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## Peru

### Biofuels Annual 2014

#### Peru's Ethanol Production Up, Biodiesel However Tumbles

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**Report Highlights:**

FAS Lima forecasts Peru's calendar (CY) 2015 ethanol production at about 250 million liters, up by 5 million liters or two percent compared to our CY 2014 estimate of 245 million liters. We forecast domestic ethanol consumption at 165 million liters in CY 2015, up 35 million liters or 27 percent compared to our 2014 estimate of 130 million liters. We foresee Peruvian CY 2015 ethanol exports at about 160 million liters, up by 5 million liters or over 3 percent compared to our CY 2014 estimate of 155 million liters. Peru will not produce biodiesel in CY 2014, nor in 2015 due to the availability of more affordable Argentine biodiesel. We forecast CY 2015 biodiesel imports to remain flat at 283,000 metric tons.

**Executive Summary:**

FAS Lima forecasts Peru's calendar year (CY) 2015 ethanol production at about 250 million liters, up by 5 million liters or two percent compared to our CY 2014 estimate of 245 million liters. We forecast domestic ethanol consumption at 165 million liters in CY 2015, up 35 million liters or 27 percent compared to our 2014 estimate of 130 million liters. Peru is currently mandating a 7.8 percent ethanol blend rate with gasoline. We foresee Peruvian CY 2015 ethanol exports at about 160 million liters, up by 5 million liters or over 3 percent compared to our CY 2014 estimate of 155 million liters.

At FAS Lima we understand that Peru will not produce biodiesel in CY 2014, nor will it likely produce any biodiesel in CY 2015. Sources indicate that despite the existence of the biofuel promotion law that prioritizes domestic biodiesel production and procurement, local fuel distributors will continue to import more affordable Argentine biodiesel. FAS Lima forecasts CY 2015 biodiesel imports to remain flat at 283,000 MT. Peru imposed anti-dumping and countervailing duties on U.S.-origin biodiesel in CY 2009 following the surge (700 percent) in U.S. exports.

**Policy and Programs:**

Peru's biofuel sector is governed by three regulations that provide the legal framework.

**Law 28,054 – Biofuels Market Promotion:** This law establishes the legal framework for promoting the utilization of biofuels in Peru. The legislation seeks to increase employment, diversify the country's fuel sources, strengthen agricultural development, reduce environmental contamination and degradation, as well as provide an alternative to illicit coca cultivation and drug production (Peru is the world's largest producer of cocaine).

Law 28,054 promotes investment in biofuel production and its commercialization. It has established the PROBIOCOM program within Peru's investment agency (i.e., PROINVERSION) in order to attract investment in the local biofuel sector.

The Biofuels Market Promotion legislation establishes the technical committee responsible for determining blend rates and schedules, as well as recommends biofuel production and commercialization regulations. The committee is also responsible for enhancing public awareness of the benefits of biofuels. The Ministries of Energy and Mines, Economy and Finance, Agriculture, PROINVERSION, DEVIDA (alternative development agency), and the private sector compose the technical committee's membership.

**Supreme Decree 013-2005 EM – Regulation for Biofuels Market Promotion:** This decree sets the biofuel content in fuels distributed and sold within Peru. Gasoline must contain at least 7.8 percent ethanol, while diesel must have a biodiesel content of no less than 5 percent.

**Supreme Decree 021-2007 EM – Regulation for the Commercialization of Biofuels:** This law (April 2007) establishes the legal requirements for trading and distributing biofuels in Peru. At the same time, it sets quality standards and procedures for registering biofuel blends with the Ministry of Energy and Mines. It also sets the schedule for including biofuels in fuel blends. Commencing in 2010, all gasoline sold in Peru is required to contain at least 7.8 percent ethanol. From 2011 onwards, diesel fuel sold in Peru must contain a 5 percent biodiesel component.

The foregoing regulations delineate responsibilities among the different agencies as follows:

- Ministry of Agriculture and Irrigation: Responsible for promoting the development of the agricultural areas necessary for local biofuel production.
- Ministry of Energy and Mines: This ministry authorizes the commercialization of biofuels and blends thereof with gasoline and diesel fuels.
- Ministry of Production: Authorizes the operation of biofuel production facilities.
- OSINERGMIN: Supervises and controls operations throughout the production chain.
- PROINVERSION: Promotes investment in the biofuels sector.

## Bioethanol and Biodiesel

Fuel Use Projections (Liters - Million)										
Calendar Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
<b>Gasoline Total</b>	2,110	2,152	2,217	2,283	2,352	2,422	2,495	2,570	2,647	2,690
<b>Diesel Total</b>	6,035	6,216	6,340	6,467	6,597	6,728	6,863	7,000	7,140	7,250
On-road	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Agriculture	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Construction/mining	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Shipping/rail	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Industry	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Heating	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
<b>Jet Fuel Total</b>	1,022	1,053	1,095	1,139	1,184	1,231	1,281	1,332	1,385	1,410
<b>Total Fuel Markets</b>	9,167	9,421	9,652	9,889	10,132	10,382	10,639	10,902	11,172	11,350

Note: N.A. = Not Available.

Source: Ministry of Energy and Mines.

## ETHANOL

### Production:

FAS Lima forecasts Peru's calendar year (CY) 2015 ethanol production at about 250 million liters, up by 5 million liters or two percent compared to our CY 2014 estimate of 245 million liters. We attribute the increase to production ramping up at the Piura area ethanol plants and good sugarcane yields.

The ethanol industry is relatively new to Peru; operations commenced in August 2009. The country counts with two modern ethanol production facilities, both of which are located in the department (state) of Piura (roughly 1,000 kilometers north of the capital city of Lima). Both facilities utilize sugarcane as the feedstock for bioethanol production. Sugarcane at these production facilities is being cultivated on formerly idle, non-irrigated desert lands.

These facilities take advantage of Piura's favorable weather conditions (i.e., ample sunlight due to proximity to the Equator). Despite an average of only 25 millimeters of annual rainfall, sugarcane is cultivated year-round by these facilities thanks to modern irrigation technology.

These sugarcane fields are drip irrigated with water drawn from the Chira River; itself fed by the Poechos Reservoir (one billion cubic meter capacity, discharge rate of rate of four cubic meters per second) located to the north some 30 kilometers from the Peru-Ecuador border. Sugarcane yields can be as high as 200 metric tons (MT) per hectare, although average yields normally are around 140 MT per hectare. Brazil's shorter 180-day growing season produces lower yields of 70 MT per hectare. Sugarcane cultivation in Piura absorbs about 17,000 cubic meters of water per hectare per year

compared to rice that takes upwards of 22,000 cubic meters of water per hectare per season (or about 44,000 cubic meters of water per hectare per year); rice farmers plant two rice crops per year in Piura's desert/semi-desert environment.

Ethanol production in Peru utilizes the diffusion method. This method consists of shredding harvested sugarcane stalks very thinly, moving the shreds through thirteen consecutive warm water (70-80°C) showers. The water from the final shower is allowed to ferment with alcohol producing yeast. Once the fermentation process is completed, the ensuing "liquor" is distilled. Industry sources clarify that this procedure is more efficient than traditional milling; its continuous flow also reduces plant idle time to a minimum.

In order for a 350,000 liter per day ethanol plant to operate efficiently, it requires the processing of about 20 hectares of sugarcane per day. With an average sugar content of 17 percent, one metric ton of sugarcane produces roughly 170 kilograms of sugar or an amount equivalent to 0.08 cubic meters of ethanol. One metric ton of sugarcane at the same time also produces some 330 kilograms of bagasse (i.e., fibrous material that remains after sugarcane stalks are crushed to extract their juice).

The bagasse is used to produce 660 kilograms of steam. Steam-turned turbines generate the processing plant's electricity needs; excess energy produced (normally 2-4 megawatts) is sold to the national power grid. Ethanol operations utilize about 8 megawatts per month.

At FAS Lima, we see that with increased automotive ownership there is a growing need for ethanol for fuel despite increased use of natural gas (*gas natural vehicular* – GNV) or methane and liquefied petroleum gas (*gas licuado de petróleo* – GLP) as transportation fuels. The government reportedly anticipates that an additional 45,000 hectares (some speculate that this number could reach 200,000 hectares) of arable land will be planted with sugarcane in the not too distant future. Such an investment (in land and production facilities) is estimated by some sources at above \$500 million; potentially generating 40,000 jobs and a return of \$1 billion.

**Caña Brava (Romero Group):** The \$210 million Caña Brava facility is Peru's largest ethanol production plant. Operations commenced in August 2009. Caña Brava counts with approximately 7,000 hectares of planted sugarcane fields along with a 350,000 liter per day processing plant. Caña Brava plans to expand planted area by an additional 2,000 hectares.

**Maple Energy PLC (an independent integrated energy company):** Through its subsidiary Maple Ethanol and Maple Bio-combustibles, is Peru's other ethanol producer. It has investments of \$280 million in Piura, having acquired 13,500 hectares of land (of which 7,800 hectares are currently planted with sugarcane). Its processing plant has built capacity of some 130 million liters of ethanol per year.

**Potential Producers:** At FAS Lima, we hear that a number of sugarcane growers are evaluating the economic feasibility of diverting part of their crop to ethanol production. We understand however that there are no immediate plans to initiate commercial operations.

**Consumption:**

FAS Lima forecasts domestic ethanol consumption at 165 million liters in CY 2015, up 35 million liters or 27 percent compared to our 2014 estimate of 130 million liters. Peru by 2011 already met the ethanol scheduled mandated by the government. We expect ethanol consumption at the current 7.8 percent blend rate to stabilize at about 165 million liters per year. At FAS Lima, we understand that the city of Lima and its immediate surroundings account for roughly 65 percent of the country's ethanol demand. REPSOL (Spain) and Petro Peru (state-owned) are the Peruvian market's main gasoline suppliers.

Industry sources indicate that demand for gasoline has suffered in recent years as taxis and buses increasingly turn to natural gas and liquefied petroleum gas as a fuel source. Demand for these two alternative fuels in CY 2013 accounted for about 40 percent of total fuel use. Peru's most consumed fuels in CY 2012 were liquefied petroleum gas (up 16 percent) followed by gasoline blended with ethanol (up 140 percent) and B5 biodiesel. These three fuel sources combined in account for about 82 percent of total fuel use.

Sources report that increasing the current ethanol blend rate of 7.8 percent to 10 percent will meet with opposition from Peru's gasoline producers. These producers fear that increasing the ethanol blend rate to 10 percent will displace gasoline, which would have to be exported potentially at a loss. Although Peru is a relatively efficient producer of gasoline, it is relatively inefficient at producing mid-grade petroleum fuel derivatives such as kerosene and diesel.

**Trade:**

FAS Lima forecast CY 2015 ethanol exports at about 160 million liters, up by 5 million liters or over 3 percent compared to our CY 2014 estimate of 155 million liters. We attribute the uptick in exports to Peru's second ethanol production facility becoming fully operational in CY 2014. FAS Lima forecasts CY 2015 imports at about 75 million liters, up by 35 million liters or around 87.5 percent compared to our CY 2014 estimate of 40 million liters. Ethanol imports are up despite Peru assessing a 6 percent import duty and an excise tax of 20 percent.

At FAS Lima, we notice that Peru's ethanol producers often find better prices in foreign markets than at home. Peruvian ethanol overseas commands higher prices, especially in the European Union (EU) due to buyers' willingness to pay price premiums for green harvesting (i.e., harvesting without cane field burning) and biological pest control among other more environmentally friendly measures. We also observe that domestic sea freight charges (Paita-Lima/Callao) at \$0.27 per gallon of ethanol are

relatively high when compared to international sea freight charges (Paita-Rotterdam) of \$0.34 per gallon of ethanol.

Peruvian ethanol producers complain that although they can ship their product to the EU and Canada, they are currently impeded from exporting to the U.S. market due to Environmental Protection Agency (EPA) regulations. Imports are permissible if foreign producers can certify that the ethanol comes from fields that were under cultivation prior to 2007. Producers criticize the EPA regulation that is meant to deter deforestation of virgin land, since it does not presently contemplate the possibility of barren, arid desert lands being brought into production through modern irrigation methods.

<b>Ethanol Used as Fuel and Other Industrial Chemicals (Liters - Million)</b>										
<b>Calendar Year</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>
<b>Beginning Stocks</b>	0	0	0	0	0	0	0	0	0	0
Fuel Begin Stocks	0	0	0	0	5	3	2	3	3	3
<b>Production</b>										
Fuel Production	0	0	0	59	70	123	235	240	245	250
<b>Imports</b>										
Fuel Imports	11	13	11	14	12	13	15	33	40	75
<b>Exports</b>										
Fuel Exports	0	0	0	58	64	51	126	148	155	160
<b>Consumption</b>										
Fuel Consumption	11	13	16	10	20	60	123	125	130	165
<b>Ending Stocks</b>										
Fuel Ending Stocks	0	0	0	5	3	2	3	3	3	2
<b>Production Capacity</b>										
Number of Refineries	0	0	0	1	1	2	2	2	2	2
Nameplate Capacity	0	0	0	126	126	230	350	350	350	350
Capacity Use (%)	0	0	0	46.8	55.6	53.4	67.1	68.5	70.0	71.4
<b>Co-product Production (1,000 MT)</b>										
Bagasse	0	0	0	177	210	369	705	705	720	723
<b>Feedstock Use (1,000 MT)</b>										
Sugar Cane	0	0	0	536	636	1,118	2,135	2,135	2,182	2,190
<b>Market Penetration (Liters - Million)</b>										
Fuel Ethanol	11	13	16	10	20	60	123	125	130	165
Gasoline	1,159	1,221	1,261	1,505	1,657	1,843	1,931	1,950	1,980	2,110
Blend Rate (%)	0.9%	1.1%	1.3%	0.7%	1.2%	3.3%	6.4%	6.4%	6.6%	7.8%

## BIODIESEL

### Production:

At FAS Lima we understand that Peru will not produce biodiesel in CY 2014, nor will it likely produce any biodiesel in CY 2015. Sources indicate that despite the existence of a biofuel promotion law that prioritizes domestic biodiesel production and procurement, local fuel distributors will continue to import more affordable Argentine biodiesel.

<b>Biodiesel (Liters - Million)</b>										
<b>Calendar Year</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>
<b>Beginning Stocks</b>	0	2	1	2	3	2	2	1	2	2
<b>Production</b>	10	10	10	10	32	32	32	56	0	0
<b>Imports</b>	81	78	111	166	162	178	238	228	283	283
<b>Exports</b>	0	0	0	0	0	0	0	0	0	0
<b>Consumption</b>	89	89	120	175	195	210	271	283	283	283
<b>Ending Stocks</b>	2	1	2	3	2	2	1	2	2	2
<b>Production Capacity</b>										
Number of Bio-Refineries	1	1	1	1	2	2	2	2	2	2
Nameplate Capacity	25	200	200	200	200	200	200	200	200	200
Capacity Use (%)	40.0 %	5.0%	5.0%	5.0%	16.0 %	16.0 %	16.0 %	28.0%	0.0 %	0.0 %
<b>Feedstock Use (1,000 MT)</b>										
Palm Oil	10	10	10	10	31	61	80	80	0	0
<b>Market Penetration (Liters - Millions)</b>										
Biodiesel, on-road use	89	89	120	175	195	210	271	283	283	283
Diesel, on-road use	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	4,043	4,043	4,043
Blend Rate (%)	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	7.0 %	7.0%	7.0 %
Diesel, total use	3,461	3,766	4,242	4,487	4,842	5,464	5,687	5,801	5,917	6,050

Note: N.A. = Not Available.

This financial determination will lead to the shutdown of local biodiesel production. The shuttering of local biodiesel processing plants will adversely affect Peru's oil palm growers who see their (feedstock) market vanishing.

At FAS Lima, we understand that a large number of oil palm growers are located within coca leaf production areas of the country. Many of these oil palm growers are themselves former coca farmers that have been encouraged by several administrations to switch production to alternative crops. Sources inform that should oil palm growers' livelihoods be threatened by more affordable biodiesel imports



(from Argentina), the situation could potentially become a serious political issue. President Ollanta Humala's administration is actively promoting alternative crops in the country's coca production areas while scaling back on the unpopular coca eradication efforts that have at times lead growers to turn to criminal gangs for protection.

Peru's largest palm oil-based biodiesel producer is Palmas de Espino. It operates a large-scale plant in the San Martín department where it processes 7,357 hectares of oil palm. Palmas de Espino is deliberating now whether to add another 10,000 hectares to its holdings in the same region to increase its palm oil production capabilities. Palmas de Espino, along with Heaven Petroleum, account for around 91 percent of total Peruvian biodiesel production.

### **Consumption:**

FAS Lima forecast CY 2015 biodiesel consumption at 283,000 MT, largely unchanged from our CY 2014 estimate. Diesel fuel continues to be the most widely consumed fuel in Peru. As of CY 2011, all diesel fuel sold in Peru must contain a 5 percent biodiesel component.

### **Trade:**

FAS Lima forecasts CY 2015 biodiesel imports at 283,000 MT, originating in their entirety from Argentina. Peru imposed anti-dumping and countervailing duties on U.S.-origin biodiesel in CY 2009 following the sudden surge (700 percent) in U.S. exports. Subsequently on August 23, 2010, INDECOPI (Peru's consumer defense agency) published Resolution 151-2010-CFD-INDECOPI imposing permanent countervailing duties of \$178 per metric ton of 100 percent biodiesel (B100) and or any biodiesel blends of 50 percent (B50) or greater from the United States. This is in addition to the \$212 per metric ton anti-dumping duty.