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GAIN Report

Global Agricultural Information Network

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Paraguay

Biofuels Annual

2013

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Report Highlights:

Paraguayan ethanol production for 2014 is projected at 190 million liters, the highest ever. A growing number of cars and the country's economic growth are pushing gasoline consumption up. The mandate mix is close to 25 percent, and both sugar cane and grains are the main feedstocks used. Biodiesel production should increase given a number of decrees were passed in early 2013 to promote its use. The new policy is expected to resolve several problems the sector had in the first years of the implementation of the Biofuels Promotional Law. Production for 2014 is forecast at 14 million liters, resulting in a blend just above one percent. Investment in the biofuels sector is expected to start growing. Practically no biofuel trade is expected in the short term.

Post:

Buenos Aires

Executive Summary:

In February and March 2013 the Government of Paraguay passed several decrees aimed at resolving a number of issues which were negatively affecting the development of the biodiesel in the country. There is now a reference price which brings certainty and some profitability to producers. In addition, Petropar, the national oil company, is now authorized to purchase biodiesel which is more expensive than imported diesel. This higher cost is ultimately paid by the end consumers. These regulations are expected to re-launch the sector. Biodiesel production for 2014 is forecast at 14 million liters. Most contacts are very optimistic and indicate that new investment will result in additional output in the next few years.

Ethanol production for 2014 is projected to continue its growth, at 190 million liters. The mandate mix is practically fulfilled, although the private sector believes there is some more room to grow. Sugar cane and grains are the main feedstocks used, switching among them depending on their prices.

The fuel market is expected to continue to grow in the next several years, as a result of an expanding economy. Diesel represents approximately 65 percent of fuel sales. Its consumption is divided roughly by one third each for transportation, rural and industry, and private vehicles.

Author Defined:**Policy and Programs:**

With the Biofuels Promotion Law in place for several years, in early 2013 the government passed four decrees to resolve the problems of the local biodiesel sector, in relation to its profitability, quality standards and commercialization. The sector is now in condition to take off as it has a set competitive price, improved tax conditions, mandated blends and quality standards.

The main changes to the local biofuels sector were:

- In February 2013, through decree 10703, the government established that diesel type III (the lowest quality, and the most widely used), has to be mixed with biodiesel, while mixing higher quality diesel is still optional. It also established that gasoline (except jet fuel and 97 octanes) has to be mixed.
- Established that the Ministry of Industry and Commerce will set mandate mixes. To increase the biodiesel mix, processors will have to request the government to raise it. Current mixes for ethanol range between a minimum of 24 percent and a maximum 25 percent. Diesel type III has to be blended at a one percent ratio with biodiesel (originally, biodiesel blends were set to be higher, but the lack of policy supporting production and negative returns forced mixes to be lowered).
- Decree 10703 also allows the blending of biodiesel made from different feedstocks, as long as the final product complies with required quality standards.
- This decree also created the Inter-Institutional Unit to monitor and control the biodiesel industry. This unit is formed by the Ministry of Industry and Commerce, Ministry of Agriculture and Ministry of Economy. Its main goals are to promote a sustainable and competitive production of biodiesel, set the reference price, and to monitor the complying of production and distribution of biodiesel in the local market.

- Decree 10724, of February 2013, established the methodology to set the price of diesel type III, which was modified to include the cost of blending with biofuel. This allows the national oil company to purchase biofuel and pass on the higher cost to the end consumer.

- In March 2013, through Decree 10761 the government increased the Value Added Tax (VAT) on biodiesel to 10 percent, as a way of allowing biodiesel processors to fully recover the tax, which previously had been set at 2 percent.

- At the same time, through Decree 10762, the government created a temporary stabilization fund to support the purchase of biodiesel at the initial stage, taking 4 Guaranies per liter of diesel sold by Petropar, the national oil company, from October 2011 to March 2013 (a total amount estimated between \$1-2 million) to help the national oil company to buy biodiesel from local producers.

In October 2005, Paraguay passed Law 2748 for Biofuels Promotion. The main objectives include to diversify the supply of renewable energy, diminish the dependence on imported fossil fuel, substitute fossil fuel with renewable fuels, improve environmental quality, develop the farm sector (focused primarily on small producers), and to export ethanol and biodiesel. Following are the main points of the Biofuels Promotion Law (and decrees):

- Declares production of biofuels to be of “national interest”.

- Recognizes biodiesel, anhydrous ethanol and hydrated ethanol as fuels. Through Decree 10703 of February 2013, it also includes as biodiesel the synthetic biofuel or its mixes produced from biomass applying the Fischer-Tropsch process.

- Biofuel use is mandatory as long as there is sufficient local supply.

- Encourages the production of different feedstocks for biofuel production, which has to be of local origin.

- Established tax benefits, especially concerning investment.

- The Ministry of Agriculture and Livestock will certify feedstocks.

Government policy does not specify the type of feedstock to be used. However, ethanol production is mainly focused on sugarcane and grains, while biodiesel is primarily focused on vegetable oil and, at a lesser extent, beef tallow. There are a few projects researching and expanding the potential use of other feedstocks such as Coco Mbokaja, Jatropha, and castor oil.

Paraguay’s main energy production source is hydroelectricity, which is primarily exported to Argentina and Brazil, but underutilized domestically. Biomass, chiefly wood and charcoal, is the largest source of energy consumed, mostly in homes and the industry. Imported petroleum products (Paraguay does not produce oil or gas), hydroelectricity, and finally biofuels are also consumed on a smaller level.

The Paraguayan fuel market for 2013 is projected to grow to a total of 1.9 billion liters, of which 64 percent is diesel and the balance is gasoline (including ethanol). This level shows a recovery to 2011 levels, as consumption in 2012 dropped because a strong drought which badly reduced crop production. Fuel consumption of both diesel and gasoline is expected to continue to grow in the short term. Official projections do not foresee a significant growth in consumption of E85 or E100 fuel, but if more flex fuel cars are imported, this could change. Private estimates indicate that of the total number of vehicles, 25 percent are flex fuel, 25 percent run on gasoline and 50 percent on diesel. Paraguay, being an important agricultural producer and with no railway system, will continue to be a strong consumer of diesel in the future. Petropar currently has a 60 percent market share of diesel sales

while the balance is in the hands of the private sector.

Fuel Use Projections (Million Liters)									
Calendar Year	2015	2016	2017	2018	2019	2020	2021	2022	2023
Gasoline Total	745	770	795	820	845	870	895	920	950
Diesel Total	1,345	1,405	1,470	1,530	1,600	1,660	1,720	1,780	1,850
On-road									
Agriculture									
Construction/mining									
Shipping/rail									
Industry									
Heating									
Jet Fuel Total	46	47	49	51	52	54	55	57	59
Total Fuel Markets	2,136	2,222	2,314	2,401	2,497	2,584	2,670	2,757	2,859

There is no compulsory environmental requirement for the production of feedstocks or the industrial process for biofuels. There are no criteria established for green house gas (GHG) emissions, land use change or biodiversity issues. At present Paraguay does not export biodiesel. However, when they begin exploring export possibilities they will need to address the lack of certification.

The Ministry of Agriculture has in place several research programs mainly aimed at small producers. Examples of these are non-toxic varieties of *Jatropha*, *Coco Mbokaja* and different tree varieties which their seeds could eventually be used to produce biodiesel. Regarding ethanol, the government has plans to improve sugarcane varieties, with higher sugar content, and to increase planted area in regions which nowadays is not produced but have shown very good potential. Contacts indicate that the industry has a lot of room to gain in efficiency at the farm and industrial levels.

Local sugar mills and distilleries use bagasse to generate electricity for their own use. A few other industries are utilizing wood chips to replace fuel oil or gas.

In mid-August 2013, Horacio Cartes, the newly elected President of Paraguay will be sworn in. He is in the stage of selecting the people who will be working with him in the administration, but most contacts believe that his government will support the biofuels sector.

Ethanol

Production

Ethanol production for 2014 is projected at a record 190 million liters, as a result of steadily growing gasoline consumption. Current blending ratios, which are at a minimum 24 percent and a maximum of 25 percent, are not expected to change in the near future.

Most ethanol plants in Paraguay can either process sugar cane or cereals. Therefore, as they switch to the most

economically feedstock at the time, it is difficult to project how much of each they will finally use. However, most contacts believe that in 2014, roughly 60 percent could be produced out of grains (corn and sorghum) and the balance from sugarcane (and molasses).

Most ethanol refineries own part of the sugarcane they process, however, Petropar, the national oil company, purchases cane exclusively from third parties. There are eight sugar mills in Paraguay, of which two have distilleries that produce anhydrous ethanol. In addition, there are two distilleries which produce hydrated ethanol. Four of the sugar mills have the capacity to utilize grains once the sugar cane harvest is over. There are 12 autonomous distilleries and 10 dehydrators in Paraguay. Inpasa is a relatively new company which already produces over 60 percent of Paraguay's ethanol. It primarily uses corn, and in smaller proportions sorghum, and sugarcane as feedstocks. Petropar is the country's second largest ethanol producer accounting for approximately 20 percent of the total.

Paraguay has 110-115,000 hectares of sugarcane, with approximately 23-25,000 small cane producers. Productivity is lower than in neighboring countries. Therefore, there are some official and private programs addressing this problem. A local cooperative is receiving funds from a credit from the IDB by which some 2000 small and medium farm members will expand cane area by 10,000 hectares. The project focuses on the use of improved varieties, soil fertility and good agricultural practices.

Paraguay continues to expand its corn production. In the past few years production ranged between 3-4 million tons, of which approximately 60 percent was exported with no value added. The balance is used domestically for animal feed, human consumption, and ethanol. The distilled grains are used for animal feed for the export and domestic market.

Paraguay's ethanol production capacity is projected at 260 million liters in 2014, the same as in the past few years as there is no additional plant expected to come in line. Processors are continuously investing in expanding capacity, improving efficiency at their plants, and expanding cane plantations. Two new ethanol biorefineries are expected to be inaugurated in 2016, taking the total production capacity to over 340 million liters of ethanol.

Most players in the local ethanol industry are in a good financial situation as the business is profitable. Distilleries currently sell ethanol to fuel companies at approximately US\$1.0 per liter, above production cost (estimated at \$0.92 per liter). E25 currently sells at US\$1.26 per liter at the pump.

Consumption

Ethanol consumption in 2014 is forecast to continue to grow at 195 million liters, the highest ever. This is a reflection of a growing number of cars in the street and expected increase of fuel demand. Most ethanol sold in Paraguay is dehydrated.

Paraguay's gasoline market in 2014 is projected at 720 million liters (including ethanol), a 5 percent increase from 2013. Practically the whole demand is for private vehicle use. Historically, of the total fuel consumption, diesel accounted for 80 percent and gasoline 20 percent. With new policies in place, the importation (tax free) of E85 and flex fuel cars, and the conversion of many engines to flex fuel, is resulting in an increase of use of gasoline (and thus, ethanol). Currently, the proportion is estimated to be closer to 65/35. The use of flex fuel cars and E85 has promoted the use of E85 gasoline, which in 2013 is expected to total about 16 million liters. The sale of this fuel continues to be provisionally authorized and it is expected to continue in 2014.

The government wants to guarantee that flex fuel cars have ethanol (or its mixes) available in almost all of its territory (at least medium and large cities and international highways). For this, it is demanding fuel companies to make the necessary adjustments.

Feedstock D									
Market Penetration (Liters - specify unit)									
Fuel Ethanol	45	60	86	110	130	150	165	175	195
Gasoline				430	557	637	660	690	720
Blend Rate (%)	#DIV/0!	#DIV/0!	#DIV/0!	25.6%	23.3%	23.5%	25.0%	25.4%	27.1%

Biodiesel

Production

Biodiesel production for 2014 is forecast at 14 million liters, the highest ever. Biodiesel production in 2011-12 was practically inexistent even though a mandate was in place. Therefore in early 2013 the government launched a new policy to improve the sector. Most contacts are optimistic about the impact of these new regulations and the sector's future.

The main changes in policy were:

- Diesel type III (the lowest quality, and the most widely used), has to be mixed with biodiesel. Currently at a 1 percent mix ratio.
- To increase the biodiesel mix, processors will have to request the government to raise it.
- Blending of biodiesel made from different feedstocks is allowed, as long as the final product complies with required quality standards. This allows the mixing of biodiesel made from tallow to be blended at a maximum 10 percent.
- Creation of the Inter-Institutional Unit to monitor and control the biodiesel industry. Its main goals are to promote a sustainable and competitive production of biodiesel, and set the reference price.
- Established the methodology to set the price of diesel type III, which now includes the cost of blending with biofuel. This allows the national oil company to purchase biofuel and pass on the higher cost to the end consumer.
- Increase the Value Added Tax (VAT) on biodiesel from 2 percent to 10 percent, as a way of allowing biodiesel processors to fully recover the tax.
- Creation of a temporary stabilization fund to support Petropar to purchase biodiesel at the initial stage.

With these new rules, Petropar, the main diesel distributor in the country, now has the possibility of purchasing biodiesel, which is more expensive than imported diesel, but can pass on the higher cost to the consumer. Last April, the inter-Institutional Unit, set for the first time the price of a liter of biodiesel at \$5650 Guaranies (\$1.25) per liter (VAT included) at Petropar. This price is about 20-30 percent higher than a liter of imported diesel at Petropar. Roughly \$20 Guaranies per liter is added to the final cost of diesel because the use of 1 percent biodiesel in the mix. Contacts indicate that biodiesel production returns with these prices are slightly positive. Biodiesel processors are soon expecting an increase in the reference price to encourage additional output. With

higher volumes in the market, fuel distributors will be able to buy larger volumes and justify the additional logistical movements involved in mixing biodiesel. The biodiesel mandate is expected to be increased one or two percentage points over the next few years.

Local producers are expected to primarily use vegetable oil and small volumes of beef tallow as feedstocks. Coco oil, once exported to Brazil and Argentina is currently having marketing problems, so it is being used domestically to produce biodiesel. Soybean oil will be the most important feedstock used, with small volumes of canola and sunflower oil as well.

In 2013 the only company that purchases biodiesel is Petropar. Most of this fuel is made from coco oil, as a way to solve a market problem of coco oil producers. Except for this production, there is very little biodiesel produced for commercial sale nowadays. There is some production in the interior of the country in hands of a cooperative which distributes diesel mixed with 1 percent biodiesel but is not focused on the urban market. Some small processors use biodiesel made from vegetable oil for their own use or small sales to third parties.

There are currently four biodiesel plants approved by the government, with an estimated production capacity of 25 million liters. This is lower than a few years ago as two plants were dismantled, which significantly reduce the country's capacity. Most of the plants can use vegetable oil and animal fat as feedstock. The production capacity of the approved companies vary from 4-12 million liters a year. There are around 20 small biodiesel plants for self-consumption scattered around the country and have no official control. Their production is primarily based on vegetable oil produced by them, and in most cases, it is for self consumption. The national oil company has plans to build two or three small biodiesel plants (5-10,000 liters a day) in the interior of the country for use within the close by area. The feedstock will be vegetable oil from soybeans produced around the plant and will have byproducts available for livestock production. By doing this, the company hopes to encourage others to follow and build more plants.

Imports of diesel in Paraguay are not restricted but the government, through Petropar, normally sets the price of diesel.

Paraguay's soybean crop normally ranges between 7-8 million tons of production, ranking as the world's 6th largest producer and 4th largest exporter. Paraguay's crushing capacity has recently expanded to about 4 million tons capacity (55 percent of the soybean crop) with the recent inauguration of two large crushing plants. Although these plants have no plans of producing biodiesel in the short term, the large availability of vegetable oil presents an opportunity for local biodiesel processors and the country to continue the path of replacing a portion of imported diesel by biodiesel produced from domestically produced feedstock.

Research in feedstock for biofuels is limited. There are a few public and private programs on research and extension of coco, and Jatropha. Coco Mbokaja is a native palm and some studies estimate that about 50 percent of the beans are currently not harvested. Its oil is of excellent quality and it is widely used in the soap and cosmetic industry. The government is trying to develop a system by which smaller producers harvest the beans in order to obtain an additional income. The government and the private sector are very interested in Jatropha production.

Petropar since 2008 has had the only laboratory that can test biodiesel quality, a key point in the development and use of biodiesel.

Consumption

Domestic consumption of biodiesel is projected at 14 million liters in 2014. This is a significant increase

compared to the previous years. The implementation of new policy (including a profitable reference price, and the possibility of Petropar buying biodiesel at a higher price than imported diesel) is expected to make the market grow. Contacts indicate that the current mandate mix of 1 percent (not fully complied nowadays), is expected to increase in the near future.

The biodiesel industry is now optimistic of its future, as they believe governments will support the diversification of the country's energy matrix and indicate the advantages of importing less diesel and replacing it by locally produced biodiesel. However, the sector will continue to be very dependent on government policy and support.

Through mid 2013 Petropar was the only commercial fuel distributor mixing biodiesel with diesel. The rest of the fuel companies are expected to start with the blending soon.

Of the country's fuel market, diesel accounts for roughly 65 percent with an estimated volume of 1.3 billion liters in 2014. Approximately 1/3 of it is consumed by cargo and passenger transport, another 1/3 by the industry and farm equipment, and the balance by private vehicles.

Trade

No biodiesel exports are projected from Paraguay in the near future as it still has a long way to go to supply the domestic market which has a lot of room to grow. To eventually become an exporter of significance, Paraguay will need to invest in infrastructure and logistics (production, terminals, storage, transportation, etc.) before thinking of exporting significant volumes of biodiesel. However, the growing oilseed crushing capacity presents an opportunity to eventually become an exporter of importance if the government decides to.

Paraguay is a landlocked country surrounded by Argentina, Bolivia and Brazil. However, it has good connections to the Atlantic Ocean with a barge system through the Paraguay and Parana rivers, and with a trucking system connected to Paranagua port in Brazil (800 kilometers from the eastern border of the country).

Exports and imports of biodiesel are duty free but have to be approved by the Ministry of Industry and Commerce. Contacts indicate that imports of biodiesel are very unlikely.

Stocks

Local biodiesel production is small and there are normally no stocks.

Diesel, on-road use									
Blend Rate (%)	#DIV/0!								
Diesel, total use				1,050	1,220	1,260	1,155	1,220	1,280

Advanced Biofuels

Regarding advanced biofuels, there is a foreign company interested in investing in a second generation biofuel plant to treat waste to produce Fischer-Tropsch diesel. However, investors are still working on obtaining the funds for its construction. Contacts indicate that if it becomes a reality, the 50 million liter plant would cover the original 5 percent biodiesel mandate.