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Paraguay

Biofuels Annual

2014

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Report Highlights:
Paraguay's ethanol production and consumption for 2015 are forecast at a record 225 million liters as a result of a growing demand for gasoline and the probable increase of the mandate mix from 25 percent to 27.5 percent. A new plant in the northern part of the country is expected to begin operations during 2014. Biodiesel production and use for 2015 are projected to remain unchanged at 8 million liters. The government recently created a working group to analyze the situation of the local biodiesel sector and make changes so as to encourage its production and use.

Post:
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Executive Summary:

The Paraguayan biofuels sector continues to move at a sluggish pace. Ethanol production and use continues to expand as a result of increased gasoline sales. The current mandate mix is 25 percent and there are rumors that it could be increased to 27.5 percent (mirroring current discussions in neighboring Brazil) in the next few months. Roughly half of the ethanol is made from sugarcane and the other half from grains (mostly corn). The high cost of cane has made ethanol producers be able to use different feedstocks, expanding their capacity to use grains. A new ethanol plant is expected to come on line during 2014 in the northern Departament of Amambay, taking the country's ethanol production capacity to 290 million liters. There are no ethanol exports projected in 2014 or 2015.

Biodiesel production for 2015 is forecast at 8 million tons, similar to 2014. This sector is going through a difficult situation as Petropar, the national oil company, does not want to pay a higher price for biodiesel than what it costs them to import diesel. Contacts indicate that private fuel distributors are not even complying with the 1 percent mandate mix. The government has recently created a biodiesel multi-institutional working group to study the sector and make recommendations to put in place new regulations and a commercialization system to promote and expand its use. Biodiesel production is made from vegetable oil. The local press indicates that an Italian company is analyzing investing in a new plant to produce and export some 10-15 million liters of biodiesel a year.

Author Defined:

Policy and Programs:

The latest policy change for the biofuels sector was Decree 1030/13 of December 2013 where ethanol and biodiesel are exempted from the value added tax (locally known as IVA).

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 now has a set 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 mix for ethanol is 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. The price of biodiesel was set at US$1.26 per liter. The price of ethanol is free.

- 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 (in December 2013 the government exempted biofuels from the value added tax).

- At the same time, through Decree 10762, the government created a temporary stabilization fund to support the purchase of biodiesel at the initial stage (a total amount estimated between $1-2 million) to help the national oil company to buy biodiesel from local producers.

In May 2008, the Government of Paraguay established that flex fuel and E85 new cars were exempted of import duty.

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 based on sugarcane and grains (primarily corn), while biodiesel is largely 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 energy supply is primarily hydroelectric, with 57 percent share, followed by biomass with 27 percent and fossil fuels with 16 percent. However, of the country's total energy consumption, biomass accounts for 46 percent, followed by fossil fuels with 38 percent and hydroelectricity with 16 percent. Paraguay exports great amounts of electricity to Argentina and Brazil, but underutilizes it domestically. Biomass, chiefly wood and coal, is the largest source of energy consumed, mostly in homes and the industry, followed by imported petroleum products (Paraguay does not produce oil or gas). Biofuels are also consumed on a smaller scale.

The Paraguayan fuel market for 2015 is projected to grow to a record of 2.1 billion liters, of which 63 percent is diesel and the balance is gasoline (including ethanol). Fuel consumption of both diesel and gasoline is expected to continue to grow in the future. Official projections do not foresee a significant growth in consumption of E85 or E100 fuel. However, many contacts indicate that the country has to promote even more the use of flex fuel cars to create a larger ethanol demand and production. Private estimates indicate that of the total number of vehicles, 3 percent are flex fuel, 47 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 with the balance in the hands of private companies.

Fuel Use Projections (Million Liters)

Calendar Year	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**
Gasoline Total	734	758	784	808	834	859	884	909	934	960
Diesel Total	1,343	1,405	1,469	1,532	1,596	1,658	1,722	1,785	1,849	1,915
On-road										
Agriculture										
Construction/mining										
Shipping/rail										
Industry										
Heating										
Jet Fuel Total	46	47	49	50	52	54	55	57	58	59
Total Fuel Markets	2,123	2,210	2,302	2,390	2,482	2,571	2,661	2,751	2,841	2,934

There is no compulsory environmental requirement for the production of feedstocks or the industrial process for biofuels. Paraguay has environmental legislation focused primarily on trying to avoid deforestation and contamination. However, it concentrates primarily in controlling deforestation and water contamination. With respect to GHG emissions from the biofuels industry, it is considered to be low as most of Paraguay's soybeans are done using no-till technology. Sugarcane production normally uses large volumes of fertilizers, but roughly 60 percent of Paraguay's sugarcane acreage is devoted to organic sugar. At the industrial stage, the sugar sector burns large volumes of bagasse to produce its own energy. The heavy use of biomass (wood and coal) produces environmental problems related to deforestation and soil degradation. At present Paraguay does not export biodiesel. However, when they begin exploring export possibilities they will need to address the lack of environmental 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 sugarcane 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 swore in as President of Paraguay. His government has indicated it will support the biofuels sector.

Ethanol

Production

Production of ethanol in 2015 is forecast at 225 million liters, the highest ever. This is as a result of growing sales of gasoline and a probable increase in the mandate mix. The current mix is 25 percent and contacts indicate that it could be increased to 27.5 percent in the near future.

In 2015 there will be 13 medium and large ethanol plants operating in Paraguay. After several years of no new inaugurations, one of the largest ethanol producers is expected to inaugurate in 2014 a second plant in the northern state of Amambay, the first ethanol plant there.

Although it is difficult to determine accurately, contacts indicate that in 2015 half of the ethanol will be produced from sugarcane and the other half from grains, primarily corn, and some sorghum. All 13 plants can process sugarcane, and only 9 of them can process grains as well (processing roughly six months with each feedstock). A few years back, most of the ethanol production was done with sugarcane. Most ethanol refineries own part of the sugarcane they process, however, Petropar, the national oil company, purchases cane exclusively from third parties. Due to the high price of cane, plus the low productivity at the farm and industrial level, many ethanol producers have become multi feedstock, increasing the use of corn. In general, the corn used for ethanol is not of very good quality. Distiller's grains are used for animal feed in the domestic market and are also exported.

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. 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 15 percent of the total.

Paraguay has approximately 110,000 hectares of sugarcane, with approximately 23-25,000 small cane producers. Productivity is low compared to neighboring countries due to the use of marginal soils, soil degradation, and old, less productive sugarcane varieties. There are some official and private programs

addressing this problem.

Paraguay's corn production in the past few years averaged 2-3 million tons, of which approximately 60-70 percent was exported with no value added. The balance is used domestically for animal feed, human consumption, and ethanol (the lesser quality corn).

Ethanol production capacity in Paraguay is projected at 290 million liters in 2015, as a result of the addition of a new plant which will be inaugurated in 2014 in the northern part of the country. This plant is expected to use both sugarcane and grains. Ethanol companies are continuously investing in improving efficiency, increasing production capacity and expanding production area and productivity at the farm level.

Most players in the local ethanol industry are in a good financial situation as the business is profitable, especially using grains as feedstock. Sugarcane prices are high; but the national oil company pays the high price to small cane producer as a way of supporting them. Distilleries currently sell ethanol to fuel companies at approximately US$0.87 per liter, while E25 at the plant costs approximately US$1.09. E25 currently sells at US$1.70 per liter at the pump.

Consumption

Paraguay's consumption of ethanol in 2015 is projected at a record 225 million liters. This is a result of expected increased gasoline sales and the probability of an increase in the mandate mix from 25 percent to 27.5 percent, copying what is expected will happen in Brazil in the near future. Most ethanol sold in Paraguay is dehydrated.

Paraguay's gasoline market in 2015 is projected at 734 million liters (including ethanol), a slight increase from what is expected in 2014. Practically the entire 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, the use of gasoline (and thus, ethanol) is gaining share. Currently, the proportion is estimated to be closer to 63/37. The use of flex fuel cars and E85 has promoted the use of E85 gasoline, which in 2015 is expected to total about 13-16 million liters.

A large increase of ethanol consumption in Paraguay would be tied to an expansion of the use of flex fuel cars which today represent roughly 3 percent of the total 800,000 cars running in Paraguay. However, contacts indicate that there should be a communicational campaign explaining advantages of such technology and the guarantee of the quality of the product. Some private projections for 2020 set dehydrated ethanol consumption at 450 million liters and hydrous ethanol (used in flex fuel vehicles) at 200 million liters.

Trade

There is no trade in ethanol in Paraguay. Exports of ethanol are permitted while imports pay no duties but have to be approved by the Ministry of Industry and Commerce. Contacts indicate it is unlikely that there will be imports. There is always talk about the interest in exploring the possibility of opening markets for small exports in certain times of the year, but the potential in the short term is negligible.

Ethanol Used as Fuel and Other Industrial Chemicals (Million Liters)										
Calendar Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Beginning Stocks	0	0	0	0	0	0	0	0	0	0
Fuel Begin Stocks	9	10	15	25	35	35	15	15	15	15
Production										
Fuel Production	46	65	90	120	130	130	165	180	200	225
Imports										
Fuel Imports	0	0	6	0	0	0	0	0	0	0
Exports										
Fuel Exports	0	0	0	0	0	0	0	0	0	0
Consumption										
Fuel Consumption	45	60	86	110	130	150	165	180	200	225
Ending Stocks										
Fuel Ending Stocks	10	15	25	35	35	15	15	15	15	15
Production Capacity										
Number of Refineries	9	9	9	11	12	12	12	12	13	13
Nameplate Capacity	236	236	236	250	260	260	260	260	290	290
Capacity Use (%)	19%	28%	38%	48%	50%	50%	63%	69%	69%	78%
Co-product Production (1,000 MT)										
DDGS				35	46	55	92	70	77	86
Co-product B										
Feedstock Use (1,000 MT)										
Sugarcane	0	0	1080	1140	1080	900	700	1,350	1,530	1,730
Grains	0	0	50	115	150	180	300	225	250	280
Market Penetration (Liters - specify unit)										
Fuel Ethanol	45	60	86	110	130	150	165	180	200	225
Gasoline	277	282	371	426	551	620	643	683	710	734

Blend Rate (%)	16.2 %	21.3 %	23.2 %	25.8 %	23.6 %	24.2 %	25.7 %	26.4 %	28.2 %	30.7 %

Biodiesel

Production

Paraguayan biodiesel production for 2015 is projected at 8 million tons, unchanged from 2014. In 2013 the government had passed several key policies (see Policy and Program sector) to support the use of biodiesel in the domestic market. Most contacts believed these changes would finally launch the domestic biodiesel sector. However, the price set by the government, based on the price of soybean oil, was too high and Petropar, the national oil company which dominates the diesel market, does not want to buy biodiesel at a higher price than what it costs them the imported diesel. The government created last year a temporary stabilization fund to support the purchase of biodiesel at the initial stage to help Petropar buy from local producers. However by the end of 2014 the fund will be totally consumed and nobody knows if it will be extended. Most of the private fuel companies are not complying with the mandate mix of 1 percent.

Contacts indicate that the local biodiesel sector faces important challenges towards the future. Some of these are: establish a viable price scheme, improved product quality, increase production scale, incorporate new technology, adapt the fuel distribution network for biodiesel, expand the number of laboratories (there is only one owned by Petropar), and implement and adopt a control system. The government has recently formed a biodiesel multi-institutional working group to analyze quality regulations and a new commercialization system to promote its use. It hopes to have it in place in early 2015.

The little production of biodiesel produced domestically is made from vegetable oil, mostly soybean oil. In some occasions other feedstock can be used, like in 2013, where Coco oil was also used due to excess availability in the market. Small volumes of canola and sunflower oil are sometimes used.

At the current price of biodiesel, producers make money. Producers which use tallow as feedstock indicate that they could even produce at a lower price, but due to some quality issues in the past, domestic fuel distributors prefer to avoid its use.

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 biodiesel but is not focused on the urban market. Some large grain producers produce biodiesel made from vegetable oil for their own use.

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 production 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. There is a project of an Italian company which is studying the possibility of installing a biodiesel plant to produce 10-15 million liters per year using vegetable oil as feedstock. The plant could initiate production during 2015.

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 7-9 million tons of production, ranking in 2013/14 as the world's 6th largest producer and 4th largest exporter. Paraguay's crushing capacity has recently expanded to over 4 million tons capacity (half of the local soybean crop) with the 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 also 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

Local consumption of biodiesel is projected to remain unchanged in 2015 at 8 million liters. This is a result of a complicated situation in which the sector is going through. Further policy changes and investment need to be made so as to encourage a larger production and thus supply. There is no doubt Paraguay would benefit strongly from the production and consumption of local biodiesel which would help cut some imports of diesel and add value to its agricultural production.

In 2013 and 2014 Petropar was practically the only fuel distributor to mix biodiesel with diesel. Although the mandated mix is 1 percent, it is only being mixed at approximately 0.6 percent.

Paraguay's diesel market in 2015 is projected at 1.3 billion liters, a slight increase from what is expected in 2014. Cargo, public transportation and agriculture use almost exclusively diesel. 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 a decrease of use of diesel in private vehicles. The current relation diesel/gasoline is estimated at approximately 63/37. Of the country's diesel market 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

Paraguay does not export biodiesel. Most contacts indicate that it first has to order its domestic market and promote investment in plants and the distribution network. Once the local market is supplied with a reasonable volume it can then think of starting to export. This whole process will demand several years. However, the local press indicates that an Italian manufacturer of industrial equipment is studying the possibility of installing a

biodiesel plant exclusively for the export market, which if it becomes true, it would begin production in 2015.

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

With such a small output, there are normally no stocks.

Biodiesel (Million Liters)										
Calendar Year	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Beginning Stocks		0	0	0	4	0	0	0	0	0
Production		3	10	8	6	1	2	8	8	8
Imports		0	0	0	0	0	0	0	0	0
Exports		0	0	0	0	0	0	0	0	
Consumption		3	10	4	10	1	2	8	8	8
Ending Stocks		0	0	4	0	0	0	0	0	0
Production Capacity										
Number of Biorefineries			5	6	6	4	4	4	4	4
Nameplate Capacity			30	45	45	25	25	25	25	25
Capacity Use (%)			33.3 %	17.8 %	13.3 %	4.0 %	8.0 %	32.0 %	32.0 %	32.0 %
Feedstock Use (1,000 MT)										
Vegetable oil						1	2	8	8	8
Beef Tallow		3	10	8	6	0	0	0	0	0
Feedstock C										
Feedstock D										
Market Penetration (Million Liters)										
Biodiesel, on-road use		3	10	4	10	1	2	8	8	8
Diesel, on-road use		937	1,050	1,050	1,220	1,260	1,155	1,215	1,280	1,343
Blend Rate (%)		0.3 %	1.0%	0.4%	0.8%	0.1 %	0.2 %	0.7%	0.6%	0.6%

Advanced Biofuels

There is very little work done on these kinds of biofuels.