Rosario area. This province processes 87% of the soybean grain, followed by the Province of Cordoba with 8%, and the Province of Buenos Aires with 5%. The location of the processing plants, less than 300 km from the main soy zone, on the River Parana coast or near to it, gives us a very different kind of competitiveness from other countries in this area. The interdependence of all the actors in the chain, and related industries and S&TMEs, define a powerful "soy cluster" in all its magnitude.

#### 14.6. Our logistics and transport reduce competitiveness

However, Argentina has practically the same road infrastructure it had decades ago, which increases the price of transportation and negatively affects the benefits received by the producers. The transportation system faces a real bottleneck. We must add that transportation is done basically by truck, and only 15% by train, which increases its cost. Not to mention the poor condition of the roads and the collapse of the system of freeways that takes place in the harvest season. On this matter, changes in the policy of investments of national funds in main freeways and the beginning of the "Beltway Plan" in the greater Rosario area have been announced recently.

#### 14.7. Soy as an employment generator

Recent studies on the agro-industry in Argentina, published by the Fundación Producir Conservando (Produce Preserving Foundation), show that soy is an important factor in employment within the scope of oils and by-products. However, not even the most detailed study can quantify the positive effects that soy has on the creation of global wealth. It was a decisive factor in the mitigation of the effects of the recent economic crisis. The soy cluster allowed a fast recovery by the towns and cities in the interior. The collection of withholdings and taxes that burden mainly the soybean, have direct impact in the social plans that serve as social containment and satisfaction of the basic needs of the low income population.

#### 14.8. The installed capacity of the oil industry, determine the aggregation process, is now investing in biodiesel plants

The new mandatory laws in countries such as the USA and the European Community, regarding biodiesel usage, activated the oils market. Soy oil is our first and richest source. It is logical for the industry to react to the worldwide projections of increasing usage with strong investments to assign better value to the by-product. By the mid 90s this sector invested USD 700 M, while in the last 3 years it has invested USD 770 M. Investments aim at the creation of new plants, expansion, storage infrastructure, rural logistics and ports. The oleaginous industry is making significant investments

The most significant information within the period of 1996 to 2006, was that Argentina contributed 92% of the growth in the world oil trade, increasing its exports by 3.21 million tons. Argentina is the leader in soybean oil trade in the world.

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## 14.9. New uses

Soy and its by-products are involved in countless uses in the industry as well as for human and animals food. Almost 10% of the whole world production is used as nourishment.

In this field, new applications of biotechnology will bring new products, such as modified oils and high-value proteins. Soybean flours account for the usage of 90% of the vegetable protein which is transformed into animal protein. As long as the standard of living of people grows, these supplies also increase, and consequently the impact is greater than the vegetative growth of the population

## 14.10. Biofuels

Biofuels production is a new positive element, especially when it is stimulated by government decisions, because they will continue fostering production and usage, for it is the only available substitute for oil at a "large" scale in transport. Due to a precarious supply situation, in 2003, the EU adopted the Biofuel Directive (it sets a 5.75% ratio in 2010 and 10% in 2020).

This fact is generating, and will continue to generate, an increase in the demand for biodiesel, and this impacts directly on vegetable oils.

## 14.11. Factors that make Argentina a competitive country in the production of bio-fuels

- Greatest worldwide production per hectare.
- High technological level.
- Privileged location of the industry in proximity to the productive area and loading ports.
- Lower implementation costs of oleaginous crops in comparison to Brazil and the USA.
- The most efficient worldwide oleaginous chain.
- Plant dimensions. Larger establishment average scale at the international level. Lower processing costs.

## 14.12. What do we need in order to consolidate this positive scenario?

- Genetics and good management.
- We must establish legal terms and conditions as well as promotion, so that the producer can easily seize the business opportunities.
- Secure and efficient power sources, both in terms of electricity and gas.
- Improvement of the country's road infrastructure to and from plants and ports.
- Greater efforts in Good Practices, especially in the use of agrochemicals.
- To keep on dredging the waterway for deeper waters.
- Greater use of, track extension of, and improvements of the railroads.

## 14.13. Argentinean perspectives

- Better prices for oleaginous production and greater export of products with added value.
- Argentina will be a relevant worldwide biodiesel exporter (availability of raw material and an efficient production chain).
- It will face problems in accessing markets (more manufacturing => greater protection).
- Internal supply: Unknown factors (price, governmental policies).



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## 14.14. Conclusions

- Argentina has become a reliable, efficient and versatile supplier of soy and grain by-products in a world of ever-growing demand.
- In this new biodiesel era Argentina is getting ready to profit from its strengths and is placing its goals in foreign supply.
- The soy complex is important not only because of its value and achievement, but also because of the "spillover effect" that it will have on our economy.
- Argentina as a whole and particularly the soy chain – clearly an exporter – must stay on the lookout for changes in international commercialization, which will unfortunately be carried out in an imperfect competence framework.

### Sources

- Argentine oil industry chamber (cámara de la industria aceitera de la república argentina, ciara)
- Secretary of agriculture, cattle, fisheries and food (secretaría de agricultura, pesca y alimentos, sagpya)

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## 15. Energy: the new cold war

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The boom of the world economy during the past several decades has demonstrated that economic growth is not a zero sum game. Robust economies abroad have led to increased opportunities on the home front provided that we utilize our competitive advantages and don't stick our head in the sand vis a vis protectionist policies.

There are many ingredients in this economic stew but one has assumed particular political salience: the availability of cheap and abundant energy. It is impossible to analyze the economy without thinking about energy. A climb in energy prices results in a ripple effect throughout the supply chain increasing end product prices. Moreover, as economic output increases so does energy consumption. Here lies the problem: heavy reliance on finite resources such as petroleum that are increasingly located in unstable and often unfriendly states. As the world's top oil consumer, the U.S. imports 60.3% of its fossil fuel needs. Without stating the obvious, having Saudi Arabia, Venezuela, Nigeria, Algeria, Angola and Russia as top suppliers is problematic.

In order to better understand this phenomenon, it is useful to note the emergence of two types of economies: net energy importers and exporters. Needless to say, net energy exporters have been endowed and emboldened with a great deal of power. Many of these states, e.g., Venezuela, have aggressively utilized this power for political ends by leveraging their natural resources in international affairs. The threat of supply disruptions has caused tensions to increase between importers and exporters. Consequently, energy dependence is a severe threat to the U.S. as we consume significantly more than we produce.

Florida is particularly prone to this problem because of its economic dependence on tourism and trade, which is compounded by its heavy reliance on automobiles. The state economy would be in shambles if it were to suffer a supply disruption and visitors weren't able to get to Disneyworld or businessmen and cargo to their destinations.

The solution to our energy woes is simple: a multi-pronged approach, which involves increased efficiency and the use of alternative energies such as biofuels. The difficulty lies in whether we have the political will to implement it. Execution will not be easy due to special interests and resistance to change. A glimmer of hope exists, however, because of greed: the development of energy efficient processes, technology and alternatives presents an economic opportunity. What better way to achieve energy independence than to co-opt the interests opposing it?

Governor Crist has taken a forward thinking policy stance that will position Florida at the forefront of this great opportunity. He recently signed three executive orders to reduce greenhouse emissions, increase the usage of renewable energies such as biofuels and change the state building code to improve energy efficiency. These efforts are on top of the great work that former Governor Bush did but they are only a starting point. Each county and city as well as the private sector must also take action to ensure the state has a viable energy policy that meets the needs of both its citizens and businesses. In short, a permanent public-private partnership on energy is vital to the well being of Florida.

Unfortunately, U.S. transport fuel consumption is so great that it is unlikely that we'll ever be able to achieve complete energy independence. Fortunately, our neighbors in Latin America have plenty of arable land, which is ideal for growing energy crops. In fact, many experts predict that Latin America will become the Saudi Arabia of biofuels. As a nexus of international trade, Florida, and in particular Miami, is well positioned to reap the benefits as the "Gateway to the Americas," providing professional services to commerce within the Americas as well as between this Hemisphere and other regions. For example, the Inter-American Development Bank recently announced two projects: a \$120 million package of financing for a biofuels refinery in Brazil and a \$20 million fund for renewable energy-related projects in Latin America and the Caribbean. These announcements are surely the tip of an iceberg of investments that will be channeled through the local economy. Moreover, Florida will be able to take advantage of lower transportation costs of biofuel imports for local consumption.

In the 21st century, green gets green. The United States and Florida would do well to capitalize on this grand opportunity.

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## 16. The legal point of view

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### 16.1. Introduction

Biofuel projects in Argentina can be export or domestic consumption oriented.

As concerns export projects, the government regulation basically requires the registration of the plant and encourages the production and exports of biodiesel by imposing higher taxes on the export of the commodities than on the export of the biodiesel. Two provinces: Santa Fe first and Buenos Aires later, have established tax benefits for plants locating in the respective province. As to other aspects of an investment, the biodiesel export projects are subject to general corporate and tax rules. We provide below an explanation of the tax benefits available in Santa Fe, the province which has already attracted several investments, in the Province of Buenos Aires, and a brief description of the taxes applicable to a project funded with debt, as has been the case on several of the exiting projects.

As concerns domestic oriented projects, the government regulation is intromissive, provides tax benefits and access to a "quota" to satisfy domestic demand and compliance with an incremental mix with fossil fuels to a restrictive list of beneficiaries.

### 16.2. Export Projects

#### a. Registration of the Plant

Every individual or entity interested in producing, mixing and commercializing biofuels, whether promoted or not, under the terms of the National Law No.26,093 shall be registered with the Secretariat of Energy of the Federal Government (the "Secretariat"), fulfilling all the requirements established by the Secretariat.

#### b. Reduced export tax

The export of seeds of soja is subject to a 27.5% withholding rate (its derivatives, as oils and flour, are subject to a 24% withholding rate). Otherwise, the exports of Biofuels are subject to a 5% withholding rate.

#### c. Tax Benefits in the Province of Buenos Aires

The matter is governed by Law No. 13,719 and its supplementary Decree No. 2189/2007, which regulate and promote the sustainable production, mixture, commercialization, distribution, consumption and use of Biofuels in the Province of Buenos Aires whether for domestic consumption or export:

##### c.1. Duration of Benefits

The tax benefits of this regime shall be applicable for:

- 15 years as from their effectiveness if the applicant: (i) produces biofuels for self-consumption; or (ii) is subject to the benefits of the National Law 26,093, described under Domestic Projects below.
- 10 years as from their effectiveness if the applicant produces Biofuels for selling in the domestic or international market.

##### c.2. Beneficiaries

The applicants must a) be settled in Argentina, and b) have a Plant in the Province of Buenos Aires, duly authorized by the Secretariat.

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### **c.3. Tax Benefits**

Within the 15 or 10 year tax stability period the company's global tax burden in the Province of Buenos Aires cannot be increased, for example, by (i) the creation of new taxes, (ii) the increase in tax rates, (iii) the repeal of exemptions or deductions, or (iv) broadening of the tax base.

Beneficiaries will be exempt from Turnover Tax (the average rate is 3%), Stamp Tax (the average rate is 1%) and Tax on Real Estate (the average rate ranges from 0.517% to 1.965%).

### **d. Tax benefits in the Province of Santa Fe**

Through Law No. 12,692 and Decree No.158/2007, the Province of Santa Fe has established a Promotional Regime for the research, development, generation, production and use of products related to non conventional renewable energies (energies that are produced naturally, inexhaustible and without causing any damage to the environmental; Biogas and Biofuel).

#### **d.1. Eligibility Requirements**

Beneficiaries must comply with the following conditions:

- Settle or be settled in the territory of the province of Santa Fe. Companies already settled in Santa Fe at the time in which the law was enacted may be granted with the promotional benefits if (i) they increase their production capacity significantly, as the result of investments in fixed assets of the industrial plant, or (ii) they increase their staff significantly.

The promotional benefits will be granted proportionally (a) to the increased production capacity or (b) to the increase of their occupied labor force.

- Be approved by the Secretariat.
- Integrate in the same process all or some of the industrial stages for the obtaining of renewable raw material.
- Produce air generators, solar panels, solar collectors, solar ovens, biodigestors, biogas, biofuels, petrochemical derivatives, energy converters or any other non-previously described products that are originated in a process derived from non conventional renewable energies.
- Obtain approval of the investment project by the Ministry of Production of the Province.
- Comply with all other requisites established by the Ministry.

In order to be eligible for the granting of promotional benefits, all the projects must prove feasibility, profitability and reasonable production costs. The companies must present a production plan which must be complied in at least 80%. Also, an Environmental Study Impact must be filed.

#### **d.2 Beneficiaries obligations**

Beneficiaries must:

- Present periodic reports and respond information requests
- Register in the National Industrial Registry.
- Comply with the plan of production and sales fixed in the promoted project.
- Maintain the assets of the project.
- Comply with the schedule of works and stages of the project.
- Maintain the installed capacity and the staff.
- Comply with environmental regulations.

#### **d.3. Tax Benefits**

Those who comply with the requirements set forth above will be granted with the promotional benefits of exemption and/or reduction and/or deference of the following provincial taxes:

- Turn over tax: on the promoted activity (as opposed to other activities of the applicant). The exemption is not available for the commercialization of resale products.
- Stamp tax: on the incorporation, capital increase, modification of the by-laws, transformation, merger and, generally, all the acts, agreements and transactions related with the promoted activity. A provisional certificate can be requested so as to not pay the stamp tax until the definite tax exemption is granted. The tax exemption will also apply to third parties granting guarantees in favor of the applicant.
- Tax on real estate: on the real estate owned by company used for the exploitation of the exempted industry, including those destined to management, deposit and/or staff residence.

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- Tax on vehicles: on the annual tax set forth in Article 259 of the Fiscal Code for cars or trailers owned by the company, registered in the province of Santa Fe and affected to the promoted activity.

#### **e. Financing a biodiesel project with debt**

##### **e.1. Exchange Control Regulations**

According to Argentine exchange controls regulations, Argentine borrowers are required to bring the principal of the loans granted by non-Argentine lenders, and convert it into Argentine pesos, within 365 days from the date funds are disbursed. Additionally, under Decree No. 616/2005 (the "Decree"), the repayment of the principal of cross-border indebtedness of Argentine residents, and any refinancing of existing debt, should be agreed for a term of at least 365 days.

The Decree also sets forth that Argentine borrowers are required to set up a mandatory reserve in US Dollars equal to 30% of the principal amount of the cross-border loan in a local financial institution for a 365-day period. The mandatory reserve is non-transferable, does not accrue interest, and cannot be used as collateral of any credit transaction.

Failure to comply with foreign exchange regulations is punished under the Exchange Criminal Law with both monetary sanctions and/or imprisonment, including fines arising up to 10 times the amount of the transaction. Prison may also be applicable after the first recidivism.

Based on these rules, the Individual should (i) bring the principal of the Loan to Argentina, and (ii) set up the one-year 30% mandatory reserve, unless:

- The loan has a duration of not less than two years, taking principal and interest payments into account, and
- The funds are used to invest in non-financial assets (e.g., fixed assets). Such use should be stated by the client in an affidavit detailing investment so as to enable the institution involved to determine univocally how those funds will be used.

This exception shall automatically expire when uses differ from those stated. In that case, the mandatory reserve shall be made within the following 10 business days of such expiration.

##### **e.2. Tax Implications**

Interest on the Loan would be subject to a 15.05% withholding tax (17.72% if grossed up) when it is paid to foreign financial institutions (i) supervised by a Central Bank or equivalent agency, and (ii) residing in countries not deemed tax havens or with exchange of information mechanisms with Argentina with no resort to bank secrecy or other types of privacy laws.

Otherwise, the applicable withholding tax rate would be 35% (53.85% if grossed up). These withholding tax rates could be reduced up to 12% if an income tax treaty were to apply. (The 12% withholding tax applies to interest payments made to beneficial owners of such income that reside in Belgium, Denmark, the Netherlands, Spain, Switzerland, the United Kingdom, among others; interest paid to a German bank is subject to a 10% withholding tax.)

Interest payments will be subject to VAT if the Argentine borrower is a VAT taxpayer. The applicable rate will be: (i) 10.5% if interest is paid to a bank located in a non-tax haven jurisdiction; or (ii) 21% in all other cases.

The Argentine borrower will be able to use the VAT paid on the interest as a credit against his VAT liabilities.

##### **e.3. Guarantees**

The Argentine Law sets forth several kinds of guarantees in order to assure the repayment of the Loan, such as pledges, floating pledges, and mortgages and trusts (the "Guarantees").

Pledges are the security interest usually required. The Argentine Commercial Code establishes the procedure to be followed in order to pledge shares and quotas of a company. The only difference is that the Pledge of Quotas must be registered before the Office of Corporations -Registry of Commerce- and the Pledge of Shares must only be registered on the Stock Ledger Book of the Company.

Additional security interest could be a mortgage on debtor's or third party's real estate property, but since its perfection is quite expensive (about 4% of the amount of the loan) they are not usually required.

It should be pointed out that Guarantees may be subject to Registration fees and Stamp Tax. This tax applies on any written

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contract executed or effective in an Argentine province. Tax rates vary depending on the type of activity and the local tax act of each province. In general, the average rate is around 0.6% and 1.5%, respectively. If a contract involves more than one Argentine province, the tax will be normally due in proportion to the effects that such contract has within each jurisdiction.

### 16.3. Domestic Projects

The matter is governed by Law No. 26,093 and its regulations issued under Decree No. 109/2007, which regulate and promote the sustainable production, mixture, commercialization, distribution, consumption and use of Biodiesel, Bioethanol and Biogas. The regime shall be applicable for 15 years. The Regime is directed mainly to the public sector. The competent authority in charge of supervising and executing the Regime is the Secretariat of Energy, which, among others, has the following powers:

- Create and carry a public registry of plants authorized for the production and mixture of biofuels and of any individuals or entities that produce, mix, store or commercialize biofuels.
- To publish periodically reference prices for biofuels.
- To establish quality standards of biofuels and to control the quality of the product during the different stages of production, mixture and commercialization.
- To inspect without further notice the authorized industrial plants or the plants suspected to be producing biofuels.
- To establish percentages for mixture between biofuels and gasoline or diesel oil.
- To set quotas for distribution of the offer of biofuels.
- To set the supervising and controlling annual tax to be paid by the beneficiaries of the Regime.

#### a. Beneficiaries

The applicants shall fulfill the following requirements: a) be settled in Argentina; b) have any of the following as controlling stockholder: (i) the Federal Government, the City of Buenos Aires, any Province, local councils or individuals, State owned companies, corporations originally incorporated in Argentina and expressly authorized to carry out the business described in the Regime, being able to carry out all or any of the necessary industrial steps for obtaining biofuels, (ii) persons doing business in Argentina whose main activity is the agricultural production, (iii) in case of cooperatives, its partners shall be involved mainly in the production of agricultural raw materials (it is not required that the cooperative itself is mainly devoted to the agricultural production); c) be registered in a special section of the Oil Companies Register created by the Secretariat, demonstrating technical and economic-financial capacity, d) to prove capacity in production proceedings, which shall be assessed and controlled by the Secretariat pursuant to direct evaluations and technical assessments; e) commercialize its whole production for mixture with fossil fuels within the local market as from the moment in which such mixture is compulsory. The Secretariat may authorize specific volumes for other purposes in case of oversupply of domestic market but such volumes will not be entitled to the tax benefits.

#### b. Tax Benefits

The promoted entities or projects shall be granted with the following benefits:

(i) (a) obtain the anticipated VAT refund corresponding to the amortizable new assets -except cars- or infrastructure works -except civil works- included in the project or, alternatively, (b) apply the accelerated depreciation on those assets for income tax purposes.

1.1. Anticipated VAT refund: The VAT invoiced for the acquisition, construction, elaboration or final importation of capital assets or for the execution of infrastructure works shall be, within 3 years as from the date in which the respective investments have been made, credited against other taxes collectable by the AFIP (Federal Administration of Public Revenues), or either refunded to the taxpayer, in each case within the term agreed at the time of approval of the project and pursuant to the guaranties and conditions established by the AFIP. Such credit or refund shall be available only if (i) VAT invoiced has not already been recovered from VAT collections originated by the development of the project and, (ii) capital assets are still owned by the beneficiary.

1.2. Accelerated Depreciation of the Income Tax: Beneficiaries shall be able to choose between the normal or the accelerated methods:

(i) Depreciable tangible property acquired, constructed, elaborated or imported within such period: at least in 3, 4 or 5 annual, equal and consecutive installments, depending on if the investments have been made during the first, second or third year immediately after the date of approval of the project, respectively.



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(ii) Infrastructure works initiated in such period: at least in the amount of annual, equal and consecutive installments arising from considering their useful life reduced to 50%, 60% or 70% of the estimated useful life, depending on whether the investments have been made during the first, second or third year immediately after the date of approval of the project, respectively.

(ii) Exclusion of the taxable base of the Assets Tax of the assets subject to the promoted activities after the date of its approval. This exclusion shall be admitted until the third financial term closed after the date of initiation of the respective project.

(iii) Biodiesel and bioethanol produced by the beneficiaries will not be subject to the Water Infrastructure Tax, to the Liquid Fuels and Natural Gas Tax, to the Tax on transfers or imports of diesel oil, or to those taxes that in the future may substitute or complete them.

The benefits listed in (i) and (ii) above can be claimed for 5 years as from the January 1st of the following year to that in which the term set for the fulfillment of the requirement of the project has elapsed.

#### **c. Mixture of Biofuels with Fossil Fuels**

As from January 1, 2010, fossil fuels commercialized in Argentina shall contain a mixture of at least 5% of biofuels over the total amount of the final product. Liquid fuels characterized as "diesel oil" shall be mixed with biodiesel, and the fuel characterized as "gasoline" with bioethanol.

#### **d. Sale of Biofuels**

The sale price of Biofuels shall be determined by the Secretariat. Such prices shall cover the reasonable operating costs applicable to the production, taxes, amortizations and a reasonable profitability (for it to be similar to business of comparable risks).

## **16.4. Doing Business in Argentina**

As contemplated in the Argentine Business Law N° 19,550, several kinds of companies – ranging from the simple partnership to the corporation – may be incorporated for conducting businesses on a regular basis in Argentina, e.g. the incorporation of a Sociedad Anónima ("SA") or a Sociedad de Responsabilidad Limitada ("SRL"), or the establishment of a branch of a foreign corporation.

### *Sociedad Anónima*

The SA is the most commonly used as the subsidiary of a foreign corporation in Argentina, because of its shareholders' limited liability. Any company in Argentina must have at least two shareholders (companies cannot be owned 100% by one owner). Both, a corporation (Argentine or foreign) or a physical person may be shareholders of a corporation, being entitled to own any amount of shares (for the second shareholder, ownership of one share would suffice).

#### **a. Corporate Capital**

The corporate capital is represented by shares, which must be denominated in pesos and have an equal, fixed par value. The amount of the corporate capital must be expressly stated in the By-laws. Under Argentine Law, the minimum required capital is \$ 12,000 (approximately US\$ 3,750). Upon execution of the By-Laws, the total amount of capital must be subscribed and each shareholder shall pay-in, at least, 25% of the capital stock. If the capital is not contributed in cash, it must be fully paid in. Shareholders responsibility is limited to the capital contributed; however, they must pay-in the shares that were subscribed by them. Notwithstanding that, under special conditions, ex. bankruptcy willfully caused at the subsidiary company level, Argentine courts have gone beyond the corporate veil of the subsidiary, declaring also the bankruptcy of the parent company.

Shares may be either common or preferred and issued in registered or book-entry form. Common shares may carry from one to five votes, but for considering certain matters (i.e. liquidation, merger, spin-off, change of the corporate purpose, redemption of stock, etc.) multiple vote is not applicable. Preferred shares may be issued without voting rights; however, when they are in arrears or whenever multiple vote is not applicable, they are also entitled to vote. Common shares are entitled to preemptive rights for subscribing capital increases. The same right may be granted to the preferred stock under the By-laws.

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Dividends, which result from earned and liquid profits of a SA as per its annual financial statements duly approved by the Board of Directors and the Shareholders' Meeting, may be declared by the Annual Shareholders' Meeting. Dividends so declared, may be freely distributed to shareholders (either Argentines or foreigners, either persons or corporations).

**b. Directors**

An SA is ruled by a Board of Directors formed by one or more directors. The majority of the directors must be domiciled in Argentina. Directors are appointed by the Annual Shareholders' Meeting. Directors may be elected for up to three fiscal years and may be reelected. Any or all of the directors may be removed by the Shareholders' Meeting.

Directors have broad powers, except for matters reserved to the Shareholders' Meeting. They are fully responsible for the management of the SA and are subject to the standard of loyalty and diligence of a good businessman. They are jointly and severally liable to the SA, to the shareholders and to third parties for damages caused by breach of their duties, including violations of the law and of the By-laws, or by fraud, abuse of their authority or gross negligence. The statutory duties and liabilities of directors cannot be contracted out by the By-laws or by the Shareholders' Meeting. Under certain circumstances, directors may also be held liable for taxes, social security charges and customs duties, environmental wrongdoings, and in case of bankruptcy, if they willfully and knowingly caused or worsened the insolvency. Save as qualified in the preceding sentence, directors are not personally liable for the obligations of the SA.

Directors must meet at least quarterly, either in Argentina or abroad (if permitted by the By-Laws). They must cast their votes personally, although they may be represented by proxy if the absolute majority of the Board is present at the meeting. It should be pointed out that all Directors (resident in Argentina or not) shall have to be registered as independent workers with the Tax Authority by obtaining a Tax Identification Number ("CUIT"). Said registration implies the inclusion of the Directors in the Argentine Social Security System.

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## 17. Biofuels: A change in paradigms already underway

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### 17.1. The global situation

The mass use of fossil fuels has had a hand in driving and speeding up the development of the world economy. Global demand for energy has been increasing during the 20th century, with oil being one of its main components. However, while mankind continues to grow population-wise and in terms of energy needs, geologists are warning that the supply of fossil fuels will decrease, starting with oil and natural gas<sup>1</sup>. Likewise, climatologists warn of the unprecedented increase detected in the concentration of gasses due to their combustion, which could be causing an unpredictable alteration in the atmosphere's climatic balance.

Thus, and according to data provided by AEREN (Spanish Association for the Study of Energy Resources) in spite of the fact that at the current rate of consumption there is enough oil for around 40 years, the most imminent challenge facing society lies in peaking global oil production and then heading towards an output decrease.

The impending exhaustion of fossil resources, within a context of growing demands for energy with no short-term alternatives, may lead to shortages in the international markets and higher prices.

As this input is vital to the development of industry and trade, this increase in prices will trigger greater production costs that will affect the consumer price index and, in turn, consumption of all countries, which places several factors, such as the financial system's balance and the changes in social indices, at risk.

One of the energy alternatives to reduce oil consumption has been found in the use of biofuels.

The most widely used and developed biofuels are bioethanol and biodiesel.

- Bioethanol, also referred to as biomass ethanol, which is obtained from corn, sorghum, sugar cane or beetroot. Brazil is the main producer of bioethanol (45% world production); the US accounts for 44%, China for 6%, the European Union for 3%, India for 1% and the remaining countries for 1%.

- Biodiesel is manufactured using vegetable oils that either has or has not already been used. In this case, rapeseed, canola, soy or jatropha tend to be used, grown for this purpose. The main biodiesel producer in the world is Germany, concentrating 63% of production. France is next, accounting for 17%, the US for 10%, Italy for 7% and Austria for 3%<sup>2</sup>.

Although the increase in bioenergy production and access to it is just one of the possible answers to the climatic change and the challenges in terms of energy safety, several features have turned it into a very interesting option:

- From an environmental contribution standpoint, biofuels is a product with low contaminating gas emissions, it is biodegradable and comes from a renewable resource.

- From an energy standpoint, biodiesel is the only alternative fuel that can be used directly in diesel engines without requiring any sort of transformation, as it has properties similar to those of diesel oil.

- From an economic standpoint, the benefits lie in the possibility of this type of industry's vertical integration, involving the creation of the raw material through to the sale of not only the main product, but also its by products.

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<sup>1</sup> AEREN (Spanish Association for the Study of Energy Resources)

<sup>2</sup> Source: Wikipedia contributors. Biocombustible [online]. Wikipedia, La enciclopedia libre, 2007 [inquiry date: October 1, 2007. Available at <<http://es.wikipedia.org/w/index.php?title=Biocombustible&oldid=11723850>>.

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## 17.2. Prospects of current competitive regions case studies: Brazil and Argentina

It should be mentioned that both Brazil and Argentina are in excellent conditions to produce biofuels and compete in the sector, not only at the regional level, but also internationally.

Argentina is at the initial stage of exploration and investment, while Brazil's development plan in this area is far more advanced.

Brazil was one of the pioneer countries on adoptions of renewable energy sources. When the petroleum crisis struck, the country implanted the "Proálcool" program to structure the ethanol production system. According to a Japan Bank for International Cooperation (JBIC) study, in 2006, forty years after the beginning of the project, 40% of all cars in the country used ethanol as fuel, and Brazil has now become one of the main bioethanol exporters worldwide.

Recently, as part of a set of measures to fight global warming, Brazil has been stimulating the use of biofuels, such as ethanol and biodiesel. These measures are also based on the government policies to create jobs in less developed areas, helping to diminish regional inequalities. In addition, the government seeks cooperation between public and private sectors to attract even more private investments to the renewable energies' sector. As part of these measures, the Brazilian government has been investing in infrastructure on specific areas and creating tax benefits for private investments on such region to promote social development and income improvement.

Expecting a large increase in internal and external demand for renewable energy, the Brazilian government has been promoting, through federal programs on a Pluriannual Plan, the development of a biofuels chain, aiming at an increase in production areas and stimulating the use of biofuels by consumers.

In summary, Brazil is focusing on 2 main areas of renewable bioenergy: sugarcane ethanol and biodiesel.

Ethanol related program emphasizes on research and jobs increase, in order to establish a stable and economically feasible supply structure. Main action plans are: eliminate restrictions of sugarcane production, increase sugarcane potential, environmental care, integration with production chain, new methods and products development for biomass, financing instruments for new plants, financing instruments for plantation, agriculture and industrial research and taxes advantages. Currently, refineries are obliged to add 25% of ethanol to the gasoline that goes to market.

Regarding biodiesel, government is focusing on: increase of oil production per square feet of land, enhance quality and feasibility of biodiesel production with ethanol, increase of residues use with feedstock, technology development to increase value of residues and sub products, technology development aiming energy auto sufficiency of plants located in remote areas. Legislation obliges<sup>3</sup> that every liter of diesel sold must contain 2% of biodiesel, beginning in 2008. This percentage should increase to 5% in 2013 or even earlier. This accounts for a demand of on million cubic meters per year in 2008 and 2.4 million cubic meters in 2013, according to MME (Ministry of Mines and Energy).

Although Argentina is at an early stage, its position is ideal for attracting investments aimed at biofuel production.

Argentina has different ecosystems that enable it to grow a large variety of crops and which give the country a great deal of flexibility when it comes to supplying the biofuel industry.

Argentina also boasts a fully developed exporting agricultural structure, based on its key strength factor: huge expanses of land fit for developing traditional and nontraditional crops, these being the main input required in the manufacture of biofuels. Argentina is the world's main flour and soybean oil exporting country, and the second-largest exporter of corn<sup>4</sup>.

It is also worth noting the importance of having an alternative energy resource to rely on, especially knowing that diesel oil accounts for an average of two thirds of the fuel consumption matrix, a number that may continue to rise, as most production machinery is being contemplated for use in the reconversion of soybean oil into biodiesel.

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<sup>3</sup> Lei do Biodiesel (Biodiesel Law) (11.097/05).

<sup>4</sup> Argentine Department of Agriculture, Livestock, Fisheries, and Food

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In Argentina, biofuel is regulated by Law 26,093, which sets forth that as from 2010, all gasoline and gasoil sold will be required to contain five percent of bioethanol and biodiesel, respectively. This represents a captive demand for 2010 in regard to both bioethanol and biodiesel, of 180,000 and 637,000 tons, respectively<sup>5</sup>. In the latter case, this potential demand implies the installation of 10 to 15 new production plants.

For the moment, the effects of the law have already begun taking shape. YPF recently presented a Premium diesel, Gasoilbio YPF, with a biofuel additive. There are also six concrete undertakings at an industrial scale that are in progress. Five of them belong to large cereal producers such as AGD/Bunge, Vincentín or Cargill. But it is estimated that Latin America is in a position to install around 100 new factories in the next three years, and it would be logical for Argentina to be considerably involved in this process, in addition to the abovementioned advantages, considering that the current value of land is low in relation to other parts of the world (not only Europe, but also neighboring countries), and high future profits look promising once the activity is in full swing.

### 17.3. The sector's main challenges

The key to placing countries in the lead when it comes to energetic change lies in creating a society prone to innovation and change. That would require coherent long-term planning of the transition and adjustment that takes into account the complexity of bringing about the change in a market-based world economy such as the one we are currently living in. From both Argentina's and Brazil's point of view, the most imminent challenges include the following:

#### Argentina's challenges:

As mentioned before, Argentina is at an exploration and investment incentive stage and therefore needs to make decisions on many issues inherent to the as yet undeveloped market. These issues refer to the supply of raw materials, foreign policy, quality, legal certainty and predictability, access to financing facilities, technology and the environment.

**Supply of raw materials.** The need to speed up research and development of new events that will facilitate the diversification of raw material sources, within a framework of sustainable agriculture, minimizing competition with food requirements, is extremely clear. According to data provided by Greenpeace, the dramatic increase in biofuels will raise corn, oilseed and wheat prices by between 11% and 26% by 2010, and each 1% increase in the price of basic foods adds 16 million people around the world who loose food security.

**Foreign policy.** International trade currently survives with market imperfections, such as subsidies, tariffs and para-tariff barriers. But the most immediate challenge lies in finding systems that will enable this product to be economically viable, regardless of what happens with oil prices. One solution would be to apply variable subsidies. Additionally, we must not leave out the fact that the following year the European Union's Generalized System of Preferences expires, a system whereby payment of the import tariff levied on Argentine biodiesel is exempted.

**Quality.** It is essential to coordinate actions in foreign policy matters, in order to better position ourselves in current and future negotiations in relation to certification requirements imposed by the European Union.

**Legal certainty and predictability.** Although Biofuels Law 26.093/06 was passed in May 2006, with the Administrative Order 109/2007 being issued in February 2007, there are still a great deal of issues to review. It is increasingly necessary to ensure a context of legal and tax certainty and predictability, as well as the utmost transparency in the Government's oversight duties, so as to provide an incentive for risky investments in order to atomize the offer, making it easier for a large number of players to join in the business, mainly agricultural producers and livestock farmers, which will be conducive to enabling SME's (small and medium-sized enterprises) to become involved in the business.

**Access to financing.** The Kyoto Protocol finances investment granting carbon credits to those who manage to reduce CO2 emissions. The Argentine Government has undertaken to support all biodiesel production projects but the ways of accessing these credits have not yet been clearly defined. The provinces are developing financing alternatives on a regional level with the support of the IADB (Inter American Development Bank), but as yet there is no action on a nation-wide level that aims to pave the way towards obtaining funds for undertakings of these dimensions.

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<sup>5</sup> Unión Industrial Argentina / Debilidades y Desafíos Tecnológicos del sector productivo./ Biocombustible

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**Technology.** There is great uncertainty as to whether the emergence of new technologies for the production of biofuels will render the plants designed to work with current technology obsolete. This factor delays decisions by investors.

**Environmental Matters.** The actual impact the use of biofuels will have on the environment is still not known for certain. Some specialists of the University of Buenos Aires hold that the apparent decrease in greenhouse gas emissions do not take into account the fact that the oil industry may turn to the manufacture of new agrochemicals and fertilizers, which would lead to an increased land overuse and pressure on the biodiversity of species .

#### **Brazil's challenges:**

As mentioned above, Brazil is at the height of developing and exploiting bioenergy; therefore, the challenges it faces are related to its objective of achieving growth continuity, ever striving to strengthen its position as one of the world's main biofuel producers. These challenges come in the form of access to financing and the adjustment of the products outflow logistics.

**Logistics and Supply Chain.** Demand for renewable energy is growing at unprecedented rates, requiring significant investments throughout the entire supply chain, driven by competing government incentive mechanisms. Relevant investments in infrastructure are required, such as transport and logistics, to allow a structured development of the sector.

**Credit Lines.** For governments, one of the key issues is to continue supporting projects through financial incentives such as tariffs and tax incentives. Additionally, the support of financial institutions is also vital to the sector development, including specific credit lines and alternative leverage options.

As Brazil and the World become more conscious about environment and global heating, clean energy becomes more important everyday. In that sense, government efforts are very important to increase private initiative participation in that sector. It is also very important that banks and other financial institutions create financing mechanisms to leverage such projects.

It is important to highlight that, although several efforts are being carried out by several financial institutions, the process of obtaining a large amount of financing for projects of such size is still long and time consuming in Brazil. Not to mention the high interest rates and the long list of requirements entrepreneurs must comply in order to be eligible for those financings.

## **17.4. Conclusions**

The need for large expanses of land available for growing crops of the raw materials required in the production of biofuels, places countries that are traditional growers of these materials in a highly competitive position when it comes to satisfying the growing demand for investments in this regard. This change of paradigm could shift the focal point of economic growth from industrialized countries to developing countries. Thus, linking the demand for energy to agriculture would lead to an increase in the demand for all inputs and agricultural production factors for the different uses.

Basically, the market of basic materials required for bioenergy offers a new opportunity and rapid growth for agricultural producers and may contribute considerably to their increase in revenues, as well as support a growth in the economy of every country.

Brazil is one of the greatest developers of renewable energy in Latin America and Argentina could achieve this standard if they managed to emulate their effort and keep up the level of work in an effective manner. In this way, both could become key players in the solution to the energy crisis. The future depends on the actions carried out by each government in terms of economic, political and financing matters to convert this opportunity into tangible reality.

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## 18. Biofuels – Necessity knows no law

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**I.** One of the toughest challenges we are faced with this century undoubtedly lies in the possibility of progressively substituting the consumption of fossil fuels, a non-renewable energy source, with alternative energy sources.

A global scenario points to biofuels as a real and tangible alternative.

Without wishing to go into technical definitions, we are referring to the liquid fuels obtained from agricultural products, from processing agroindustrial products or from organic waste, termed biomass.

Our aim is to highlight the relative, but never insignificant, importance of tax-related incentives or benefits that governments could offer producers of these fuels, so as to foster production, focusing the analysis on 'Argentina's case' in relation to Brazil's experience, a country already well in the lead.

**II.** While the latter has shown a solid and persistent increase in both production and consumption of biofuels in the last few decades, especially bioethanol, coming in second among the world's largest producers of these fuels, Argentina has gone along other roads as far as energy is concerned, putting off an increase in manufacturing activities through a lack of policies and laws encouraging such growth.

What is more, contrary to what is expected in the promotion of alternative fuels, Argentina has allowed and subsidized the use of natural gas as fuel for vehicles during the last few years, with market prices that are considerably lower than gasoline and diesel fuel, which is just the opposite of what should logically be paid for selling a scarce and non-renewable asset.

According to our opinion, this also unquestionably affected and drew out the creation of provisions that encourage the development of production investments in this area.

In addition to the effect created by providing natural gas for consumption in motor vehicles, the supply of this input for industrial activities has recently been affected causing a negative impact on productivity, leading to potential shortages in supplies and the need to import large volumes of gas from Bolivia. This phenomenon has essentially contributed to confirming a new paradigm represented by a feeble energy system, which, at the rate of economic growth in the last few years, looks likely to collapse and is no longer self sufficient.

In addition to this, we should point out that Argentina's current diesel fuel refining capabilities are being used to full capacity.

In reaction to this state of affairs, several regulations of a different nature, among them the tax-related ones we will comment on further ahead, have recently been issued, many still focusing essentially on environmental aspects, while some provincial governments have promoted the advantageous aspects of their territories as locations in which to undertake biofuel-related projects; this, however, has taken place somewhat erratically, without an integrated development plan at a national level providing the proper legal framework.

The question we must ask ourselves at this stage of the analysis, therefore, is why growth in this matter has differed so greatly between both countries.

Although we have already anticipated some of the arguments, one possible answer, that may seem far too simplistic but



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which holds true nonetheless, may lie in the fact that during the nineties Argentina, with its peso pegged to the US dollar at par, gave up on sustained industrial growth in favor of substitutional imports of the products it had stopped producing, using its non-renewable resources for the abovementioned purposes, perhaps even making a show of their availability, without foreseeing shortages or a currency devaluation that would once again position it in a context of productive growth, as the one being experienced at present and, therefore, making Argentina highly demanding of different types of fuels (mainly diesel fuel, fuel oil and gas).

In other words, this lack of foresight may possibly be attributed, among other equally valid reasons, to the economic context of those years and to the availability of sub-used fossil fuels.

In the coming paragraphs, we will look at what tax-related incentives authorities have come up with as a palliative for this scenario, although we will also attempt to show that, based on the relative experience of other countries, such as Brazil, these incentives cannot form the basis around which we could expect a significant increase in the production of biofuels to emerge.

III. Those of us working in the world of taxes, welcome the recent publication of a framework law that attempts to regulate and promote the production of biofuels in Argentina, without losing sight of how taxes affect the development of economic activities.

As mentioned repeatedly in the above paragraphs, the benefited activities are currently at a stage of incipient development, characterized by quasi-primitive undertakings, if we compare them to those in the US, Brazil, France, Germany and Spain, the largest biofuels producers in the world.

The purpose laid out by authorities consists in achieving a gradual substitution of the use of non-renewable fossil fuels, following along the lines of what the European Union, among others, has planned for 2010.

In Argentina, by that time and pursuant to the provisions set forth by these regulations, diesel fuel being sold in the territory will have to contain at least 5% of biodiesel, while gasoline will be required to contain at least 5% of bioethanol.

That is why certain appealing but improvable tax benefits have been included that will attempt to boost a potentially promising Argentine industry.

These benefits consist mainly in the following:

- an early reimbursement of VAT credits resulting from acquiring capital assets and conducting infrastructure construction works;
- accelerated depreciation of certain assets in relation to income tax;
- temporary minimum presumed income tax exemption of assets used in the project; and
- exemption from paying the water infrastructure works rate and taxes on liquid fuels and on the transfer or import of diesel fuel.

In spite of the relative effects we pointed out earlier, we should not play down the virtues of relying on an adequate tax incentive system when considering the extraordinary competitive advantages Argentina has for producing, for example, biodiesel, a 100% biodegradable fuel, that causes a considerably lower emission of gases and which is obtained from virgin oils or already-used oils from traditional crops grown in Argentina, such as soybean, sunflower, peanut, among others.

The actual promotion of production undertakings of this kind may, at least, make it easier for certain sectors related to agricultural activities to become more sophisticated and avoid suffering the effects of a possible alteration in the current exchange and/or decrease in the price of commodities.

The delicate balance to be achieved between the development of an industry with clear advantages in multiple aspects and the proper tax framework governing the activity, should not overlook the known benefit that for other economic activities (mining, forestation and wind and solar power) is an exclusive prerogative: tax stability. This has been, and still is, an incentive of proven importance in regard to the mining investment boom in Argentina.

The guarantee of invariability in tax charges inherent to tax stability would surely boost the interest of investors proportionately to the expectations of authorities and the importance they have given the matter, besides the abovementioned tax benefits.



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If Argentina is thinking in terms of sustained and sustainable development in this activity, the granting of this benefit should at least be analyzed.

Furthermore, Argentina's potential not only involves the local market, but also the external market. This being the case, clear and steadfast rules dealing with export duties should be put in place, as their negative impact on the internal rate of return may cause foreign investors to focus on a country other than Argentina.

Regardless of the valuable contribution of these incentives to the development of biofuels production in Argentina (in their current or improved state), we should mention that Brazil's tax benefits by sector, which appear to have a smaller scope than those granted in Argentina, are not the reason for its manufacturing increase, as shown categorically by the circumstances.

This makes one thing clear: the tax environment and system is important when it comes to making an investment decision, but it is not the defining factor.

In this regard, we will now focus on some of the characteristics of a paper<sup>1</sup> dealing with this matter that indirectly relativizes the effect of tax benefits, considering other aspects to be of crucial importance to the development of this activity. Neither should we overlook other types of restrictions imposed by environmental regulations existing in more developed countries and, basically, the oft-proven fact that indicates that growth of this industry is an ideal alternative for supply needs that cannot be satisfied with a country's own non-renewable resources (fossil fuels) and for the ever increasing prices; these measures are thus essential, in most of the duly planned cases, to deal with the increase in fuel consumption by industry, trade and people.

**IV.** Indeed, the paper prepared by our European colleagues, based on the creation of indicators enabling them to set up a ranking of the most propitious countries for biofuels production and the largest producers, focuses on the following factors, as summarized below:

#### *Biofuels Index*

The individual Ethanol and Biodiesel indices combine in equally weighted proportions to generate the All Biofuels Index, which is made up as follows:

- Biofuels Infrastructure Index – 35%
- Fuel-specific Indices – 65%

#### *Biofuels Infrastructure Index*

The Biofuels Infrastructure Index is an assessment by country of the general regulatory infrastructure for biofuels. On a weighted basis, the index considers:

- Market regulatory risk – 29%: The score in this category depends on how strongly the general regulatory, political, and economic environment in the respective market advocates the production, distribution, and use of biofuels.
- Supporting infrastructure – 42%: A market with sufficient arable land available to cultivate, an established and widespread distribution network, and R&D activity will score well.
- Access to finance – 29%: Markets with a sound financial industry, proven financial track record of financing biofuels projects, listed companies operating in the biofuels sector, and strong appetite by foreign and domestic investors score highly.

#### *Fuel-specific Indices*

This comprises two Indices providing fuel-specific assessments for each country, namely:

- Ethanol
- Biodiesel

Each of the Indices consider, on a weighted basis, the following:

- Offtake incentives – 25%: This includes the level of mandatory blending targets, tax breaks on fuel excise duty, and tax credits awarded to biofuels producers.
- Tax climate – 8%: Countries that create a favorable tax climate, such as enhanced capital allowances or corporation tax holidays, will score highly.
- Grants and soft loans – 8%: Comprises grants and soft loans for investment in biofuels production.
- Current installed base – 11%: Existing production capacity installed in a country.
- Domestic market growth potential – 15%: Conventional fuel consumption of a country, and the headroom given the

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<sup>1</sup> Biofuels Country Attractiveness Indices, Renewable Energy Group, Q2 2007, Ernst & Young – Germany

current regulatory regime and installed capacity, determine the ultimate growth potential for alternative fuels.

- Export potential - 15%: A market's score is determined by its geographical location, and any free trade and bilateral export agreement to which it is party.
- Feedstock - 10%: Takes into account the energy yield, sustainability, and price volatility of a country's main biofuels feedstocks.
- Other factors - 8%.

## All Biofuels Index at Q2 2007

Ranking*		Country	All Biofuels	Ethanol	Biodiesel	Infrastructure
1	(1)	US	75	81	69	90
2	(2)	Brazil	71	76	66	94
3	(3)	Germany	67	69	64	81
4	(4)	France	66	65	67	70
5	(5)	Spain	65	66	64	61
6	(7)	Sweden	59	62	56	76
7	(6)	UK	58	60	58	76
8	(8)	Canada	57	65	49	66
9	(9)	Italy	53	51	55	47
10	(10)	Thailand	52	52	52	44
11	(11)	China	51	53	49	50
12	(13)	The Netherlands	51	51	51	59
13	(-)	Indonesia	49	48	50	44
14	(14)	India	48	50	46	46
15	(12)	Australia	47	51	45	56

Source: Ernst & Young

\*Ranking in the Q1 2007 All Biofuels Index in brackets

The relative importance given in these measurements to the effect of tax benefits granted to producers as incentives is compatible with what we have discussed so far, but also noteworthy are Argentina's weaknesses in a considerable number of the items taken into account, the development of which has not been encouraged or contemplated by the recently published laws that attempt to regulate the activity.

Without a doubt, considering all the aspects involved in the measurement and even those that we could reasonably add on, it would be difficult to sustain, empirically-speaking and, therefore, also in theory, that growth of the biofuels production sector has been based on the tax incentives that countries have granted their producers.

It goes without saying that incentives of this kind should not be ruled out; that would be a mistake. However, these are not the policies on which a harmonious, sustained and legally predictable growth of the sector should be based.

Some of the aspects considered in the indices prepared by our Firm have been clearly left to one side in Argentina: granting financing facilities at preferential rates, a transparent tax environment that provides investments with legal security, clear and consistent tax rules that prevent unexpected increases in tax charges when the producer obtains more favorable prices in other markets, among others.

V. In conclusion, we would like to reflect on what has been discussed so far.

First of all, we should firmly point out that encouragement of the activity under analysis should be based on adequate strategic planning by the Argentine government, supported by clear regulations and long-term objectives.

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These objectives should be based on fostering rational production and use of energy resources. Whether these resources are renewable or not.

We believe it important to emphasize, in spite of sounding repetitive, the need and advantage of establishing tax incentives that encourage or boost the activity's growth, although we cannot consider this as being enough.

We should also highlight the need to analyze and even emulate foreign experiences which have been implemented with the utmost success and that could even be improved upon, given Argentina's excellent territorial conditions for the development of biofuels.

Finally, we should work towards banishing the phrase that tends to be repeated in resignation and that has given this paper its title, and take action with the future in mind to anticipate events and avoid missing the train of progress.

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## 19. Handling, Transport and Storage of Biofuels

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### 19.1. Introduction

The biggest challenge posed towards Argentina's exports sector consists of increasing exports not only in terms of volume and revenues, but also by selling more value-added goods. To achieve this goal, emphasis should be placed on transforming raw materials into finished products, which add more value to the original product.

In this regard, Argentina has a comparative advantage for the production of fuels from renewable sources (biofuels), because it is a world leader in the production of agricultural food and oleaginous crops, having an increased milling capacity beyond its current harvests. The country would be able to meet the energy needs of industrialized nations such as the US, where production of biofuels is encouraged but fails to supply its own demand (remember that one of the biggest B20 consumers in the US is its own Department of Defense).

Biofuels are fuels and / or fuel additives duly registered with the US Environmental Protection Agency (EPA), that meet the standards set by the American Society for Testing and Materials International (ASTM).

The following are the main features of biofuels such as biodiesel, methanol and ethanol:

- they are energy from renewable resources
- they are biodegradable, so they quickly dissipate in the event of spillage
- they reduce greenhouse gas emissions. The use of B100 may eliminate up to 90% of the toxic gases from the burning of regular diesel, which are thought to cause cancer and other diseases. In fact, the US Department of Mine Safety and Health Administration (MSHA) has approved the use of biodiesel in underground mining equipment, where workers are exposed to high levels of gases in the air as a result of combustion, thus reducing the risk of diseases
- their high flashpoint and low volatility, which prevents quick ignition as in the case of conventional diesel, considerably improving handling, transport and storage-related risks
- they are non-toxic and environmentally friendly
- in addition, biodiesel degrades four times faster than conventional diesel
- So far, based solely on confirmed projects, production in Argentina has reached around 2,300,000 tons/year of installed capacity for 2008. Since its use has not been mandated until 2010, it is clear that a considerable part of the production could be exported.

In order to reach this objective and make the most of this comparative advantage, it would be helpful to obtain tax incentives not only for production, as in the case of the Rosario-Santa Fe Pole in the Province of Santa Fe, but also for exports. By way of example, these incentives might consist of the elimination of export duties. In addition, tax-cuts would help balance the tariff and non-tariff barriers found when looking for new markets, which affect Argentine foreign trade in general.

Moreover, increased exports mean genuine tax revenues for the State, instead of recessive export duties. Additional benefits will be the creation of jobs and improvement of regional economies as a result of the opening of new production facilities.

Important differences between Argentina's position compared with that of Brazil:

In January 2005, Brazil passed law 11.097, providing for the introduction of biofuels in the country. Between 2005 and 2007, the legislation requires a mixture of 2% (B2) biodiesel in diesel, which has been possible through the permit granted by the Brazilian energy authority. Let's keep in mind that the number following letter B indicates the percentage of biodiesel in

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fuel. For the 2008-2012 period, the addition of B2 will be mandatory nationwide. From 2013, the volume of addition is to be increased to 5%.

The original 840 M/liter objective estimated for meeting 2% of the total diesel demand, established by the National Program for the Production and Use of Biodiesel (Programa Nacional de Producao e Uso de Biodiesel - PNPB) has been exceeded in 2007. Biodiesel's installed production capacity at present reaches 962 M/liters. Besides this, the PNPB provides for a series of tax incentives aimed at promoting this activity.

In adopting these measures, Brazil intends to favor the less developed areas of the north and northeast of the country, while creating more employment opportunities.

Argentina, in turn, presents a more complex scenario, since the shortage of gas oil cannot be solved and the problem is far from disappearing.

Argentine Law 26.093 provides that from 2010 onwards, the addition of 5% of bioethanol in gasoline and 5% of biodiesel in gas oil will be mandatory. Even though the local Biofuel Law establishes tax incentives for this activity, the enabling regulations provide that sales of biofuels by promoted companies will be made at rates fixed by the respective authority, which clearly implies a risk of distortion.

Even though the potential markets may vary, there is no doubt that the US (due to its market size, fuel consumption levels, inability to meet its own demand, and need to break free from petroleum-producing countries), Mexico and Chile (due to their high pollution levels), and Europe (due to the deficit between supply and demand), are the natural markets for Argentine biofuels.

We have written this article with a view to analyzing the different forms of transport, handling, and storage of biofuel varieties, on the basis of the above assumptions regarding the probable destination of the larger part of our biofuel exports.

There are quite a few differences among biofuels. While B20 has practically the same features as those of conventional fuels, B100 is completely different. The former may be considered an additive which does not change the properties of the original product considerably. This is not the case of B100.

In all the cases, the tank to be used for transporting liquids must be very clean, but in the case of B100 (ASTM D6751-03) it is imperative to clean the transport or storage tank extremely well, since the product is a very good solvent and may quickly dissolve existing sediments.

On the other hand, contact with an excessive quantity of water must be avoided during transport and / or storage, since it may result in non-compliance with the specifications regarding the water content allowed. Excess water may cause corrosion and a suitable environment for the development of microorganisms.

When handling and storing B100, it must be taken into account that this product freezes at higher temperatures than most conventional diesels, and crystallizes at 1.5 to 7.5° C ("cloud point"), which may sometimes lead to the need for heated lines.

B100 should be stored at 2° C to 3° C at least, above the fuel's "cloud point", which is the temperature from which little solid crystals begin to form as the fuel cools down. A 4.5° C to 7.5° C temperature would be convenient for most B100, though some might require higher storage temperatures. Under these temperature conditions, it may also be stored in drums and / or totes (IBC).

However, since the sun's heat and light speed up unsaturation, which affects B100 stability, it is not advisable to store or transport the product in the open air in translucent or light totes during the summer.

In addition, when temperatures drop considerably, reaching the "cloud point", B100 quickly takes the form of a gel and increases viscosity. This may cause an extra burden on loading and unloading pumps.

However, when crystals begin to form, B100 may be heated to become a solution again. If this is done slowly or partially, the crystals settle in the bottom of the tank and slowly become a gel.

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For this reason it is important to take precautions so that the tanks, drums or totes do not undergo temperatures lower than "cloud-point", and that the pumps and other elements used for loading and unloading are adequately protected from extreme cold temperatures by a suitable heating system.

B100 is incompatible with some hoses and gaskets. It may even soften and degrade (to the point of destruction) some kinds of rubber components used in certain hoses and gaskets (such as natural rubber, nitriles, buna-N, etc.), causing biofuel leakages and even destruction of the pump used. It is therefore imperative to ensure that all parts in contact with B100 are compatible with the product.

B100 is not compatible with certain metals and plastic components. In addition, it may form high levels of sediment when in contact with copper and copper alloys, and / or galvanized surfaces for long periods. Besides, B100 may permeate some kinds of plastics such as polyethylene and polypropylene; so these materials should not be used for storing and / or transporting B100. Instead, materials such as Teflon, Viton, fluorinated plastics and nylon are B100-compatible.

The US National Biodiesel Board recommends not storing B100 for more than six months. If so, antioxidants should be used and periodical tests performed to check acidity, sedimentation and viscosity levels and to ensure that the product still meets the ASTM D6751 standard. In general, this applies to all biofuels, though it is understood that lower blends (B2 to B20) should tolerate longer storage periods than those of B100.

Most tanks suitable for transporting and / or storing regular diesel could be used for B100 without any inconveniences. Some compatible materials are aluminum, steel, teflon and fiberglass. Materials such as copper, bronze, tin and zinc may speed up biodiesel oxidation and create insoluble sediments, gels or salts when they react in the presence of some fuel components.

As in the case of petroleum, it is important that B100 be transported without harming the environment.

The following procedures are recommended for transporting biofuels in general, and B100 in particular, either in vessels, tankers, trucks or rail:

1. Acceptable materials: aluminum, carbon steel or stainless steel
2. Inspected tanks with accompanying cleanliness certificates
  - a. In the absence of certificates, inspect previous tanks and residues
  - b. In general, only regular diesel is accepted as residue
  - c. Not accepted:
    1. Food products or vegetable oil raw materials
    2. Gasoline
    3. Lubricants
  - d. No residual water should be present
3. All parts in contact with the product must be compatible with it
4. Establish some special isolation or heating system in the event of transport, loading and unloading, at extremely cold temperatures
5. Biofuel's "cloud point", temperature, ambient temperature, kind of transport and its transit-time, are all factors to take into account when transporting biodiesel.

Based on the projected export volumes, the first option to take into account for international transport are vessels with bulk liquid tanks.

The other options, such as drums and totes, are expensive and have little capacity.

Isotanks are a possible alternative as well. However, they are not broadly available in Argentina, so they seldom meet the seasonal demand of products with such high volumes as biofuels. In addition, certain geographical locations may not be attractive for Isotank Operators, so in addition to tank rental, transport and cleaning costs, repositioning costs should be added.

Finally, flexitanks are the most suitable alternative after tankers; however, according to the information we have at present, there are no Argentine-made flexitanks approved by the National Institute of Industrial Technology (Instituto Nacional de Tecnología Industrial - INTI), so the ones to be used are those manufactured and approved abroad, at a slightly higher cost.

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When it comes to opening new markets, a previous analysis of our company and product strengths and weaknesses must be conducted, and advice of experienced professionals must be sought when undertaking this kind of activity.

In order for the selected agent to be able to transport the goods, the producer and / or exporter must previously submit the MSDS (Material Safety Data Sheet) of the product in question. We are attaching a sample of this data sheet for your information.

With the above information it is possible to assess the acceptable equipment and existing availability.

We at Airsealand ( [www.airsealand-group.com.ar](http://www.airsealand-group.com.ar) ) are convinced that Argentina has a unique opportunity to profit from its enormous comparative advantages and export a product which is bound to change the rules of fossil fuel consumption. Our organisation is ready to support this change.

## 19.2. Glossary/definitions

*additive*: material added in small amounts to finished fuel products to improve certain properties or characteristics.

*antioxidant*: substance that inhibits reactions promoted by oxygen

*biodiesel*: methyl esters of fatty acids meeting the requirements of ASTM specification D6751.

*biodegradable*: capable of being broken down by the action of microorganisms

*cloud point*: the temperature at which a sample of a fuel begins to show a cloud or haze of wax (or in the case of biodiesel, methyl ester) crystals when it is cooled under standard test conditions, as defined in ASTM D2500.

## 19.3. Sample – Biodiesel material safety data sheet

### *Chemical Product*

General Product Name: Biodiesel

Synonyms: Methyl Soyate, Rapeseed Methyl Ester (RME),

Methyl Tallowate

Product Description: Methyl esters from lipid sources

CAS Number: Methyl Soyate: 67784-80-9; RME: 73891-99-3;

Methyl Tallowate: 61788-71-2

Composition/Information On Ingredients

This product contains no hazardous materials.

Hazards Identification

Potential Health Effects:

### INHALATION:

Negligible unless heated to produce vapors. Vapors or finely misted materials may irritate the mucous membranes and cause irritation, dizziness, and nausea. Remove to fresh air.

### EYE CONTACT:

May cause irritation. Wash eye with water for at least 15 to 20 minutes. Seek medical attention if symptoms persist.

### SKIN CONTACT:

Prolonged or repeated contact is not likely to cause significant skin irritation. Material is sometimes encountered at elevated temperatures. Thermal burns are possible.

### INGESTION:

No hazards anticipated from ingestion incidental to industrial exposure.

First Aid Measures

### EYES:

Wash eyes with a heavy stream of water for at least 15 to 20 minutes.



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**SKIN:**

Wash exposed areas of the body with soap and water.

**INHALATION:**

Remove from area of exposure, seek medical attention if symptoms persist.

**INGESTION:**

Give one or two glasses of water to drink. If gastro-intestinal symptoms develop, consult medical personnel. (Never give anything by mouth to an unconscious person.)

**Fire Fighting Measures**

Flash Point (Method Used): 130.0° C min (ASTM 93)

Flammability Limits: None known

**EXTINGUISHING MEDIA:**

Dry chemical, foam, halon, CO<sub>2</sub>, water spray (fog). Water stream may splash the burning liquid and spread fire.

**SPECIAL FIRE FIGHTING PROCEDURES:**

Use water spray to cool drums exposed to fire.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:**

Oil soaked rags can cause spontaneous combustion if not handled properly. Before disposal, wash rags with soap and water and dry in well ventilated area. Firefighters should use self-contained breathing apparatuses to avoid exposure to smoke and vapor.

**Accidental Release Measures Spill Clean-Up Procedures**

Remove sources of ignition, contain spill to smallest area possible. Stop leak if possible.

Pick up small spills with absorbent materials such as paper towels, "Oil Dry", sand or dirt.

Recover large spills for salvage or disposal. Wash hard surfaces with a safe solvent or detergent to remove any remaining oil film. A greasy surface will be slippery.

**Handling And Storage**

Store in closed containers between 50°F and 120°F.

Keep away from oxidizing agents, excessive heat, and ignition sources.

Store and use in well ventilated areas.

Do not store or use near heat, spark, or flame, and store out of the sun.

Do not puncture, drag, or slide the container.

The drum is not a pressure vessel; never use pressure to empty.

Exposure Control /Personal Protection

**RESPIRATORY PROTECTION:**

If vapors or mists are generated, wear a NIOSH approved organic vapor/mist respirator.

**PROTECTIVE CLOTHING:**

Safety glasses, goggles, or face shield recommended to protect eyes from mists or splashing. PVC coated gloves recommended to prevent skin contact.

**OTHER PROTECTIVE MEASURES:**

Employees must practice good personal hygiene, washing exposed areas of skin several times daily and laundering contaminated clothing before re-use.

**Physical And Chemical Properties**

Boiling Point, 760 mm Hg:>200°C Volatiles, % by Volume: <2

Specific Gravity (H<sub>2</sub>O=1): 0.88 Solubility in H<sub>2</sub>O, % by Volume: insoluble

Vapor Pressure, mm Hg: <2 Evaporation Rate, Butyl Acetate=1: <1

Vapor Density, Air=1:>1

Appearance and Odor: pale yellow liquid, mild odor

Stability And Reactivity

**GENERAL:**

This product is stable and hazardous polymerization will not occur.

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**INCOMPATIBLE MATERIALS AND CONDITIONS TO AVOID:**

Strong oxidizing agents

**HAZARDOUS DECOMPOSITION PRODUCTS:**

Combustion produces carbon monoxide, carbon dioxide, and thick smoke.

Disposal Considerations

**WASTE DISPOSAL:**

Waste may be disposed of by a licensed waste disposal company. Contaminated absorbent material may be disposed of in an approved landfill. Follow local, state and federal disposal regulations.

Transport Information

UN HAZARD CLASS: N/A

NMFC (National Motor Freight Classification):

PROPER SHIPPING NAME: Fatty acid ester

IDENTIFICATION NUMBER: 144920

SHIPPING CLASSIFICATION: 65

Regulatory Information

**OSHA STATUS:**

This product is not hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29 CFR 1910.1200. However, thermal processing and decomposition fumes from this product may be hazardous as noted in Sections 2 and 3.

TSCA STATUS: This product is listed on TSCA.

CERCLA (Comprehensive Response Compensation and Liability Act): NOT reportable.

SARA TITLE III (Superfund Amendments and Reauthorization Act):

Section 312 Extremely Hazardous Substances: None

Section 311/312 Hazard Categories: Non-hazardous under Section 311/312

Section 313 Toxic Chemicals: None

**RCRA STATUS:**

If discarded in its purchased form, this product would not be a hazardous waste either by listing or by characteristic. However, under RCRA, it is the responsibility of the product user to determine at the time of disposal, whether a material containing the product or derived from the product should be classified as a hazardous waste, (40 CFR 261.20-24)

**CALIFORNIA PROPOSITION 65:**

The following statement is made in order to comply with the California Safe Drinking Water and Toxic Enforcement Act of 1986. This product contains no chemicals known to the state of California to cause cancer.

*Other Information*

This information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any other process. Such information is to the best of the company's knowledge and believed accurate and reliable as of the date indicated. However, no representation, warranty or guarantee of any kind, express or implied, is made as to its accuracy, reliability or completeness and we assume no responsibility for any loss, damage or expense, direct or consequential, arising out of use. It is the user's responsibility to satisfy himself as to the suitability and completeness of such information for his own particular use.

**NOTICE**

This article was prepared with a view to analyzing the different forms of transport, handling and storage of biofuel varieties, on the basis of the assumptions regarding the probable destination of the larger part of our biofuel exports. The author does not make any warranty, express or implied, or assume any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, product, or process disclosed, or represent that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its recommendation.

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## 20. Allianz commitment to biofuels

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### 20.1. Allianz Group Policy

Allianz Group is firmly committed to sustainable development and reducing the effects of climate change, that impact directly and indirectly on more than 60 million clients across the world. Therefore, Allianz Group has developed a research and disclosure policy of the factors contributing to climate change, as well as a series of actions to reduce its causes.

One of the pillars of this strategy is the promotion of initiatives to foster the use of renewable energies, to reach a higher energetic efficiency, and to develop emerging technologies targeted at reducing carbon emissions.

Allianz actively supports the European Union targets for a 20% CO2 reduction by 2020, as well as a binding target of a 20% share of renewables in the energy mix.

As an active member of the United Nations Environment Program – Finance Initiative, Allianz points to the UN mandate for a clear post 2012 climate regulation to follow the current Kyoto regime, and calls for clear direction no later than the end of 2009.

### 20.2. Insurance Solutions and Risks Transfer

On the other hand, Allianz Argentina aims to lead the insurance area for undertakings associated with renewable energies, including the biofuel industry. To reach this aim, Allianz Argentina has developed specific solutions which will be useful for our investors, constructors and biofuel plant operators. Our insurance coverage and associated services are applicable to the production of biodiesel from vegetable oil, bioethanol, and others.

These insurance solutions include the design, construction, commissioning, and operation of biofuel plants, and cover a vast array of risks within these stages.

Our specialists will give you advice on how to identify risks and get the best coverage for them. Products include risk consulting services by our engineers, who share the know-how that Allianz Risk Consultants provide us, as well as the Allianz Center for Technology's technological and scientific resources.

Risk consulting services, which are part of the coverage of solutions, include: defining basic standards to design fire protection systems; reviewing those projects; on-site inspections to verify adequate implementation of works in protection facilities; fire protection systems maintenance & operation consultancy; assessment of fire prevention during the operational phase, including fire safety organization, damage prevention practices, and various prevention programs.

We expect to continue sharing our expertise in the field of renewable energies and to consolidate Allianz's presence in initiatives that contribute to enhancing the quality of life in our world.

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## 21. ePlus: a world wide supplier for renewable energy solutions

By ePlus

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Phone/Fax: (+54) 11-4342-0006

E-mail: [info@eplusenergy.com](mailto:info@eplusenergy.com)

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### 21.1. About Us

Nowadays, the shortage of non-renewable resources is driving visionary entrepreneurs, world wide companies and nations around the world to venture into the use of alternative energy sources. As the liquid fuels demand continues to expand and high investment technologies like hydrogen remain uncertain, liquid biofuels emerge as a complementary source for a most secure and sustainable energy matrix. This opportunity has reached several regions, where ePlus has taken the lead by offering its products and services, and therefore consolidating as a leading-edge technology and cost-efficient supplier. We provide environmentally-friendly renewable fuel generation by means of our world-class Biodiesel production facilities.

ePlus focuses in Biodiesel project rollout, engulfing all the possible production schemes from the oil extraction process to the refining of the final fuel, including all the complementary services for a turn-key provision. Our target has always been to provide integrated energy solutions through high-standard Biodiesel production facilities, fulfilling both local and international safety and quality standards.

In such a dynamic business, new market challenges demand permanent innovation in order to achieve strategic flexibility. Under the basis of this new paradigm, we are continuously improving our technology as we develop our own proprietary process. At ePlus, we believe that efficient energy resource management will be the key to survival for future generations. Shouldn't we get down to it today?

### 21.2. Our History

ePlus started off in May 2003 as a project supported by DON MARIO SEMILLAS, a renowned agribusiness company leader in the Argentinean soybean sector since 1980. After gathering a team of experienced professionals from the fields of energy, industry and agriculture, the group was ready to pursue a breakout challenge: funding Argentina's first soybean-based Biodiesel production plant of industrial scale. The success of the project proved that the company could live up to its mission: to offer economic and healthy energy generation, through engineering, construction and assembly of renewable fuel production plants, based on the ultimate technology and the most strict quality and safety regulations.

But this event was only the foundational stone of what ePlus is nowadays: an international quality leader in Biodiesel know-how, and an operational plants supplier for medium and high scale projects. Energy solutions are a planetary matter, and so is ePlus business scope.

In light of the market's increasing demand and the need for ongoing R&D, new alternatives are required to emerge and be available at an industrial level. Following this goal, in 2007 ePlus combined forces and made a prosperous alliance with a renowned engineering firm: Grupo de Ingeniería Aplicada, GIA. This group is managed by senior specialists and has a long-standing, international track record in formulating, assessing and developing industrial, technological and chemical plans and projects. Over the past ten years, the company's core group has undertaken several projects in Argentina, the U.S. and other American countries. With several running assignments in the areas of Oleochemicals, Soap & Detergents, and Glycerin, the group has become an industry leader, constantly working with high-technology proprietary designs. In the Biodiesel field, the Company provided the detail engineering for a 240,000 ton per year continuous plant, one of the first large scale production facilities in Argentina.

Thus, both companies rely on their combined extensive skills and know-how to serve their clients, by developing reliable and safe projects and processes that meet worldwide quality standards and leading technological breakthroughs. ePlus project

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teams combine young and experienced engineers with expertise in the energy, industrial and chemical sectors. All of them integrated through management politics based on a permanent empowerment motto.

### 21.3. What we do

ePlus's core business focuses on providing integral Biodiesel production plants, 100% automated and operating according to international standards. This includes equipment and facility, pre-commissioning and commissioning tasks, assembly and activation support, management and overall coordination of the project, and every other stage regarding a complete turn-key plant supply. These tasks are performed by our team of professionals, reaching both local and international safety regulations and quality standards. As an additional warranty to ensure plant operation, we also provide personnel training as required for plant efficiency and safety performance, as well as regular maintenance.

Nowadays, building long-term client-supplier relationships is a key factor to reach mutual competitive advantages in the business to business sector. At ePlus we believe that our responsibility as a high technology supplier goes beyond the assembly and set-up tasks. Even when the project is fully operational under the warranted parameters, we have realized that a major issue that our clients constantly seek is the capability of adjusting their facilities to multiple market scenarios as they come across. This is why we offer, as a complement to our plant provision, advisory service that includes a Business Feasibility Analysis, providing all our know-how to build a complete technical, economical and financial overview for each project to be undertaken. Both our products and services make optimal synergy, allowing our customers to determine (and therefore bring into being) a Biodiesel production project. Even though these two services are independent in matter, in most cases customers moving forward with plant construction usually commission our Advisory Analysis first.

In ePlus we are proud to know that we don't only have deep knowledge on the Biodiesel industry, but we also comprise the merge of human resources with vast proven experience in energy crops development, vegetable oil industry and energy generation, all of them together combined to form one of the main technology players all around the world.

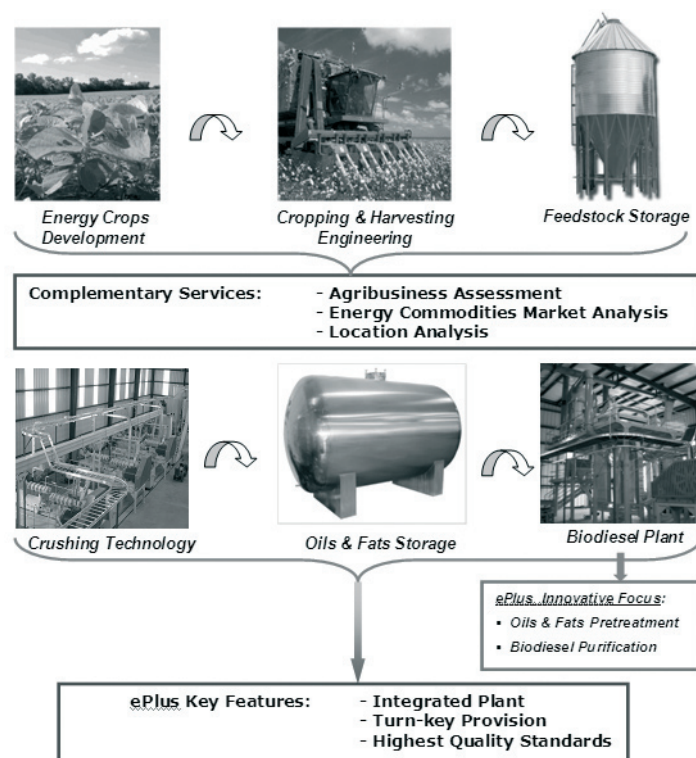
### 21.4. Integrating process: a win-win strategy

The global biofuels market development throughout the past years has shown it to be a combination of components both from the energy and agricultural commodities sectors. But as well as every developing sector, it demands permanent updating to variable conditions. This ever changing requirement comes not only from the economic aspects of the industry, but it is also attached to environmental and social goals, with diverse implications in each part of the world.

From an economical point of view, technical and commercial flexibility is always a basic need to bring new solutions for our customers. The opportunity of integrating oil extraction processes into the Biodiesel production plants becomes then one of our main advantages.

Our Turn-key Models include Crushing Facilities (both Chemical and Mechanical in nature), Oil-based Biodiesel Production Plants (strictly aimed to the transesterification Reaction Phase), and finally Fully Integral Plants (from the beans to the fuel, based on both Crushing and Reaction Phases in an Integrated Facility).

Concerning technical flexibility, our plants may be adjusted to accommodate to a wide variety of crops such as soybean, sunflower, canola, safflower, and many other vegetable oils, as well as animal fats. We strongly believe that Multi Feedstock processing capability will be the key to leading the new Biodiesel industry, since new raw materials continue to emerge while traditional feedstocks are being specifically designed towards the Biodiesel production. Here again, ePlus has permanent contact with the latest developments related to the genetically modified seeds, through our partners at DON MARIO SEMILLAS.



## 21.5. Our products

As the Biodiesel industry keeps growing in demand, and new technologies emerge, so did our knowledge and experience develop on integrated processes. Nowadays, ePlus products have become a set of solutions for every possible production scenario in the market.

Our proposal includes:

### ► Crushing Facilities:

- Mechanical or Solvent-based Extraction Systems.
- Multi Feedstock Processing Capability: Soybean – Sunflower – Safflower – Rapeseed / Canola – Castor.
- Pre-conditioning Equipments and Seed Storage Provisions.
- Dehulling System and Grinding Facilities.
- Continuous Deactivation of ureasic activity and indigestible proteins.
- Raw Oil Purifications Systems: Degumming and Drying Modules.
- Lint Recycling Circuit: higher yields and zero liquid waste.
- High Protein Meal obtained.

### ► Biodiesel Reaction Phase (Transesterification Plant):

- Oils and Fats Pretreatment: higher yields and feedstock flexibility.
- Continuous Process.
- Methanol Recovery Unit: low consumption of petroleum-based products and catalysts.
- Biodiesel Purification: by Humid or Dry Wash, according to production scale.
- Final Product that complies with EN14214 and ASTM 6751-D International Standards.
- Zero Waste currents or effluents.
- Lower Emissions.

### ► Integrated Plants:

- From the Bean to the Fuel.
- Turn-key Provision: plant delivered ready for operation.
- Technical Advice for procurement of all the auxiliary equipment.

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- 100% Automated Facilities.
  - All services for a project rollout commissioned: Procurement, Activation Support, Project Management and Overall Coordination.
  - Plant in accordance with all local safety requirements.
  - Product quality and process yields warranted as per contract specifications.

## 21.6. Technology advantages

Designing new processes and production methods is a permanent challenge in every industry, and the emerging biofuels sector is not the exception to the rule. The demand for high yield technologies is a request imposed both by the market and the society in general.

ePlus's self designed and developed processes carry the ultimate technology advantages:

### ▶ *Greater Efficiency:*

- Our technology uses 100% of oils' fat for optimum transesterification performance. Thus, raw material costs are reduced by 2 percentile points, while by-products (soap, fatty acids, and unsaponifiable substances) disposal costs are eliminated.
- Production increases by 1,800 tons in every 100,000 tons produced (as a result of the 2-point reduction in raw materials).
- Byproduct disposal costs are reduced by US\$ 900,000 in every 100,000 tons produced, since no lint is generated during the oil treatment stage due to the lack of fat acid residue.

### ▶ *Greater Versatility:*

- As a result of robust oil pre-treatment, raw materials from any origin and quality grades may be used, thus ensuring long-term supply. These include raw or recycled vegetable oils, as well as animal fat and fodder.
- Plants may even use waste from other plants, including lint produced by other technologies.

### ▶ *No effluent emissions:*

- Our process has been designed to optimize energy and every other resource consumption, minimizing the use of methanol and catalysts, and even eliminating liquid effluents.

### ▶ *Top quality by-products:*

- The high-purity glycerin (above 80% concentration) is easier to market and suitable for a number of applications, such as heating fuel, animal feed, and even reprocessing it to obtain high value by-products for the energy and chemical industry (currently under development).
- The high protein meal results in great demand as animal feed.

### ▶ *Entirely Automated Continuous Process.*

### ▶ *The Resulting Product meets the most demanding, first-rate safety and quality standards.*

## 21.7. Beyond Geographical Limits. Crossing Frontiers

Currently, ePlus is carrying out several projects on diverse scales in Argentina, the United States and other American countries.

Our first project in the U.S. consists of an Integrated Soybean-based Biodiesel Production Plant, and represents one of the thriving achievements of the Company's main international goals.

The Facility is equipped with a Continuous Process Technology, a Special Oil Pretreatment Process (ePlus's proprietary design), and a Methanol Recovery Unit, among many other features developed to magnify the client's savings and flexibility, regarding an efficient use of the raw materials. This Plant has three oil extraction lines that undergo all the feedstock processing operations: Pre-conditioning, Breaking and Rolling of the beans; Extrusion for Deactivation of ureasic activity; Mechanical Extraction of the Oil; and finally Oil Purification (Degumming and Drying) and Meal Grinding. This phase also



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includes a Soybean Dehulling Unit, which helps obtaining a higher protein meal, and therefore a most valuable by-product for the animal protein industry.

The design and construction of the Integrated Plant Equipment was entirely made in Argentina, with Basic and Detailed Engineering from ePlus teams, based on proprietary processes adapted according to our client's specific requirements.

All the Procurement, Logistics and Exportation Services were included in the provision, in order to submit the committed Project Planning without any risk for equipments or personnel integrity.

The Equipment, Piping and Instrument Assembly Tasks were performed by a team of engineers and technicians with 24-hours availability at the plant site. Once the Assembly Stage was accomplished, our experts conducted all the required equipment tests and process operational trials to carry away the Start-up Tasks needed and ensure that the obtained product complied with the specified warranties.

These operations are critical for achieving long-term high performance on the integrated process, aimed to meet all safety and quality regulations for the American Market. Energy, steam and other auxiliary service installations are provided 100% ready to operate, just as well as the production lines.

An Overall Coordination of every project is led both from ePlus headquarters and through the direct supervision of the project's general manager at the plant site. The On-site Coordination and Monitoring guarantees that each one of the abovementioned operations is executed as planned, and thus the entire Plant can be delivered as a Turn-key Facility, with every process reaching the yields and quality standards as originally specified in the Proposal.

The use of Biodiesel in the international energy matrix is already a tangible reality among us. And this reality is even expanding faster than we could ever think of. Now, this undeniable present and future opportunity actually conforms the environment where ePlus builds Integral Business Solutions for today's and tomorrow's needs. We have become Seekers and Architects of Energy Solutions. You are welcome to join us in our mission.

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## 22. Contact Data

### 1. German–Argentinian Chamber of Industry and Commerce

Cámara de Industria y Comercio Argentino-Alemana  
Corrientes 327, C1043AAD Buenos Aires  
Phone: (54 11) 5219-4000  
Fax: (54 11) 5219-4001  
E-Mail: [ahkargentina@cadicaa.com.ar](mailto:ahkargentina@cadicaa.com.ar)  
Web Page: [www.cadicaa.com.ar](http://www.cadicaa.com.ar)

### 2. Prosper.Ar

National Investment Development Agency  
Agencia Nacional de Desarrollo de Inversiones  
Florida 375 – Piso 8 B – Buenos Aires (C1005AAG)  
Phone: (54 11) 4328.9510  
E-mail: [info@prosperar.gov.ar](mailto:info@prosperar.gov.ar)  
Web Page: [www.prosperar.gov.ar](http://www.prosperar.gov.ar)

### 3. Export.Ar Foundation

Fundación Exportar  
Paraguay 864/866 – Buenos Aires (C1057AAL)  
Phone: (54 11) 4315-4841  
Web Page: [www.exportar.org.ar](http://www.exportar.org.ar)

### 4. Secretary of Energy

Secretaría de Energía  
Av. Paseo Colón 171 Capital Federal – CP (C1063ACB)  
Phone: 54-11-4349-5000  
E-Mail: [energia@minplan.gov.ar](mailto:energia@minplan.gov.ar)  
Web Page: [www.energia.gov.ar](http://www.energia.gov.ar)

### 5. German Embassy, Buenos Aires

Villanueva 1055 Capital Federal – CP (C1426BMC)  
Phone: (5411) 4778-2500  
Fax: (54 11) 4778-2550  
Web Page: [www.buenos-aires.diplo.de](http://www.buenos-aires.diplo.de)

### 6. National Biofuels Programme

Secretariat of Agriculture, Livestock, Fisheries and Food  
Secretaría de Agricultura, Ganadería, Pesca y Alimentos  
Paseo Colón 982 – 2nd. Floor – Office 220 – Buenos Aires (1063)  
Phone: (5411) 4349-2222 / 2226 / 2533  
E-mail: [biocombu@mecon.gov.ar](mailto:biocombu@mecon.gov.ar), [malmad@mecon.gov.ar](mailto:malmad@mecon.gov.ar)  
Web Page: [www.sagpya.gov.ar](http://www.sagpya.gov.ar), [www.biodiesel.gov.ar](http://www.biodiesel.gov.ar)

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## **7. Country Brand Strategy**

"Marca País" Program

[www.marcaargentina.gov.ar](http://www.marcaargentina.gov.ar)

## **8. Ministry of Production of the Province of Buenos Aires**

Ministerio de Asuntos Agrarios y Producción, Provincia de Buenos Aires

Calle 51 e/ 10 y 11. La Plata (1900)

Phone: 54-0221-429-1600

E-mail: [info@mp.gba.gov.ar](mailto:info@mp.gba.gov.ar)

Web Page: [www.mp.gba.gov.ar](http://www.mp.gba.gov.ar)

## **9. Ministry of Production and Work of Cordoba Province**

Ministerio de Industria y Trabajo, Provincia de Córdoba

Marcelo T. de Alvear 347 - Cordoba

Phone: (54 351) 434-2485

Web Page: [www.cba.gov.ar](http://www.cba.gov.ar)

## **10. National Institute of Agricultural Technology**

Instituto Nacional de Tecnología Agropecuaria

c.c. 25 - Castelar - (1712)

Phone: 54 11 4665-0495 0450

Móvil Phone: 54 9 11 4 1434394

E-Mail: [hilbert@cnia.inta.gov.ar](mailto:hilbert@cnia.inta.gov.ar)

Web Page: [www.inta.gov.ar](http://www.inta.gov.ar)

## **11. Biofuels and Hydrogen Argentine Association**

Asociación Argentina de Biocombustibles e Hidrógeno

E-mail: [claudiomolina@fibertel.com.ar](mailto:claudiomolina@fibertel.com.ar)

## **12. Agrobusiness and Food Program of the Faculty of Agronomy**

Programa de Agronegocios y Alimentos de la Facultad de Agronomía

University of Buenos Aires

Av San Martin 4453 (1417) -Buenos Aires

E-mail: [vilella@agro.uba.ar](mailto:vilella@agro.uba.ar)

Web Page: [www.agro.uba.ar](http://www.agro.uba.ar)

## **13. Maizar – Argentine Corn and Sorghum Association**

Asociación Maíz Argentino

Lavalle 548 3°"B" – Buenos Aires (C1047AAL)

Tel: 5031-2676 / 5238-1177

E-mail: [info@maizar.org.ar](mailto:info@maizar.org.ar)

Web Page: [www.maizar.org.ar](http://www.maizar.org.ar)

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#### **14. Argentinean Soy Chain Association – Acsoja**

Asociación de la Cadena de la Soja Argentina

Paraguay 777 – 4to. Piso (S2000CVO)

Rosario – Santa Fe – Argentina

Phone: 54-341-4213471 int. 2289

E-mail: [contacto@acsoja.org.ar](mailto:contacto@acsoja.org.ar)

Web Page: [www.acsoja.org.ar](http://www.acsoja.org.ar)

#### **15. The Interamerican Ethanol Commision**

1200 Anastasia Ave – Ste 500 – Coral Gables (FL 33134)

Phone: 305-476-0155

Fax: 305-476-5452

E-mail: [info@helpfuelthefuture.org](mailto:info@helpfuelthefuture.org)

Web Page: [www.helpfuelthefuture.com](http://www.helpfuelthefuture.com)

#### **16. Garrido Law Firm**

Av. Del Libertador 498, PISO 23°

C1001ABR – Buenos Aires

Phone: (+54)11 4850-4000

Fax: (+54)11 4850-4001

E-mail: [info@garridolawfirm.com](mailto:info@garridolawfirm.com)

Web Page: [www.garridolawfirm.com](http://www.garridolawfirm.com)

#### **17 – 18. Ernst & Young**

25 de Mayo 487 – Buenos Aires (C1002ABI)

Phone: 0054-11-45152687

Web Page: [www.ey.com/ar](http://www.ey.com/ar)

#### **19. Airsealand Group**

Alsina 653 Buenos Aires C1087AAI

Phone: +54-(11)-4342-0123

Fax: +54-(11)-4331-1052

E-mail: [airsealand@airsealand-group.com.ar](mailto:airsealand@airsealand-group.com.ar)

Web Page: [www.airsealand-group.com.ar](http://www.airsealand-group.com.ar)

#### **20. Allianz Argentina**

Phone: +54 (011) 4320-3800/1

Fax: +54 (011) 4320-7185

E-mail: [paglo.cabrera@allianz.com.ar](mailto:paglo.cabrera@allianz.com.ar)

Web Page: [www.allianz.com.ar](http://www.allianz.com.ar)

#### **21. ePlus**

Tacuareí 202 11th Floor – Buenos Aires (1071)

Phone/Fax: (+54)11-4342-0006

E-mail: [info@eplusenergy.com](mailto:info@eplusenergy.com)

Web Page: [www.eplusenergy.com](http://www.eplusenergy.com)

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