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Colombia

Biofuels Annual

2017

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Report Highlights:
Colombia's biofuel production decreased in 2016 as a result of difficult weather conditions that affected its main feedstocks (sugarcane and palm oil). Moreover, unclear biofuels policies on increasing blend mandates have resulted in little incentive to increase production despite new biofuels facilities coming online. In late 2016, the Ministry of Mines and Energy (MME) lifted all restrictions on fuel ethanol imports by May 2017 as long as the biofuel complies with quality and carbon footprint standards that will allow Colombia to achieve its climate change commitments. Those standards are not yet set, however depending on how they are written; they could become a trade barrier for U.S. corn-based ethanol. In the first part of 2017, Colombia's imports of U.S. ethanol (nearly all for fuel use) reached a record 30.8 million liters, well above the previous full-year record of 18.6 million liters in 2016.

Post:

Bogota

Executive Summary:

Colombia manages its biofuel markets using a system of mandates, tax relief, environmental regulations and price controls. It also restricted fuel ethanol imports from April 2014 to April 2017, mainly impacting U.S. suppliers, when cheaper imports threatened to displace domestic production. Tax incentives have been in place since 2002, but the implementation of Colombia's mandates has slowed industry growth. Longer-term goals to introduce E10 and B10 across most of the country, goals established in 2005 for ethanol and 2007for biodiesel, remain unfulfilled.

Total biofuel use has seen modest expansion since 2012. Over the past five years, fuel ethanol use rose 21% to 457 million liters, while biodiesel rose slightly but then fell for an overall decrease of 5% to 528 million liters. With the continued expansion of gasoline and diesel consumption, the national average blend rate has hovered between 7-8% for both fuels with no upward trend for ethanol and some decease for biodiesel. Ethanol production has risen most years in response to expanded domestic use, while exports remain zero and imports are controlled when they threaten the domestic industry. The biodiesel market has mostly stagnated with little growth evident in the past 5-6 years, although production and use are well above pre-2011 levels.

In 2017, Colombian sugarcane-based ethanol production is supplied by seven ethanol plants with a production capacity of 600 million liters. Post estimates fuel ethanol production to reach 450 million liters in 2017, increasing further to 530 million liters in 2018, supposing normal sugarcane growing and harvesting conditions. Colombia's fuel ethanol imports reached 22.8 million liters in 2016, most of which was U.S. fuel ethanol (81.3%), supported by MME's previous authorization to permit imports given a shortfall in domestic production due to adverse weather conditions. In the first part of 2017, ethanol imports reached historically high volumes at 33.5 million liters, primarily sourced from the U.S. (92.2%). In May and June 2017, with no restrictions in place, Colombia imported an average of 7.9 million liters per month of U.S. fuel ethanol.

Colombian palm oil-based biodiesel production is supplied by eight plants with a production capacity of 700 million liters. Biodiesel production decreased to 530 million liters in 2016 as a result of difficult weather conditions in palm-oil producing regions. Post estimates biodiesel production to reach 590 million liters in 2017, increasing to 685 million liters in 2018 driven by a higher blend mandate and assuming normal palm-oil growing conditions. There is no biodiesel trade.

To achieve its climate change commitments under the 2015 Paris Climate Conference (COP21), Colombia increased the biodiesel blend mandate from B8 to B9 in the country's central region (including Bogota) in April 2017. To align trade policy with carbon reduction goals, Colombia lifted all restrictions on ethanol imports by May 2017 while indicating that all ethanol, produced and imported, must comply with fuel quality and carbon footprint standards that will be in place in approximately one year. Depending on how the carbon footprint standards are established, they may become a trade barrier for imported ethanol.

Author Defined:

Policy and Programs

General Overview

The national policy on biofuels was primarily developed to support additional revenue streams for the sugarcane and palm oil industries. It also aims to diversify Colombia's sources of energy by decreasing its dependency on fossil-fuels, and more recently has added the additional goal of introducing environmentally friendly fuels to reduce greenhouse gas (GHG) emissions. The legal instruments that originated the Colombian biofuels strategy were two laws issued by the Ministry of Mines and Energy (MME) (Law 693 of 2001 for ethanol, and Law 939 of 2004 for biodiesel) which set fuel quality standards and cover tax, price setting and mandate support.

To promote biofuels use and production, the government passed a 2002 tax reform that eliminated the value-added tax (VAT) for biofuels and exempted them from the global tax. In addition, the ethanol blended with gasoline is relieved from local surcharge fee. The 2016 tax reform (Law 1819 of 2016) did not modify these conditions which still apply. In the 2016 tax reform, a new tax is imposed on fossil fuels. This tax is known as a "Green tax" or "Carbon tax." This bill creates a tax on the carbon content of all fossil fuels, including all oil derivatives and all types of fossil gas used for energy purposes. The rate is based on the release-of-carbon-dioxide (CO_2) factor for each fuel, which would be expressed as the volume or weight of the fuel. The table below illustrates the current taxes on fossil fuels and biofuels:

Table 1. Current fuel and biofuel tax rates in Colombia

Tax	Gasoline	Diesel	Biofuels	Regulation
Global tax	$ 490 per gallon on regular gasoline (US¢17) $ 930 per gallon on higher octane gasoline (Premium) (US¢32)	$469 per gallon (US¢16)	Exempt	Art. 167,168,173 - Law 1607 of 2012 Art. 218,219,220 - Law 1819 of 2016
Value added tax (VAT)	19 percent	19 percent	Exempt	Art. 183 - Law 1819 of 2016 Art. 477 - Estatuto Tributario (Biofuels exempt)
Carbon tax	$ 135 per gallon (US¢4)	$ 152 per gallon (US¢5)	Exempt	Art. 221, 222, 223 - Law 1819 of 2016
Local surcharge fee	25 percent of the reference price. Reference price in border departments: $1,900 per gallon (US¢65) Reference price in the rest of the country: $5,078.77 per gallon (US$1.74)	6 percent of the reference price. Reference price in border departments: $3,400 per gallon (US$1.17) Reference price in the rest of the country: $5,024.59 per gallon (US$1.72)	Exempt on ethanol blended with gasoline. There is not surcharge tax relief on biodiesel.	Art. 117 to 121 - Law 488 of 1998 MME's resolution 40147 of 2017
Note: Values are in Colombian pesos (COP). Specific tariffs are valid for 2017 and updated on annual				

basis.

Source: Fuel Information System (SICOM), MME.

The MME is the authority that regulates Colombia's biofuels policy, including market prices and volumetric blend mandates, and issues technical regulations. Biofuels blend mandates have changed over time and across the country, and the degree to which they have been successfully implemented is tied to the development of marketing chain infrastructure, domestic industry growth, and imports.

Fuel and biofuel prices are controlled by the Colombian Government. The MME sets the price for gasoline and diesel at wholesale markets periodically. These prices include the price that fuel distributors or blenders must pay to domestic producers of biofuels, and are calculated based on a formula previously defined by the regulation.

The MME periodically issues regulations on gasoline and diesel prices according to a pricing structure based on four components: producer income, maximum wholesale distributor price, maximum retailer price and consumer price. The international prices of gasoline and diesel are taken as the reference price plus the reference price of the biofuel proportion for producer income, and then taxes, transportation and marketing fees, and margin are added to determine the distributor, retailer and consumer prices. The current price structure is established through MME's resolution 41281 of 2016. Reference fuel prices change across the country depending on the transportation and distribution costs to each region. Table 2 and 3 illustrate an example on how fuel prices are structured:

Table 2. Current price structure in Bogota (Capital city)

E8 Price in Bogota			
August, 2017	***COP/Gallon***	***USD/Liter***	***%***
Gasoline producer income - Proportion (92%) Reference price $4,122.03	3,792.27	0.34	43.8%
Ethanol producer income - Proportion (8%) Reference price $8,559.67	684.77	0.06	7.9%
Producer Income	**4,477.04**	**0.41**	
Global tax on gasoline *($490 per gallon)*	450.80	0.04	5.2%
VAT on gasoline (19%)	720.53	0.07	8.3%
Carbon tax on gasoline *($135 per gallon)*	124.20	0.01	1.4%
Fuel marking fee	7.45	0.00	0.1%
Transportation cost of gasoline	352.77	0.03	4.1%
Transportation cost of fuel ethanol	44.88	0.00	0.5%
"Plan de continuidad" government fee	71.51	0.01	0.8%
Maximum wholesale distributor price	**6,249.18**	**0.57**	
Wholesale distributor margin	375.34	0.03	4.3%
VAT on wholesale distributor margin	71.32	0.01	0.8%
Local surcharge fee on gasoline	1,168.12	0.11	13.5%
Maximum retailer price	**7,863.96**	**0.71**	
Retailer margin	706.37	0.06	8.2%
Evaporation loss	31.46	0.00	0.4%
Transportation cost to fuel stations	57.17	0.01	0.7%
Consumer price E8	***8,659***	***0.78***	***100.0%***

B9 Price in Bogota			
August, 2017	***COP/Gallon***	***USD/Liter***	***%***
Diesel producer income - Proportion (91%) Reference price: $4,116.29	3745.82	0.34	47.4%
Biodiesel producer income - Proportion (9%) Reference price $9,989.22	899.03	0.08	11.4%
Producer Income	**4,644.85**	**0.42**	
Global tax on diesel *($469 per gallon)*	426.79	0.04	5.4%
VAT on diesel (19%)	711.71	0.06	9.0%
Carbon tax on diesel *($152 per gallon)*	138.32	0.01	1.8%
Fuel marking fee	7.45	0.00	0.1%
Transportation cost of diesel	356.61	0.03	4.5%
Transportation cost of biodiesel	32.49	0.00	0.4%
"Plan de continuidad" government fee	71.51	0.01	0.9%
Maximum wholesale distributor price	**6389.72**	**0.58**	
Wholesale distributor margin	375.34	0.03	4.8%
VAT on wholesale distributor margin	71.32	0.01	0.9%
Maximum retailer price	**6836.38**	**0.62**	
Retailer margin	706.37	0.06	8.9%
Transportation cost to fuel stations	57.17	0.01	0.7%
Local surcharge fee	301.48	0.03	3.8%
Consumer price B9	**7901.39**	***0.72***	**100.0%**

Source: Colombian oil and gas information system (SIPG), Unit of Mining and Energy Planning (UPME), MME.

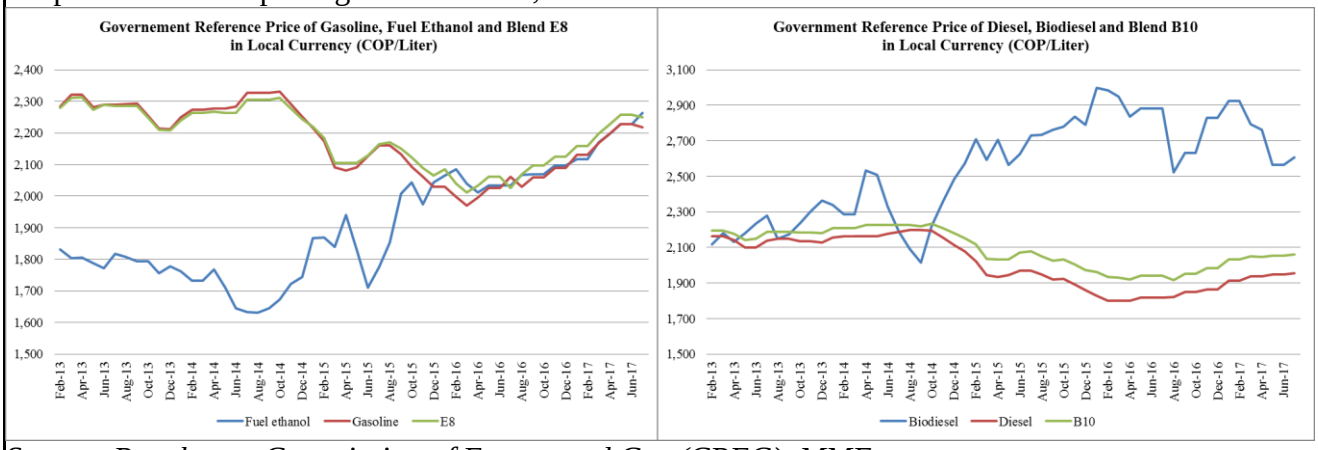
Table 3. Current components of consumer fuel prices in Bogota

Component	**E8**	**B9**
Fossil fuel cost	43.8%	47.4%
Biofuel cost	7.9%	11.4%
National taxes	16.7%	18.1%

Local taxes	13.5%	3.8%
Transportation and distribution costs	18.1%	19.3%
Total	**100.0%**	**100.0%**

The most recent MME mandated price for a liter of ethanol is approximately $0.78. For biodiesel, the most recent MME mandated price per liter is about $0.90. However, imported biofuels are not subject to MME mandated prices creating opportunities for imports. The graph below illustrates the historical pricing in local currency per liter of biofuels compared with fossil fuels and blend mandates.

Graph 1. Historical pricing of fossil fuels, biofuels and blend mandates in Colombia



Source: Regulatory Commission of Energy and Gas (CREG), MME.

The price setting formulas of biofuels are based on the international prices of refined sugar and palm oil (explained afterwards). These price mechanisms have lately raised the price of gasoline and diesel at the pump when blended with biofuels given the rising trend of sugar and palm oil prices.

Since 2012, Colombia has been working on a Low-Carbon Development Strategy to identify and prioritize mitigation measures in different economic sectors. In addition, under COP 21, Colombia committed to reduce its GHG emissions by 20 percent with reference to the Projected Business as Usual Scenario (BAU) emissions by 2030. Environmental commitments were established given the potential increase in Colombia's GHG emissions as the economy grows, driving up energy demand.

Fuel Ethanol

The Colombian ethanol policy guidance came out in 2002 when Law 693 was issued. This law made it mandatory to use a 10-percent blend of ethanol in gasoline (E10) in cities with populations larger than 500,000 inhabitants (approximately 10 cities countrywide), and it also established the regulatory framework for ethanol production. Due to Colombia's lack of ethanol facilities, the law went into effect four years later in September 2005, when the first ethanol plant started operation. The country's potential demand for E10 was far above domestic production, thus the government established a phase-in period throughout the country for mandatory E10 use.

The ethanol blend mandate has changed over time and across the country. It fluctuated among E8 and E10. However, estimations indicate that E8 has never been reached when calculated as an average across the entire country. In some cases, the government has removed the blend mandate

entirely for periods of time due to a shortage of domestic production. In October 2013, the MME increased the gasoline blend mandate to E10 to stimulate domestic production and reduce inventories, but this increase resulted in record levels of U.S. ethanol exports to Colombia. Three months later the government reduced the mandate back to E8. The reduction in the blend mandate was followed by MME resolution 9-0454 in April 2014 that limited trade access for imports if the blend mandate could be satisfied with domestic production. Trade abruptly fell to zero as the MME delayed for about one year publishing a methodology to determine the necessary import volumes (MME Resolution 4-0565 of May 2015).

On November 2, 2016, the MME issued a resolution that annulled the April 2014 regulation. The new measure lifted all restrictions on ethanol imports by May 2017 as long as ethanol, produced and imported, complies with quality standards, and also with carbon footprint standards that will allow Colombia to achieve its climate change commitments.

The quality standards (water content, acidity and conductivity) were established through resolution 789 issued in May 2016 to be in place one year later (May 2017). However on May 24, 2017, the MME issued resolution 4-0467 to postpone the implementation period for one more year as there are not proper authorities to issue the certificate of compliance of the quality requirements to enforce this measure.

Regarding the carbon footprint regulation, the Ministry of Environment has published three versions for public comments. The last version was notified on April 26, 2017 to the World Trade Organization (WTO) Committee on Technical Barriers to Trade for a 90-days public comments period. The proposed regulation establishes a maximum footprint limit associated with the greenhouse gas inventory of denatured anhydrous ethanol fuel. In this version, Colombia lowered the carbon limit making it more difficult to meet. The Colombian sugar-ethanol industry committed to reach a 20 percent reduction of GHG emissions. According to the Ministry of Environment, a 20 percent reduction by 2021 would mean that the calculations for the biofuel index quotient would set a value of 780 kg of CO2e/Cubic meter fuel ethanol. By 2021, the limit will represent an approximate 61 percent reduction in GHG emissions of ethanol relative to gasoline. The table below illustrates the gradation included in the last version of the proposed regulation on fuel ethanol:

Table 4. Maximum allowable limit graduation of GHG emissions index proposed by the Colombian Ministry of Environment

Year	Baseline	Year 1 (2017)	Year 2 (2018)	Year 3 (2019)	Year 4 (2020)	Year 5 (2021)
Limit: kg CO2e/Cubic meter fuel ethanol	962	924	889	853	817	780
Relative GHG reduction of fuel ethanol relative to gasoline	51.8%	53.7%	55.5%	57.3%	59.1%	61%

Source: Ministry of Environment G/TBT/N/COL/223 Add. 1 – FAS/OASA calculation on relative GHG reduction.

The Colombian sugar industry is concerned about competitively-priced imports of U.S. ethanol due to zero import duties under the U.S - Colombia Trade Promotion Agreement (CTPA) and competitive corn-based ethanol prices. The MME ethanol price set grants to ethanol producers an income that equals international price for refined sugar and the ethanol price that producers obtain

for selling in the local market. This mechanism of administered prices based on refined sugar creates market opportunities for ethanol producers abroad that use less expensive feedstocks or in general are able to produce at lower costs, for instance, U.S. corn based ethanol price per liter landed in Colombia is approximately $0.46, while the most recent MME's mandated price is $0.78.

The formula to calculate the ethanol price to be paid to producers is defined by the MME's resolutions 181232 of 2008 and 91865 of 2012. The fuel ethanol price is established as the higher of the following two calculations: the opportunity cost of using refined sugar to produce ethanol (the international price equivalence for refined sugar at the London market) and the international price for gasoline adjusted by technical factors (increased octane and reduction on sulfur content).

Biodiesel

Law 939 of 2004 was the first legal instrument for the promotion of biodiesel production to be used in diesel engines. The MME has issued a series of comprehensive measures to establish the regulatory framework for the biodiesel market, including quality standards, blending mandates and market prices.

The current mandate for biodiesel blending in diesel fuel is B2, B9 or B10, depending on the region of the country (*see Section V. Biodiesel – Consumption*). On April 28, 2017, considering Colombia's environmental commitments and exceeded production capacity of biodiesel plants, the MME issued the resolution 4-0351 that increases the biodiesel blend mandate from B8 to B9 in Colombia's central region, Bogota and eastern plains. As in the case of ethanol, the biodiesel blend mandate has changed over time and across the country showcasing the insular nature of GOC biofuel policies that cater to domestic industry concerns, as opposed to meeting blend mandate goals through domestic production and, if necessary, imports.

Through resolution 182142 of 2007, the MME issued the technical and safety requirements for the production, distribution and import of biofuels to be used in diesel engines, in accordance with Law 939 of 2004. In addition, this regulation established that all biodiesel importers must be authorized by the MME. It was not until July 12, 2017 that the MME issued resolution 31537 to authorize the first biodiesel importer. This has created concerns in Colombian biodiesel industry about competitively-priced imports from Brazil and Argentina.

The formula to calculate the biodiesel price to be paid to producers is defined by the MME's resolutions 181780 of 2005, 181966 of 2011, and 181489 of 2012. The biodiesel price is established within a price band: the ceiling price is calculated as the import parity price of fossil diesel adjusted by technical factors, and the floor price is expressed as the export parity price of palm oil at the Rotterdam market adjusted by freight costs and technical factors.

Gasoline and Diesel Market:

The state-owned Colombian Petroleum Enterprise (ECOPETROL) is responsible for managing all aspects related to the petrochemical industry. There are five petroleum refineries in Colombia but 98-percent of all refining capacity is accounted for two facilities: Barrancabermeja and Cartagena, located at the north part of the country. In 2016, countrywide demand for gasoline and biodiesel was

mainly supplied by domestic production.

Fuel distributors have increased in the recent years to fifteen, but the market is dominated by three: Terpel, Exxon, which operates Esso and Mobil, and Chevron, which operates Texaco.
In 2015 the demand for local gasoline increased by 642 million liters to 6,144 million liters a year due to the closing of the border with Venezuela. The price of Venezuelan gasoline is much cheaper than Colombian, which represents an incentive for contraband. The closing of the border reduced the availability of the black market fuel, which meant that Colombia's largest refineries had to supply gasoline in border Departments where consumers were using the illegally obtained fuel.

According to the MME's Unit of Mining and Energy Planning (UPME), gasoline and diesel demand will rise during the next ten years mainly due to growth in the Colombian economy. The table below presents the history and outlook for fuel in Colombia.

Fuel Use History (Million Liters)

Calendar Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Gasoline Total	4,373	4,402	4,519	4,748	4,908	5,155	5,502	6,144	6,278	6,502
Diesel Total	5,944	6,294	6,702	7,206	7,637	7,620	7,747	8,112	8,373	8,630
On-road	5,662	5,909	6,084	6,547	6,745	6,879	7,056	7,389	7,626	7,860
Agriculture										
Construction & Mining										
Shipping & Rail										
Industry										
Heating										
Jet Fuel Total										
Total Fuel Markets	10,317	10,696	11,221	11,953	12,545	12,775	13,249	14,256	14,651	15,132

Fuel Use Projections (Million Liters)

Calendar Year	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Gasoline Total	6,818	7,146	7,416	7,695	7,907	8,292	8,620	8,988	9,262	9,509
Diesel Total	8,903	9,177	9,415	9,719	9,968	10,249	10,629	11,050	11,386	11,672
On-road	8,109	8,358	8,575	8,852	9,079	9,334	9,681	10,064	10,370	10,622
Agriculture										
Construction & Mining										
Shipping & Rail										
Industry										
Heating										
Jet Fuel Total										
Total Fuel Markets	15,722	16,323	16,830	17,414	17,875	18,541	19,249	20,037	20,648	21,181

Source: Unit of Mining and Energy Planning (UPME).

According to the Ministry of Transportation, Colombia has approximately 5.6 million motor vehicles. In terms of type of fuel used, 48 percent of vehicles use diesel and 52 percent use gasoline. MME established temporary fleet efficiency goals for new vehicles in 2012, but that policy was eliminated shortly after its announcement due to domestic auto industry complaints. The Colombian Vehicle Manufacturers Association (ANDEMOS) only supports voluntary blends up to E10 and B5. However, tests performed in Colombia show that vehicles can run on E15 and higher blends.

Fuel Ethanol

Production

Colombian ethanol production is derived entirely from sugarcane. Ethanol production has displaced about 40 percent of the country's sugar exports with little impact on domestic sugar prices and consumption, which has remained around 1.5 MMT during the last 10 years.

Currently Colombia's ethanol production is supplied by seven ethanol distilleries with a production capacity of 600 million liters. Six ethanol plants with an annual capacity of 540 million liters are located near the city of Cali in south central Colombia and, are clustered within larger industrial sugar production and milling facilities. These six plants are able to produce almost year round, except for a period of 30 to 40 days when the plants close operations due to technical maintenance. One additional ethanol facility called *Bioenergy* is located in the eastern plains in the Meta Department. *Bioenergy*, managed by ECOPETROL, started operations in December 2016 with a current annual capacity of 60 million liters. Once at full capacity, the *Bioenergy* plant will add 120 million liters to Colombia's ethanol production capacity. This new distillery is sourcing sugarcane from 17,000 hectares established near the area. In this region, climate conditions only allow to harvest sugarcane during eight months per year. This plant processes sugarcane for ethanol production only and it is the first ethanol facility in Colombia not linked to the sugar industry.

In 2017, Colombian sugarcane-based ethanol production capacity increased by 11 percent given the added volume from *Bioenergy*. Despite the increase in ethanol production capacity and production in recent years, a shortfall in sugarcane supply due to the weather phenomena "El Niño" caused ethanol production to decrease by five percent in 2016. In addition, the rising trend of sugar prices from late 2015 to late 2016 has motivated producers to focus on the sweetener instead of the biofuel. In 2017, excessive rains at the beginning of the year in the primary sugar-producing region, south central Colombia, created harvesting challenges, and limited feedstock availability for ethanol. During the first five months of 2017, ethanol production has decreased by 22.1 percent compared to the same time period a year before.

Post forecasts ethanol production to reach 450 million liters in 2017 assuming sugarcane production in south central Colombia recovers in the second semester. Ethanol production is forecast to increase further to 530 million liters in 2018 as the new ethanol facility, *Bioenergy*, increases operations, and supposing normal growing conditions and cane sugar content.

Most Colombian ethanol plants are energy self-sufficient and generate surplus power that is sold to the national electric grid. They use bagasse to generate energy needed for processing and create surplus. The sugar-ethanol industry capacity for electric power generation is at 237 megawatts (MW), of which 147 MW is for supporting self-sufficient plant operations with the remaining amount sold to utilities for public consumption. The new ethanol plant *Bioenergy*, located out of the sugar-mills cluster, has a potential capacity for electric power generation at 43 MW but it is currently producing 35 MW, of which 16 MW are for self-sufficient plant operations.

Consumption

Post estimates that 2017 fuel ethanol consumption will reach 493 million liters driven by higher imports as a result of the competitive price of imported ethanol (with no trade restrictions in place) and increased production. Post estimates consumption will increase further in 2018 to 580 million liters due to further increases in production and imports in response to increased gasoline use and a blend rate that will exceed E8 on average nationwide.

The blend mandate changes across the country primarily along with the ethanol industry growth and imports supply. In the southern, central and most of the northern area of the country close to E8 is met,

but in the border departments with Venezuela no blend mandate has been established. In several periods, the MME has suspended the ethanol blend mandate due to shortage in local production; for instance, the ethanol blend mandate was eliminated from May 18 to July 6, 2017 for most of the country, except for the north coast region and Antioquia department, where the biofuel mandate was mainly supplied with U.S. ethanol imports.

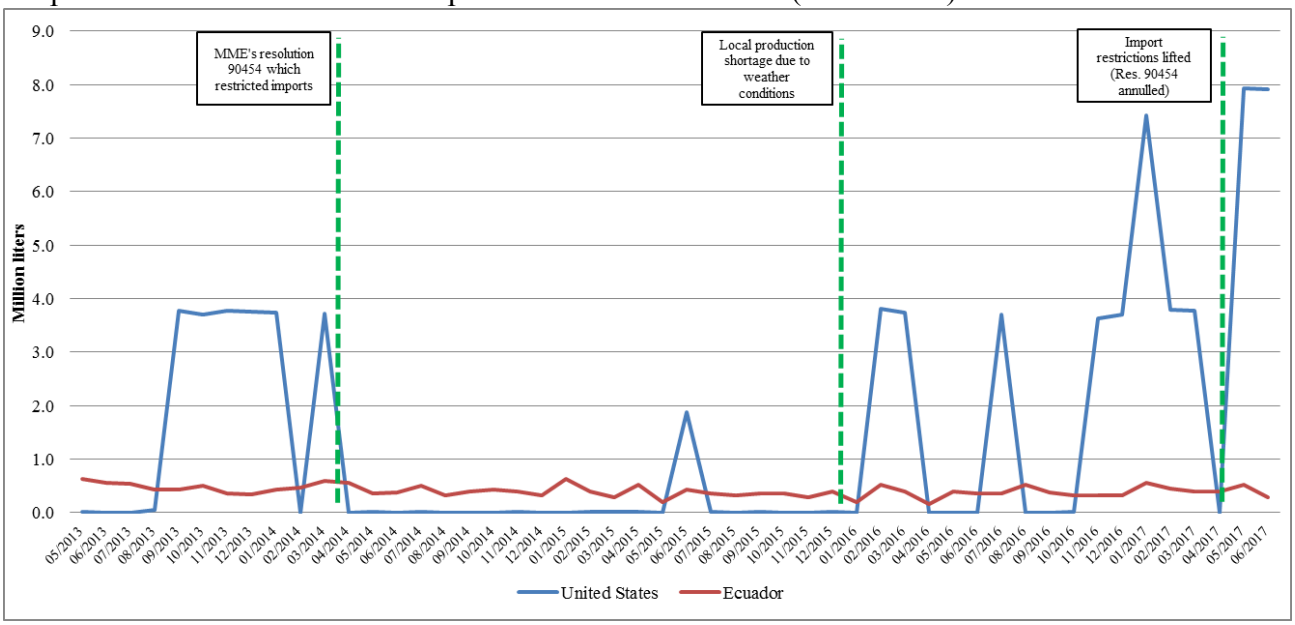
There is no official data on the nationwide blend level. However, Post calculations based on annual ethanol production and gasoline consumption show that the sugarcane-based ethanol industry has been unable to supply the country with enough biofuel to reliably meet the current E8 blend mandate. The new ethanol plant (*Bioenergy*) which brings additional production capacity on line in 2017 and 2018, along with some increase in imports should permit the country to slightly exceed an average E8 blend rate by 2018.

Trade

Under the CTPA, Colombia's import duties for the provision HS 220710 (un-denatured ethanol) were immediately eliminated when the agreement entered into force (2012). In the case of the provision HS 220720 (denatured ethanol) the 15 percent base rate duty was removed in five equal annual stages beginning in 2012. Therefore, since 2016, U.S. denatured ethanol, which is the one used as fuel ethanol, enters duty-free.

However, from April 2014 to April 2017, U.S. ethanol imports were subject to a MME's prior authorization, given resolution 9-0454, that restricted free access to the Colombian market. Regulatory restrictions notwithstanding, smaller volumes of fuel ethanol imports, primarily from Ecuador, continued. Colombia does not export fuel ethanol. The graph below illustrates fuel ethanol monthly imports from the United States compared to the primary competitor, Ecuador.

Graph 2. Historical Colombia's imports of denatured ethanol (HS 220720)



Source: DANE - Global Trade Atlas.

After resolution 9-0454 was issued, and denatured ethanol imports were restricted to the volume authorized by the MME, fuel ethanol imports from the United States immediately dropped to zero, except for June 2015, when the MME allowed the importation of 2 million liters. In 2016, the MME authorized imports of fuel ethanol due to a shortfall in local production driven by the "El Niño" weather phenomena that affected sugarcane production. In the first part of 2017, 30.8 million liters of U.S. fuel ethanol were imported, reaching historically high levels.

Since May 2017, the Colombian market is open to ethanol imports without any regulatory restrictions. This has resulted in an average 7.9 million liters of U.S ethanol imported in May and June. Post estimates that 2017 ethanol imports will reach 45 million liters, increasing further to 53 million liters in 2018 given the competitive prices of imported ethanol. However, depending on how the Ministry of Environment writes Colombia's pending carbon footprint standards, they could become a trade barrier for U.S. corn-based ethanol if they favor sugarcane-based ethanol.

The mechanism of administered prices for ethanol based on the international price for refined sugar creates market opportunities for corn-based ethanol producers, especially during periods when sugar prices spike and corn prices remain lower. The forecast for some increase in ethanol imports assumes U.S. corn-based ethanol will continue to be competitive against domestic and Andean Community (e.g. Ecuador) suppliers of sugar-cane ethanol.

Stocks

Colombia does not have programs to encourage storage or long-term stocks of biofuels. However, gasoline and diesel fuel regulations require stocks to adequately supply the market at 10 days of total fuel demand, which represents approximately 12 million liters of fuel ethanol.

Ethanol Used as Fuel and Other Industrial Chemicals (Million Liters)										
Calendar Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Beginning Stocks	9	12	8	11	12	15	11	10	10	10
Fuel Begin Stocks	9	12	8	11	12	15	11	10	10	10
Production	327	291	337	370	388	406	456	434	450	530
Fuel Production	327	291	337	370	388	406	456	434	450	530
Imports	32	70	55	89	138	98	108	106	110	115
Fuel Imports	4	6	7	8	21	18	7	23	45	53
Exports										
Fuel Exports	0	0	0	0	0	0	0	0	0	0
Consumption	356	365	390	457	523	508	566	540	558	642
Fuel Consumption	328	301	341	377	406	428	464	457	493	580
Ending Stocks	12	8	11	12	15	11	10	10	12	13
Fuel Ending Stocks	12	8	11	12	15	11	10	10	12	13
Total BalanceCheck	0	0	0	0	0	0	0	0	0	0
Fuel BalanceCheck	0	0	0	0	0	0	0	0	0	0
Production Capacity (Million Liters)										
Number of Refineries	5	5	5	5	5	5	6	6	7	7
Nameplate Capacity	378	378	378	412	412	412	465	540	600	660
Capacity Use (%)	87%	77%	89%	90%	94%	99%	98%	80%	75%	80%
Co-product Production (1,000 MT)										
Bagasse	1,182	1,053	1,220	1,336	1,402	1,469	1,650	1,569	1,627	1,916
Feedstock Use for Fuel (1,000 MT)										
Sugarcane	3,940	3,509	4,065	4,454	4,673	4,897	5,499	5,229	5,422	6,386
Market Penetration (Million Liters)										
Fuel Ethanol	328	301	341	377	406	428	464	457	493	580
Gasoline	4,402	4,519	4,748	4,908	5,155	5,502	6,144	6,278	6,502	6,818
Blend Rate (%)	7.5%	6.7%	7.2%	7.7%	7.9%	7.8%	7.6%	7.3%	7.6%	8.5%

Biodiesel

Production

In 2016, biodiesel production decreased by 9.1 percent from the previous year to 530 million liters as a result of difficult weather conditions from "El Niño" that affected palm oil production. Post forecasts biodiesel production to recover to 590 million liters in 2017, increasing to 685 million liters in 2018 assuming normal weather conditions and responding to the higher biodiesel blend mandate in Colombia's central region. There are eight biodiesel plants using palm oil as the feedstock, but one of them has started to produce biodiesel from used cooking oil.

Only six of the eight plants are members of the National Biofuels Producers Association (FEDEBIOCOMBUSTIBLES). However, these six plants are fully operational and produce about 95 percent of the total Colombian biodiesel production. Two new biodiesel facilities came online in 2017, adding 110 million liters to the national capacity.

The palm oil sector capacity for electric power is estimated at 340 MW. Palm oil producers generate energy from biomass and/or biogas to support self-sufficiency. Currently, there are only three palm oil plants that generate surplus, but there is no comprehensive information on quantity. The palm and ethanol industries claim to be capable of generating more power resources to sell to local utilities.

Consumption

Colombia biodiesel consumption is entirely dependent on local production to meet the government blend mandate, which varies by location. On April 28, 2017, the MME increased the blend mandate on-road from B8 to B9 in Colombia's central region, Bogota and the eastern plains. The blend mandate for the Caribbean and Pacific coasts and the south-central part of the country is B10. Some remote areas along the more remote eastern plains and border regions are permitted to blend at a lower B2.

Biodiesel consumption in 2016 reached 528 million liters as a result of lower domestic production and a 45-days trucker's strike which paralyzed heavy traffic transportation. Post forecasts that biodiesel consumption will increase to 589 million liter in 2017 and will probably increase further to 689 million liters in 2018 assuming increasing production and the beginning of imports.

Trade

Colombia neither imports nor exports biodiesel. There were no authorized biodiesel importers until July 12, 2017, when the MME issued resolution 31537 to authorize the first biodiesel importer. To date there have been no biodiesel imports registered, though Post estimates 5 million liters of biodiesel will be imported from South American countries in 2018. In 2017 and 2018 biodiesel exports will remain null.

The biofuels industry aspires to export biodiesel as palm area continues to expand and biodiesel facilities have exceeded capacity, improving the potential for more biodiesel production. However, Colombia is one of seven countries warning of a trade dispute with the European Union (EU) as the EU approved a resolution calling on the European Commission to phase out the use of palm oil, claiming that it drives deforestation, by 2020.The countries will have to comply with a single sustainability certification scheme for palm oil entering the European Union. In addition, the United States Environmental Protection Agency (EPA) has not granted renewable identification numbers (RINs) to Colombian biodiesel due to environmental concerns.

Colombia has provided information to the United States and the EU claiming that the palm oil biodiesel produced in the country complies all social and environmental standards, as palm oil crops are in already existing agricultural land and do not destroy virgin forest.

Stocks

Colombia does not have programs to encourage storage or long-term stocks of biofuels. However, gasoline and diesel fuel regulations require stocks to adequately supply the market at 10 days of total fuel demand, which represents approximately 9 million liters of biodiesel.

Biodiesel (Million Liters)										
Calendar Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Beginning Stocks	0	5	4	5	6	3	8	6	8	9
Production	185	384	503	557	572	589	583	530	590	685
Imports	0	0	0	0	0	0	0	0	0	5
Exports	0	0	0	0	0	0	0	0	0	0
Consumption	180	385	502	556	575	584	585	528	589	689
Ending Stocks	5	4	5	6	3	8	6	8	9	10
BalanceCheck	0	0	0	0	0	0	0	0	0	0
Production Capacity (Million Liters)										
Number of Biorefineries	2	5	5	6	6	6	6	6	8	8
Nameplate Capacity	204	525	525	590	590	590	590	590	700	700
Capacity Use (%)	90.8%	73.1%	95.9%	94.3%	96.9%	99.8%	98.8%	89.8%	84.3%	97.9%
Feedstock Use for Fuel (1,000 MT)										
Crude Palm Oil	170	353	463	512	526	541	515	463	520	598
Used Cooking Oil	0	0	0	0	0	0	22	25	28	33
Market Penetration (Million Liters)										
Biodiesel, on-road use	180	385	502	556	575	584	585	528	589	689
Diesel, on-road use	5,909	6,084	6,547	6,745	6,879	7,056	7,389	7,626	7,860	8,109
Blend Rate (%)	3.0%	6.3%	7.7%	8.2%	8.4%	8.3%	7.9%	6.9%	7.5%	8.5%

Advanced Biofuels

There is no production of advanced biofuels in Colombia. Some universities have conducted research on advanced biofuels without relevant results.

Notes on Statistical Data

The source of production data for biofuels is FEDEBIOCOMBUSTIBLES, which receives information from the Colombian National Association of Sugar Producers (ASOCAÑA) for ethanol and the National Federation of Palm Oil Growers (FEDEPALMA) for palm oil and biodiesel. The Colombian Customs Authority (DIAN) and the National Department of Statics (DANE) are the primary source for trade data. Fuel consumption data is source by the MME's Unit of Mining and Energy Planning (UPME). Biofuels consumption (treated as a "residual") is used to balance supply and demand once production and trade is accounted for. Stocks are unknown and estimated by an average of 10-day fuel supply according to fuel regulations.