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Paraguay

Biofuels Annual

2012

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Report Highlights:
In 2013, Paraguay is projected to produce and consume 180 million liters of bioethanol, mostly based on the use of grains, and a smaller part using sugarcane and molasses. While ethanol is expected to reach a record, biodiesel production and consumption is still forecast to remain well below the current mandate of 1 percent. The pricing of biodiesel and some quality/standard problems in the past have discouraged the local expansion of production. Two new large oilseeds crushing plants will be on-line in 2013/14, duplicating the country's production capacity. This could encourage the government to set conditions to start meeting the delayed mandates. Biofuel exports of significance are not expected in the short term.

Post:
Buenos Aires

Executive Summary:
Paraguay's ethanol industry continues to slowly grow every year as a result of larger demand promoted by official policies, including the biofuels law. Local ethanol producers enjoy good returns, and continue to invest in expanding output and becoming more efficient. Contacts indicate that one of the main constraints is the limited acreage with sugarcane, but more and more grains are being used. The largest ethanol producer currently utilizes corn as its main feedstock. A couple of new refineries in the Department of San Pedro are expected to come on-line in 2014. One will use sugarcane as feedstock and the other sugarcane and grains.

A challenge for the local biodiesel sector is that currently its cost of production is higher than the cost of imported diesel. Production is negligible as most plants are not operating. Despite this situation, Paraguay has great potential to increase its biodiesel production, as it is one of the world's top soybean producer and exporter, with significant investment in expanding its crushing capacity. There are some other alternative feedstocks which could also be used. A few public and private entities have research and extension programs focusing on Jatropha and Coco Mbokaya.

Author Defined:
Policy and Programs:

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. The law sets mandated mixes for gasoline and diesel.

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 tallow and vegetable oil. There are a few projects researching and expanding the potential use of other feedstocks such as Coco Mbokaya, Jatropha, spurge, and castor oil.

Paraguay's main energy production source is hydroelectricity, which is primarily exported to Argentina and Brazil, but underutilized domestically. Biomass, mostly wood and charcoal, is the largest source of energy consumed, mostly in homes and the industry. Then follow the consumption of petroleum products which are imported (Paraguay does not produce oil or gas), hydroelectricity, and finally biofuels with a very small share of the total.

Following are the main points of the Biofuels Promotion Law (and its following decrees):

- Declares production of biofuels to be of "national interest".
- Recognizes biodiesel, anhydrous ethanol and hydrated ethanol as fuels.

- Establishes minimum mix mandates for biodiesel at 1 percent in diesel for 2007, 3 percent in 2008, and 5 percent for 2009. However, due to the lack of sufficient local supply, in June 2009 the mix was reduced to a minimum 1 percent until further notice. The maximum blending mix at gas stations can reach 20 percent.
- Establishes mix mandates for ethanol of a minimum of 20 percent and a maximum of 24 percent in gasoline of 95 octanes or under. In March 2009, the government set all mixes at 24 percent. However, quite recently it increased the mix level to 25 percent.
- 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 Industry will control investment and will determine production levels. The Ministry of Agriculture and Livestock will certify feedstocks.

In May 2008, the government passed Decree 12240 reducing the Value Added Tax (VAT) on biodiesel and ethanol to 2 percent and eliminating import duties on flex fuel and E85 new and used cars.

In August 2010, the government, through Decree 4952, established that local importers of fossil fuel have to present every month the documentation of their purchases of local biofuels in order to be allowed to import fuel.

There is no compulsory government 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. Therefore, certification is not an issue so far as exports to markets which demand certification are still far from being made.

Industry contacts report that the local ethanol industry is growing slowly, but steadily and has a good future, thanks to expected growth of the domestic market and potential exports. Ethanol mandates are being fulfilled and producers of ethanol currently enjoy good returns as production costs are lower than the selling price to local fuel distributors. Grains, primarily corn, are the main feedstock used for ethanol production. This is expected to remain as is as long as the sugarcane area does not expand significantly.

Despite Paraguay being a large oilseed producer and exporter, some sources are doubtful about the future of biodiesel in Paraguay. They indicate that additional policy should be in place to offset high production costs. Of the total fossil fuel demand, which is entirely imported, diesel accounts for approximately 65-70 percent. Contacts indicate that despite the Biofuel Law, most fuel distributors do not comply with the mandate. There are currently no fuel distributors buying biodiesel to sell at the pump.

The Ministry of Agriculture has in place research programs on Jatropha, coco and sugarcane. Some universities, private entities and companies also have developed some research. Private companies are adopting new sugarcane varieties, which in most cases come from Brazil and Argentina.

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.

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. Contacts indicate that if it becomes a reality, the 50 million liter plant would cover the original 5 percent biodiesel mandate.

In late June 2012, President Lugo was impeached by the Paraguayan congress and former Vice President Franco swore in as President. At this time we do not know if the change of government will affect the biofuels sector, which has already gone through two different presidencies.

Ethanol

Production

Ethanol production is expected to reach 180 million liters in 2013, a significant increase from the 150 million liters of the previous year as expected higher demand is likely to be met by production. Blending requirements for ethanol with gasoline changed several times in the past years. Paraguay has had mixing requirements since Decree 2162 of March 1999 and its following resolutions. It first established that gasoline be mixed with 7 percent ethanol. The last modification took place a few months ago, by which it increased mandate mixes from 24 to 25 percent. Ethanol production for other industrial uses is negligible.

In 2013, roughly 65 percent of ethanol in Paraguay will be obtained from grains (primarily corn), and the rest from sugarcane (and a small volume from molasses). The use of grains for ethanol increased in the past few years as high world sugar prices encouraged the production of sugar rather than ethanol. 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 65 percent of Paraguay's ethanol. It primarily uses corn, and in smaller proportions sorghum, manioc and sugarcane as feedstocks. Petropar is the country's second largest ethanol producer accounting for approximately 17 percent of the total.

Paraguay is the world's largest exporter of organic sugar. The sugarcane area is estimated at approximately 110,000 hectares. Official studies indicate that the country has the potential to expand to 450,000 hectares. Sugarcane is produced in 14 of the 17 departments (states), but the largest concentration is in the central part of the eastern region. Planted area has been growing continuously since 2001. Sugarcane production has a strong social and economic importance as more than 25,000 famers, most of which are small-scale producers, make a living with it. Private estimates indicate that about 15-20 percent of the sugarcane crop is used directly for the production of ethanol. Contacts point out that an additional 20-30,000 hectares of sugarcane are needed to have the sugar and ethanol sector

operating at full capacity. Several refineries are investing in the expansion of plantations.

There is one ethanol plant in the eastern part of the country that mostly uses grains, primarily corn. Paraguay's normal corn production is about 2-3 million tons, of which about half is exported and the balance used domestically for animal feed, human consumption, and ethanol. The distilled grains are used for animal feed for the export and domestic market. Another alternative feedstock for ethanol production is manioc, also known as cassava, which is widely produced in Paraguay.

Paraguay's ethanol production capacity is projected at 260 million liters in 2013. Producers are investing in expanding capacity, improving efficiency at their plants, and expanding cane plantations. Two new ethanol biorefineries will be inaugurated in 2014. Private projections indicate that by 2014, Paraguay could produce over 300 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$1.06 per liter, well above production cost. E85 currently sells at US$1.08 per liter at the pump and E25 at US$1.66 per liter. The big difference is the tax paid by gasoline.

Consumption

Ethanol domestic consumption for 2013 is forecast at 180 million liters. Consumption in 2012 is expected at 150 million liters, the same as the previous year. As a result of a growing economy and the official permission to import flex fuel and E85 cars duty free, the demand for ethanol is projected to grow. Approximately 95 percent of all ethanol sold is dehydrated.

Paraguay's gasoline market in 2013 is projected at 580 million liters (including ethanol), a 10-12 percent increase from last year. 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 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 2011 totaled about 18 million liters. The sale of this fuel continues to be provisionally authorized, and it is forecast to increase to 24 million liters in 2013.

Trade

Exports of ethanol are free 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.

Statistical Information

Ethanol - Conventional & Advanced Fuels (Mil. Liters)								
Calendar Year	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
Production, Total	46	65	90	120	130	130	150	180
Advanced Only								
Imports	0	0	6	0	0	0	0	0
Exports	0	0	0	0	0	0	0	0
Consumption	45	60	86	110	130	150	150	180
Ending Stocks	10	15	25	35	35	15	15	15
Production Capacity - Conventional								
No. of Biorefineries			9	11	12	12	12	12
Capacity (Mil. Liters)			236	250	260	260	260	260
Capacity Use (%)			38%	48%	50%	50%	58%	69%
Production Capacity - Advanced								
No. of Biorefineries								
Capacity (Mil. Liters)								
Capacity Use (%)								
Feedstock Use - Conventional (1,000 MT)								
Sugarcane			900	960	900	800	780	820
Grains			50	115	150	180	225	300
Feedstock C								
Feedstock D								
Feedstock Use - Advanced (1,000 MT)								
Feedstock A								
Feedstock B								
Feedstock C								
Feedstock D								

Biodiesel

Production

Biodiesel production for 2013 is projected at 4 million liters, but the final volume will depend on official policies. Although there is a law and regulations which promote the production and use of biodiesel, the higher cost of production vis-à-vis imported fossil diesel slow its development. Contacts indicate that the greatest problems faced by the local industry is the official resistance to increase the price of diesel (with biodiesel) at the pump, reflecting higher production costs of biodiesel; the lack of consumer knowledge on biodiesel; and some technical problems with biodiesel made of tallow, especially in cold days.

Currently, there is very little biodiesel produced for commercial sale. 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 vegetable oil for their own use or small sales to third parties. The largest local processors mainly used tallow, but they are currently not producing. The country's entire supply of tallow is only sufficient to reach a 1 percent blending ratio.

This level does not take into account competing uses for tallow, which is currently being exported to neighboring Brazil. To accomplish the original 5 percent blending mandate, Paraguay will have to utilize vegetable oil (most likely from soybeans) as feedstock. The production cost of biodiesel is also higher than the current local price of diesel.

Resolution 236 of June 2009 of the Ministry of Industry and Commerce reduced the obligatory mix of 5 percent of biodiesel in diesel to a minimum of 1 percent. The lack of local supply, high cost of feedstock, controlled diesel prices, and quality problems did not encourage production. This resolution is not being enforced, and today the mix is almost inexistent.

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, sometimes lower than its cost. Private fuel distributors only import when it is profitable to do so.

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. However, due to a severe drought in 2011-12, about 40 percent of the soybean crop was lost. Paraguay's crushing capacity is roughly 2 million tons with a new plant coming on-line in 2013 and another in 2014, for a total country crushing capacity of about 4 million tons. Soybeans that are not processed are exported as beans. The large production provides potential opportunities to eventually replace some imports of diesel with renewable fuels produced from locally grown feedstock.

Apart from soybean oil, Paraguay has good potential to produce biodiesel from Coco Mbokaya (Acrocomia totai), a palm which is widely found in a vast area of the country.

Research in feedstock for biofuels is limited. There are a few public and private programs on research and extension of coco, and jatropha. Coco Mbokaya 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. Official sources estimate that there are 10,000 hectares of castor oil plants in Paraguay and there are plans to increase the area. The government and the private sector are very interested in jatropha production. The plant grows very well (with high oil content) in Paraguay, especially in the western Chaco region. Preliminary results based on research of the Ministry of Agriculture's experiment stations; show that three-year-old plants yield 3-

4 tons of beans per hectare, with 37 percent oil content of excellent quality. The harvest is done manually and this is seen as an opportunity for thousands of small-scale producers.

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

Consumption

Biodiesel consumption for 2013 is projected at 4 million liters. Of the country's total fuel market, diesel accounts for roughly 65-70 percent with an estimated volume of 1.1 billion liters in 2013. Approximately 30 percent of it is consumed by cargo and passenger transport, another 30 percent by the industry and farm equipment, and the balance by private vehicles.

Currently, there is no large fuel distributor buying biodiesel in Paraguay.

Trade

Biodiesel exports from Paraguay are not expected in the short or medium term. Apart from enforcing policies to promote biodiesel production, Paraguay will need to invest in infrastructure and logistics (terminals, storage, transportation, etc.) before thinking of exporting significant volumes of biodiesel in the future.

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.

Statistical Information

Biodiesel - Conventional & Advanced Fuels (Mil. Liters)								
Calendar Year	2006	2007	2008	2009	2010	2011	2012	2013

Production, Total		3	10	8	6	1	2	4
Advanced Only								
Imports		0	0	0	0	0	0	0
Exports		0	0	0	0	0	0	0
Consumption		3	10	4	10	1	2	4
Ending Stocks		0	0	4	0	0	0	0
Production Capacity – Conventional								
No. of Biorefineries			5	6	6	4	4	4
Capacity (Mil. Liters)			30	45	45	25	25	25
Capacity Use (%)			33%	18%	13%	4%	8%	16%
Production Capacity - Advanced								
No. of Biorefineries								
Capacity (Mil. Liters)								
Capacity Use (%)								
Feedstock Use - Conventional (1,000 MT)								
Beef Tallow		3	10	8	6	0	0	0
Soybean Oil						1	2	4
Feedstock C								
Feedstock D								
Feedstock Use - Advanced (1,000 MT)								
Feedstock A								
Feedstock B								
Feedstock C								
Feedstock D								