



Biofuels

How to recover the
virtuous cycle of
productive growth

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The challenge of market recovery

Ten years have elapsed from the enactment of Law No. 20093, which promoted the production of biofuels and helped Argentina become one of the main global players in a short time. As a consequence of domestic policies imposing restrictions on the sector in the last years, the initial drive slowed down but now the situation is reversing.

Introduction

Out of all the renewable energy resources that may be used as an alternative to oil byproducts, biofuel shows the greatest development and potential locally. It is defined as liquid fuel generated on a renewable basis from organic waste. It works as a substitute for or alternative to fossil fuel, such as oil, gas and carbon. Biofuel can be obtained from the processing of natural organic waste (or biomass) or from industrial or urban waste (biodegradable waste). Biomass waste, in turn, can be classified into two large groups: biofuel and bioliquids. While biofuel is mainly used in transport¹, bioliquids are primarily used for electric power and cooling or heating. Biofuels include, among others², bioethanol and biodiesel which, in addition to being two of the main renewable fuels generated from natural resources produced at a global level (according to the World Bioenergy Association, in 2013/2014 they accounted for approximately 87% of the global supply of biofuel) they imply a significant portion of the national supply of alternative fuel.

Bioethanol is an ethanol produced from biomass or the biodegradable fraction of waste. It accounts for around 85% of the global supply of biofuel. In Argentina, the most common sources for its production are sugar cane and corn³. Among the advantages of bioethanol, it is an octane enhancer, it reduces greenhouse gases and also the use of lead and other dangerous additives, with antifreeze properties. Biodiesel is a methyl-ester produced from vegetable oil (soy, corn and sunflower, among others) and/or animal oil (bovine, porcine and birds). As in the case of bioethanol, it is used as biofuel, mainly as a substitute for gasoil in diesel engines. Biodiesel stands out for its higher lubricity compared with gasoil. Storage and transportation is safer, its degradation is faster and it has no sulphur, which reduces greenhouse gases. During the expansion of this sector in our country (2007-2012), Argentina held the 4th position among the main producers of biodiesel globally (up to that moment, the European Union, USA, Brazil and

¹ For example, Biodiesel and Green Diesel are similar to gasoil.

² In addition to Bioethanol and Biodiesel, we can mention Green-diesel, Biogas, Bio-methanol, Bio-DME, Bio-ETBE and Bio-MTBE, synthetic biofuel, Butanol, HBD, Bio-kerosene, Bio-hydrogen and pure vegetable oils.

³ In USA, corn is the main raw material for the production of bioethanol. In other countries producing these fuels, such as Brazil and Mexico, sugar cane stands out (as it is related to the tropical weather), but *mandioca* or *yucca* are also used. In the last years, bioethanol has been produced out of wheat straw, barley, wood and other forest waste.

Argentina accounted for more than 85% of the supply). However, in the last years, Argentina's position in the ranking of the main producers and exporters of biodiesel suffered certain falls and recoveries, and in 2014 it reached the first position, leaving USA behind. As in the case of most of the countries which produce this fuel, the raw material used is soybean oil and, therefore, the country has a considerable advantage, as it is the main exporter of this byproduct⁴.

From a historical viewpoint, the production of biofuels can be explained by their supply and their demand. Among the factors relating to the supply, the regulatory policies and reforms implemented since the 70's (mainly by governments such as USA, Brazil, Canada, the EU, China, India and Argentina, among others) stand out. These policies and reforms sought to promote the production of these fuels as a substitute for fossil fuels; another factor is the cost that must be incurred to generate them. This last factor has been the main drawback faced since then by the investment and generation of biofuels as, in the first place, costs are usually higher than those associated with the production of oil, gas and carbon and, in the second place, the cost of the raw material commonly used represents from 50% to 80% of the variable cost of production, basically due to the trade-off of certain supplies such as soy or corn which, in addition to being essential for production (at least in Argentina), have other equally important uses pushing up costs as competition is generated in the demand. Consequently, at present, although it is expected that in a near future these fuels will evidence an upward trend, their share in the worldwide energy supply does not exceed 1% (the supply of renewable resources, which include biofuels and nuclear energy or hydropower -among other examples- has a significantly higher share of around 14%). Other factors affecting the demand of biofuels are the prices of carbon, oil and gas (which serve as substitutes for biofuels and for renewable energy in general), the price of raw materials used as supplies to produce them (for example, soy, corn and sugar cane in the case of Argentina) and policies oriented to the permanent adoption of alternative fuels to the detriment of fossil fuels. In this sense, it can be sustained that even though the public policies that have been implemented for some decades may have been aimed at fostering the use of biofuels, the variations in the price of agro and energy commodities recorded in the last decade have affected that objective, both locally and globally.

In fact, the sustained increases in the prices of the main commodities traded at an international level throughout the 2003-2013 decade have favored the production and export of commodities such as soy and byproducts (mainly soybean oil and flour) but have made the production of biodiesel (which uses soy as the main raw material) more expensive, not only due to the higher price of the supply but also due to the recharge derived from demand competition in a pro-exporter context. Furthermore, during that same period, the local production of oil and gas began to decline (which had been occurring since 1998), which would derive in an important crisis in the national energy balance and is expected to be solved with policies promoting the production of alternative fuels (mainly renewable), among other measures. Nevertheless, although the production of these fuels had a significant rise in the period 2007-2012, the restrictions imposed by the State to favor domestic consumption, added to the high costs to produce them, put an end to the growth in an area that is key to the achievement of a sustainable and environment-friendly development.

As previously highlighted, the main biofuels produced in Argentina are bioethanol and biodiesel. Both of them recorded an unprecedented growth until 2012, where their production plummeted due to various local factors (certain restrictions affecting exports in a context of favorable prices) and foreign factors (basically the restrictions imposed by the EU on the import of national biofuels).

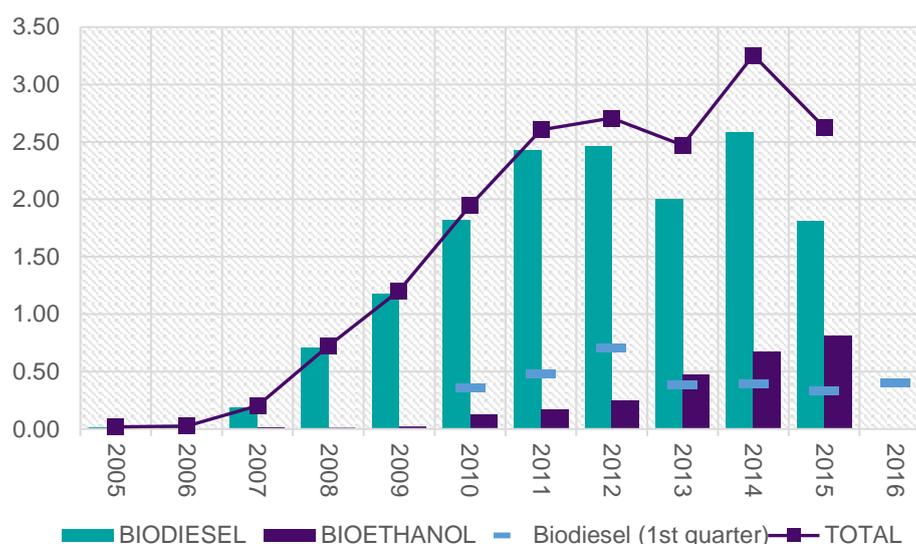
⁴ Argentina is the main exporter of soybean oil and flour. In 2015, our country exported around 40 million tons of soy and byproducts (flour, oil and biodiesel), accounting for 70% of production and revenues for approximately US\$ 17 billion.

However, given the changes in the management of public accounts and a new national administration, which is more market-oriented, together with the fact that foreign markets are willing to receive these products, the sector seems to be reactivating again. In this sense, this document analyzes the most recent changes, by identifying the clear phases: i) a first phase of “high production”, ii) another phase of “domestic restrictions which had a negative impact on development” and, finally, iii) a third phase of “reactivation”. These matters are dealt with in the first section. Finally, the second section includes final considerations and prospects for the future.

I. The three phases of the national production of biofuels

As briefly explained at the end of the previous paragraph, the changes and behavior of production in the national biofuels sector can be divided into three phases. The first phase showed a significant growth in the period 2007-2012, where the production of bioethanol and biodiesel evidenced an end-to-end growth of 1180%, from an aggregate of 200 million liters to one of 2700 million liters (see *Figure 1*).

Figure No. 1
Changes in the production of biofuels in the period 2005-2015 and the first quarters of 2010 to 2016
(In billion liters)



Source: Prepared by us based on the INDEC’s data

Although during the 70’s and the 80’s various economic and legal events took place which established the bases for the development of alternative fuels (such as the drive of the Brazilian program PROALCOOL in 1978, the tests conducted in the Alconafita Plan in 1979 -seeking to prove the blend of ethyl alcohol and naphta as an alternative fuel, and Law No. 23287 -which declared the Alconafita Plan of national interest), in 2006 there was an increased domestic interest in production, due to the considerable growth experienced by the prices of non-renewable energy commodities (oil and gas) and the more expensive budget resulting from their use upon a considerable fall in domestic production.

Within this framework, Biofuel Law No. 26093/2006 and Ethanol Production Promotion Law No. 2634/2007 were enacted which established, in the first place, the mandatory use of biofuels in a proportion or cut not lower than 5% in the production of fossil fuels (gasoil, diesel-oil and naphta) as from 2010 and, in the second place, the extension of the regime providing benefits to the production of bioethanol (tax reductions and exemptions mainly oriented to sugar mills and sure cane producers). As it can be noted, one of the immediate effects of the previous laws was the creation of a local market with a fixed biofuel production basis (of around 700 million liters by 2008) which, in principle, was primarily used for the local manufacturing of naphta and gasoil (by observing the cut imposed by the law).

However, it is worth highlighting that the laws referred to above, mainly Law No. 26093, do not have a sufficiently clear or flexible regulatory framework as it relates to the acquisition and regulation of biofuel prices (since according to sections 4 and 9 of Law No. 26093 prices depend on the discretion of the competent authorities; on the other hand, the purchase of biofuels for blending purposes by qualified companies must exhaust the domestic production available, which almost forbids imports)⁵, as well as regarding the benefits and beneficiaries of this promotion regime (as there are important restrictions on access)⁶.

For the reasons above, even though the production of biofuels evidenced a substantial development after 2007 (with average growth rates of 300% in the first years, which then became moderate and unchanged in 2012), the development was more in line with the behavior and trend of the international prices of agricultural and energy commodities (which were evidencing an upward trend and had an effect on the supply of biofuels - because they were profitable- and also on the demand –because they worked as a substitute for fossil fuels given the increase in prices-)⁷ and the broad possibilities to export the surplus of local production, than due to the regulatory framework to promote it.

⁵ Furthermore, section 12 of Regulatory Decree 109/2007 explains that the acquisition of biofuels, to comply with section 9 of Law No. 26093, shall be performed at the prices established by the competent authorities, considering the profitability and costs of producers, without providing many details as to how to do it, which leaves it to the discretion of competent authorities.

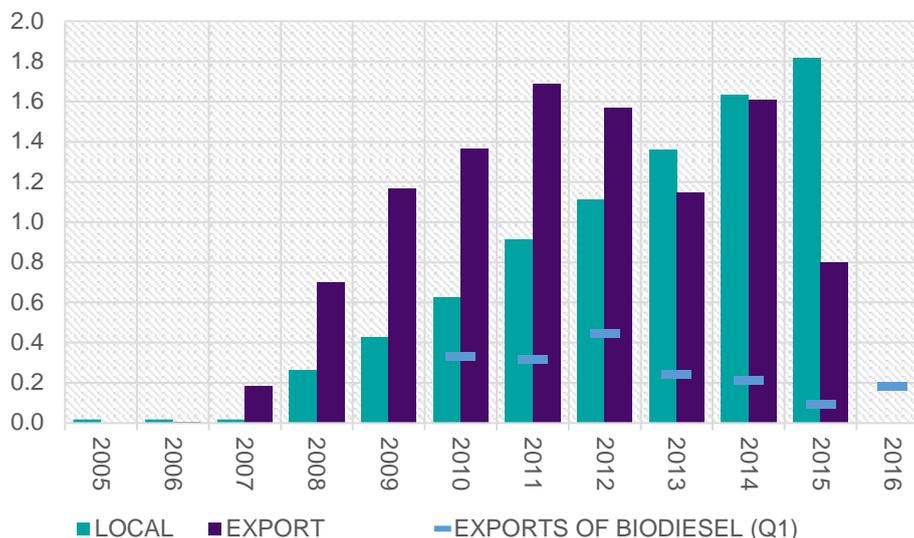
⁶ Section 13 of Law No. 26093 explains that the only beneficiaries of this law are the following: i) those established in the national territory, ii) companies or projects exclusively authorized to develop biofuels, iii) those whose majority owner is the State or legal entities mainly engaged in agribusiness, and iv) those meeting the regulatory conditions on quality imposed by the State.

Furthermore, section 14 sets forth a limit on the distribution of benefits, prioritizing small and medium sized companies engaged in agribusiness and excluding the potential foreign investors; and section 15 breaks down the benefits.

⁷ For example, due to demand pressures, the international price of biodiesel went up by 54% in dollars from 2007 to 2011 (when it reached the maximum amount of USD 1.37/liter).

Figure No. 2
Changes in the local exports and sales of biofuels in the period 2005-2015 and exports
during the first quarters of 2010 to 2016

(In billion liters)



Source: Prepared by us based on the INDEC's data

In this sense, as noted in Figure 2, the joint exports of biofuels showed a good performance until 2011, primarily exports of biodiesel, accounting from 98% to 99% of these exports. From 2007 to 2011, where there was a significant growth, foreign sales of biofuels went from 186 million liters to 1.7 billion liters, which implied an increase in foreign revenues of approximately 840% in dollars in the same period (from USD 160 million in 2007 to USD 1.5 billion in 2011).

Another outstanding consequence of the events referred to above was the rise in the number of companies engaged in the national production of biodiesel, as well as the capacity. Whereas by 2007 the number of producing companies was around 8, in 2011 that figure was three times higher (reaching 26). Moreover, the production capacity increased by 450% in the same period, from 560,000 tons in 2007 to 3,000,000 tons in 2011. The average size of the companies in this sector also grew, as expected, which meant a considerable increase in their productivity. The whole process, which determined the existence of a highly competitive industry with cutting-edge technology, was supported by the context and by the previous existence of an important primary (soy) and industrial (soy by-products) sector, which was highly qualified and efficient⁸.

However, from 2008 to 2011, within the first phase but giving rise to the start of the second phase, a series of internal events took place which had an effect on the sector and resulted in decreased investments, with the consequential negative impact on the production of biofuels. At the beginning of the second phase, characterized by the deceleration of the short-term growth in the production of biofuels (which went on increasing all the same), Resolutions 125 and 126 of 2008 were issued.

⁸ In the case of soy grains, we can mention the sustainable production, the direct sowing and the strategic location of sown farms which, on the average, are no more than 300 km away from milling plants. As it relates to the production of by-products (mainly soy oil), plants are efficient, use cutting-edge technology and located on River Parana, which makes transportation and logistics easier.

Whereas Resolution 125 was aimed at implementing a system of variable withholdings to increase export duties on soy, corn and wheat, Resolution 126 was applicable to biodiesel, increasing export duties from 5% to 20%. Even though, after a heated argument including political and social aspects and an emerging crisis of the farming sector, Resolution 125 was revoked in July that year (and, therefore, the system of variable withholdings on grains was rendered inapplicable), Resolution 126 was confirmed and affected one of the main drivers of the production of biofuels (i.e. exports, in a context of upward prices), giving rise to an unexpected and unclear scenario which discouraged investments and new projects. Consequently, in 2011 there was a significant fall in the upward trend of the national production of biofuels (partly sustained by the Biodiesel Supply Agreement for the blend of Biodiesel with Fossil Fuels - Resolution 7/2010 signed in 2010 between the Government and the sector producers and exporters). The situation was even worse after the implementation of exchange restrictions, the additional restrictions on imports and exports (in a critical context including the depletion of the Central Bank coffers), the elimination of certain benefits to exporters of biofuels (mainly refunds and the increase in the withholding rate to 24.24%) and the reduction by the competent authorities in the internal sales price of biodiesel. Additionally, to make matters worse, in 2012 Spain decided to stop importing nationally produced biodiesel (Spain was the main market for biodiesel exports and accounted for 50% of our country's exports) and the European Union (EU) decided to apply a fee higher than 24% on those imports in response to an alleged dumping case (i.e. according to the EU producers of biofuels, our country placed the product at a price well below market prices), considering that Argentina had placed 90% of biodiesel exports in that market that year. Even though in both cases it is explicitly argued that these decisions were adopted to sustain a European industry of biofuels showing an idle capacity, the implied message in the case of the restrictions adopted by the Spanish Government is that they were imposed in response to the crisis faced by both Governments as a result of the nationalization of the firm YPF during that year (which since 1999 had been owned by Repsol, a Spanish company) within the State project known as "Soberanía Hidrocarburífera de la República Argentina" (Hydrocarbon Sovereignty of the Republic of Argentina).

Given these events, the production of biofuels had only grown by 4% between 2011 and 2012 (basically driven by bioethanol, since biodiesel had remained unchanged at 2400 million liters), from 2600 million liters to 2700 million liters (see Figure 1). Subsequently, as from 2013, the industry of national biofuels evidenced the first signs of the negative impact of the local and international adjustments introduced in the prior years and recorded the first fall in growth (-9%) from its emergence in 2007. Thus, production that year fell to 2500 million liters and, although there was a slight recovery in 2014 (with a record production of 3300 million liters), sustained by the extension of the Supply Agreements, the increase in mandatory cuts (to 10%) and the decrease in export duties, production went down again in 2015, and reached previous levels (2600 million liters), with a significant fall in the production of biodiesel during the first quarter (330 million liters) compared with the 2010-2012 median (520 million liters)⁹.

As it can be expected, exports followed the trail of production. From 2011 to 2013, foreign sales of biofuels recorded a deceleration of 32% in the amount (from 1700 to 1100 million liters) and 7.2% in revenues (from USD 1.5 billion to USD 1.4 billion). Likewise, although in 2014 there was an important recovery promoted by the measures referred to above, exports plummeted again in 2015, reaching 800 million liters (accounting for USD 600 million). Therefore, in the last five years (2011-2015), exports decreased by 53%.

⁹ However, the production of bioethanol went on increasing in 2013, 2014 and 2015, driven by the rise in oil prices which made fuel more expensive and, thus, resulted in the promotion of blends, giving rise to increases in the proportion or cut of bioethanol (reaching 9% in 2014) and, consequently, in production

Nonetheless, it is worth noting that this fall was due to the high weight of biodiesel in the total national exports of biofuels, since bioethanol, a product with a low relative weight in production and exports, grew in both medians in the same period but to non-significant levels unable to stop the decrease in biodiesel sales. In this sense, it can be stated that whereas biodiesel went from 1.68 billion to 788 million liters exported between 2011 and 2015 (accounting for a decrease of 53% in the amount and 60% in dollars), bioethanol increased sales by 43% in the same period, from 8 million to 12 million liters. Finally, in spite of the adverse conditions, the number of companies and the production capacity went on growing. While the production units of biodiesel went from 26 to 36 by the end of 2015, their capacity reached 132,700 tons of annual production on the average, i.e. an aggregate production capacity of around 4.8 million tons annually.

As opposed to the last three-year period, the trend began to reverse in 2016. The new scenario, characterized by a significant political and economic change (due to the Argentine Administration change in December 2015, showing a higher orientation towards the markets), added to the decision taken by the Spanish Government not to extend the restrictions on the import of national biofuels, and the recent judgment issued by the World Trade Organization (WTO), which benefited Argentina in its dispute with the EU in the dumping case (where the Argentine State was accused of placing its exports of biodiesel at prices significantly lower than market prices), set the bases for a new development phase in the sector. In this regard, as it can be noted in Figure 1, the first quarter of 2016 had an auspicious start since the production of biodiesel grew by 21% compared with the same quarter of 2015 (from 330 million to 400 million liters) and although the level of 2013 and 2014 was reached, production was still far from its level in 2012 (710 million liters were recorded in the first quarter of 2012). On the other hand, the production of bioethanol went on growing and from the first quarter of 2015 to the first quarter of 2016, it increased other 16%, until reaching 200 million liters by the end of March 2016. Following this trend, and thanks to the improved foreign context, the exports of biodiesel went up by 94% comparing the same quarters (see Figure 2), from 96 million liters (around USD 73 million) to 185 million liters (or USD 140 million).

Considering these figures and a trend that has evidenced positive changes in the last months, prospects are promising. It is still unknown how the important energy crisis faced by our country will be solved, because even though numerous measures and policies have been implemented, there have been no radical changes in the production of oil and gas, two influential components of our energy matrix, given the falling prices. Nonetheless, the emerging development of biofuels seems to be part of a more comprehensive solution in line with the objective to gradually increase our dependence on them, reducing the intensity of the import of fossil fuels (such as gasoil) and their current and future environmental impact.

II. Final considerations and certain immediate prospects

By projecting the growth in this industry globally, the Organization for Economic Cooperation and Development (OECD) estimates that by 2015 the production of biofuels will reach a level 16% higher than that evidenced today (from a total of 146 billion liters of bioethanol and biodiesel to 170 billion liters). Likewise, certain studies on this subject¹⁰ estimate that by this year a significant portion of the global production of grains (12%), vegetable oils (14%) and around 30% of sugar cane will be allocated to the production of biofuels, promoted by the expected growth in cuts in blends with fossil fuels, as well as by social and economic pressures to attain environmental sustainability. In Argentina, the design of policies and a consistent framework seek to foster the development of renewable energy sources and alternatives to fossil fuels with the purpose to substitute the imports of gas and fuels such as gasoil, save foreign currency and diversify the energy and electrical matrix at a national level.

¹⁰ Prospectiva 2020, GBD Network - "Biocombustibles. Perspectivas del mercado mundial. Situación en Argentina". December 2014

The laws referred to above (Laws Nos. 26093 and 26334) or Law No. 27190 of 2015, as amended (Law No. 27191) provide a timely framework for the use of renewable energy in the generation of electric power. Moreover, it is to note that Argentina is one of the main exporters of soy by-products (mainly oil and flour), which offers a great advantage in the production of biofuels (mainly biodiesel) in a context of price recovery and market openness. Similarly, the changes introduced by the Government should be taken into account, primarily the increase in mandatory cuts for blends of naphta and gasoil or the reductions in export rates for biodiesel. Even though these measures are anti-cyclical (given the recent fall in the prices of commodities, mainly oil) and imply counter-measures with respect to the restrictions imposed in prior years in a more favorable international context, they nonetheless encourage local production, which needs more investments to go on raising its capacity.

Regarding local prospects, Argentina has a solid basis for the sector development. Added to its installed capacity, technology and an important local supply market (soy, corn and cane) should enable the sector to do business at a large scale and reasonable costs, with a significant profit margin encouraging investors. Moreover, it is expected that cuts in the production of fossil fuels will go on growing until reaching 30% in 2030, which means another incentive internally. In the last years, due to the reasons referred to above, the use of the installed capacity in the production of biodiesel was low (40% in 2015). However, the trend has begun to reverse after the measures adopted by the Government to the benefit of the agro sector. The official data confirm this change and prove the statements made above, as in the first quarter of the year, the production of biofuels recorded significant levels, whereas the exports of biodiesel grew by more than 90% year-on-year, mainly allocated to the US market (Telam, July 1, 2016).

The change in the trend of foreign markets, basically as a consequence of the European market openness, and the importance of the sector at a national level (since biofuels imply a sustainable alternative to energy generation), as well as the idle capacity and the increase in the proportion of local grains and vegetable oils allocated to the production of biofuels, all of them together should drive production in the next years. As a matter of fact, the OECD estimates that by the end of 2016 the joint production of biodiesel and bioethanol will amount to 3.42 billion liters in Argentina, exceeding the historical maximum amount reached in 2014 (3.3 billion liters). By 2020, the estimated production amounts to 3.27 billion liters of biodiesel and 1.3 billion liters of bioethanol, which would add up to a joint production over 4.6 billion liters. If this trend is maintained, by 2025 the sector would record an annual production of 5 billion liters (1.4 billion liters of bioethanol and 3.6 billion liters of biodiesel), which would imply a considerable contribution of export revenues and a privileged position among the main global suppliers of biofuels.

Despite the “good news” for the sector, it should be remarked that the market for this type of fuels is very new and going through the first steps. This means that its size, meant as its current potential, is still very small, both locally and globally and, thus, the short-term survival and growth will go on depending on the behavior of international prices and on the cuts established for blends, whereas the sector must continue competing for a demand of supplies that have a significant opportunity cost today (mainly because grains such as soy and by-products are globally demanded as food), which might make prices raise, thus increasing production costs and losing appeal. Nevertheless, the conditions required for the development of the sustainable biofuel industry over time seem to be being met within a local scenario where, in the medium term, might record converged economic and institutional factors to set the bases for a new upward trend able to position Argentina as a global referent in the subject.

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