
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 CO₂), or even, 3.5 tons of cereals for each ton of alcohol (remaining as by-products, grains and distilled dry soluble –DDGS– and CO₂).

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

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.

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

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 inbalance 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.

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 alchemical 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).

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 CO₂ 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.

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.