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Brazil

Biofuels Annual

Annual Report 2016

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Report Highlights

The Brazilian ethanol-use mandate remains unchanged at 27 percent (E27). Resolution # 92 from September 2015, from the Ministry of Development, Industry and Commerce (MDIC)/Chamber of Foreign Trade (CAMEX) extended the zero import tariff for ethanol through December 31, 2021. In March 2016, President Dilma Rousseff sanctioned law #13,263/2016, which increased the biodiesel-use mandate from seven percent (B7) to ten percent (B10) in 2019, as follows: eight percent (B8) in March 2017; nine percent (B9) in March 2018 and ten percent (B10) in March 2019. Total ethanol production for 2016 is estimated at 30.372 billion liters, similar to revised figure for 2015 (30.385 billion liters). Total ethanol exports for 2017 are forecast at 1.4 million liters, similar to 2016 (1.4 million). Fuel ethanol exports for 2016 are estimated at 750 million liters, mostly to the United States market. Biodiesel production remains regulated by the government. In 2016, total Brazilian biodiesel production is projected at 3.87 billion liters, down three percent compared to the revised estimate for 2015 (4.01 billion liters). The projections take into account the current recession of the Brazilian economy and the consequent decrease of diesel consumption, according to updated information released by the Petroleum, Natural Gas and Biofuels National Agency (ANP).

1. Executive Summary

The report includes the following sections: (1) Executive Summary; (2) Policy and Programs; (3) Gasoline and Diesel Use; (4) Ethanol; (5) Biodiesel; (6) Advanced Biofuels; (7) Notes on Statistical Data; (8) Exchange Rate.

1.1. Brazil's Geographic Division

The map below shows Brazil's division by regions and states.



2. Policy and Programs

For a historical perspective of the Brazilian Ethanol Program (Proalcool) and the National Biodiesel Production Program (PNPB) refer to [GAIN Report BR10006](#), the Brazil Biofuels Annual Report from 2010. (BR10006).

2.1. Government Support Programs for Ethanol

2.1.1. Regional Producer Subsidy

The "Regional Producer Subsidy" is the only direct subsidy paid by the government of Brazil (GOB). The program was created decades ago to provide sugarcane producers from the north-northeastern states support to balance their cost of production with that of the most developed growing areas in center-south Brazil. Throughout the years the GOB has tailored this subvention program to the evolving reality of the sugarcane industry. No subsidy has been paid to producers as of July 2015 due to the current economic recession in Brazil.

2.1.2. Ethanol Use Mandate

The ethanol-use mandate has been mandatory since 1977 when the legislation required a 4.5 percent blend of ethanol to gasoline. According to the legislation, the ethanol blend can vary from 18 to 27.5 percent and it is currently set at 27 percent (E27). The table below shows the historical ethanol-use mandate as of 2016.

Ethanol Use Mandate		
Year	Month	Mandate
2006	Jan-Feb	E25
	Mar-Oct	E20
	Nov-Dec	E23
2007	Jan-May	E23
	Jun-Dec	E25
2008	Jan-Dec	E25
2009	Jan-Dec	E25
2010	Jan	E25
	Feb-Apr	E20
	May-Dec	E25
2011	Jan-Sep	E25
	Oct-Dec	E20
2012	Jan-Dec	E20
2013	Jan-Apr	E20
	May-Dec	E25
2014	Jan-Dec	E25
2015	Jan - Mar 15th	E25
	Mar 16th - Dec	E27
2016	Jan-present	E27

2.1.3. Tax Incentives for Ethanol

A. Tax Incentives for Ethanol-flex Fuel Vehicles

Tax incentives have played an important role in supporting ethanol consumption since the introduction of flex-fuel cars. The table below shows the value of Tax on Industrialized Products (IPI), Contribution to the Social Integration Program/Contribution for Financing Social Security (PIS/COFINS) and state tax for circulation of goods and services (ICMS) for different categories of vehicles as reported by the National Association of Motor Vehicle Manufacturers (ANFAVEA). Note that IPI on flex cars has been lower compared to gasoline only powered vehicles. ANFAVEA reports that regardless of the engine power, the tax burden as a share of the suggested retail price is usually lower for flex-fuel than gasoline only powered vehicles.

Taxes Applied to Ethanol, Flex-Fuel and Gasoline Vehicles (Percentage)						
Year	Taxes	1000 cc	1001-2000 cc		Over 2000 cc	
		Gas 1/ /Eth/Flex	Gas 1/	Eth/Flex	Gas 1/	Eth/Flex
2004 to 2007	IPI	7	13	11	25	18
	ICMS	12	12	12	12	12
	PIS/COFINS	11.6	11.6	11.6	11.6	11.6
	% of Avg MSRP	27.1	30.4	29.2	36.4	33.1
2008	IPI	0	6.5	5.5	25	18
	ICMS	12	12	12	12	12
	PIS/COFINS	11.6	11.6	11.6	11.6	11.6
	% of Avg MSRP	22.2	26.4	25.8	36.4	33.1
2009	IPI	5/3*	11	7.5	25	18
	ICMS	12	12	12	12	12
	PIS/COFINS	11.6	11.6	11.6	11.6	11.6
	% of Avg MSRP	25.7/24.4*	29.2	27.1	36.4	33.1
January thru March 2010	IPI	7/3*	13	7.5	25	18
	ICMS	12	12	12	12	12
	PIS/COFINS	11.6	11.6	11.6	11.6	11.6
	% of Avg MSRP	27.1/24.4*	30	27.1	36.4	33.1
As of April 2010 and 2011	IPI	7	13	11	25	18
	ICMS	12	12	12	12	12
	PIS/COFINS	11.6	11.6	11.6	11.6	11.6
	% of Avg MSRP	27.1	30.4	29.2	36.4	33.1
May thru December 2012	IPI	0	6.5	5.5	25	18
	ICMS	12	12	12	12	12
	PIS/COFINS	11.6	11.6	11.6	11.6	11.6
	% of Avg MSRP	22.2	26.4	25.8	36.4	33.1
2013	IPI	2	8	7	25	18
	ICMS	12	12	12	12	12
	PIS/COFINS	11.6	11.6	11.6	11.6	11.6
	% of Avg MSRP	23.6	27.4	26.8	36.4	33.1
2014	IPI	3	10	9	25	18
	ICMS	12	12	12	12	12
	PIS/COFINS	11.6	11.6	11.6	11.6	11.6
	% of Avg MSRP	24.4	28.6	28	36.4	33.1
2015	IPI	7	13	11	25	18
	ICMS	12	12	12	12	12
	PIS/COFINS	11.6	11.6	11.6	11.6	11.6
	% of Avg MSRP	27.1	30.4	29.2	36.4	33.1

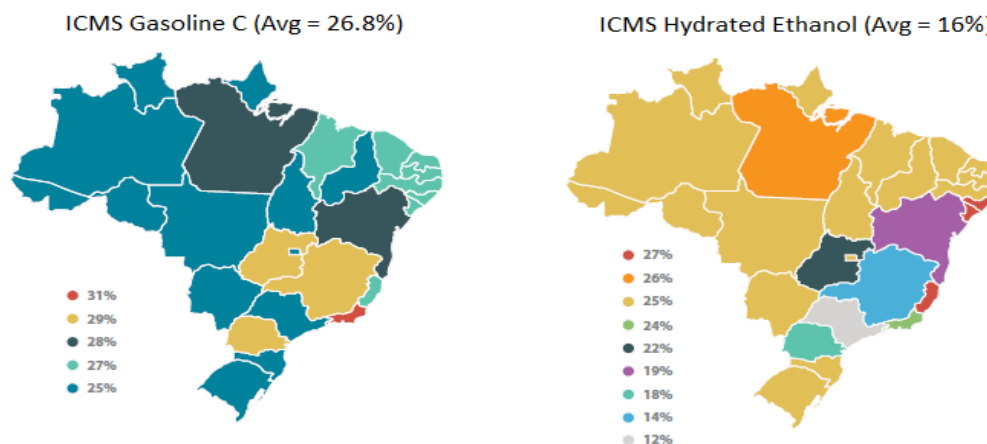
Source: National Association of Motor Vehicle Manufacturers (ANFAVEA)

1/ Gas = Gasoline. *The tax of 3% refers to flex fuel cars MSRP = Manufacturer Suggested Retail Price.
The aggregation of the individual taxes does not necessarily add up to the percentage of the Average

B. Tax Incentives for Ethanol Fuel

The GOB has a complex tax system including several taxes at the federal, state, and municipal level. Depending on the economic and financial strategies pursued by policymakers, GOB can provide incentives for gasoline and/or ethanol at the pump. Currently, GOB provides preferential treatment for ethanol compared to gasoline under both its Contribution for Intervention in Economic Domain (CIDE) and Contribution to the Social Integration Program/Contribution for Financing Social Security (PIS/COFINS) programs. In addition, governments from several Brazilian states provide differential treatment for ethanol by using different state taxes for circulation of goods and services (ICMS) percentages for ethanol and gasoline.

1. Contribution for Intervention in Economic Domain (CIDE): No changes have been made on CIDE for ethanol and gasoline since 2015 – see BR15006 for latest information on CIDE.
2. Contribution to the Social Integration Program (PIS) and Contribution for Financing Social Security (COFINS): No changes have been made on PIS/COFINS for ethanol and gasoline since 2015 – see BR15006 for latest information on CIDE.
3. Tax for Circulation of Goods and Services (ICMS): ICMS is a state tax varying from state to state. The payment of ICMS is also related to different tax regimes depending on the state. ICMS charged on ethanol varies from 12 to 27 percent. ICMS for gasoline varies from 25 to 31 percent. The figures below show the ICMS set by each Brazilian state for 2015, according to the Fuels Industry Syndicate (Sindicom). Note that the states of Minas Gerais, Bahia, Parana and Mato Grosso do Sul made changes to the ICMS applied to gasoline and/or hydrated ethanol during 2015.



Source: SID/COM

2.1.4. Credit Lines

The National Bank for Social and Economic Development (BNDES) provides specific credit lines for the sugar, ethanol, and bioenergy industries to fund investments on sugarcane production, expansion of industrial capacity for sugar and ethanol, cogeneration, logistics, and multimodal transportation. Total financing for the industry in 2015 was R\$ 2.74 billion, down 60 percent from 2014 (R\$ 6.8 billion) due to financial constraints faced by the Brazilian government.

In May 2016, the Ministry of Agriculture, Livestock and Supply announced the Brazilian Agricultural Crop and Livestock Plan for 2016/17. A total of R\$ 185 billion will be released to fund agricultural and livestock programs including Prorenova for sugar and PASS for ethanol. This represents a 1 percent reduction over the previous crop plan.

Prorenova is a credit line to finance the renewal and/or expansion of sugarcane fields. A total of R\$ 1.5 billion should be available to finance the program. The annual interest rate is comprised at 75 percent of the “long term interest rate” (TJLP) plus 25 percent of the Brazilian Central Bank (BACEN) basic interest rate (SELIC). The payment is due within 96 months and there is an 18-month grace period. The amount of credit per beneficiary has not yet been decided, and the GOB has not yet given an indication when it will be determined.

The ethanol stock program also known as BNDES PASS program should release a total credit of R\$ 2 billion. The interest rate has not been set yet. The payment is due within 270 days.

2.1.5. Ethanol Import Tariff

According to the Mercosul (Common Southern Market) agreement, the import tariff for ethanol is 20 percent, however, since April 2010, the product has been included in Brazil’s “list of exceptions” and the import tariff has been cut to zero.

Resolution # 92 (September 24th, 2015), (www.camex.gov.br/legislacao/interna/id/1455) of the Ministry of Development, Industry and Commerce (MDIC)/Chamber of Foreign Trade (CAMEX) postponed the zero import tariff for ethanol through December 31, 2021.

2.2. Government Support Programs for Biodiesel

2.2.1. Biodiesel Use Mandate

The National Biodiesel Production Program (PNPB) was created in 2004 to promote domestic biodiesel production, to reduce petroleum import dependency, and to lower pollutant emissions and health related costs. In addition, PNPB was established to generate jobs and income and alleviate regional economic disparities by passing on benefits to family farmers, especially those in North and Northeast Brazil.

Federal Law #11.097/2005 (http://www.planalto.gov.br/ccivil_03/ato2004-2006/2005/Lei/L11097.htm) defined and established a legal mandate for use of biodiesel as a fuel. The biodiesel-use mandate was initially set at two percent in 2008 and later raised to higher percentages to accommodate the growing biodiesel production.

Resolution #3 (September 21, 2015) from the National Energy Policy Council (CNPE), http://www.mme.gov.br/documents/10584/2431527/Resolu%C3%A7%C3%A3o_3_CNPE_Biodiesel.pdf/d7480b33-c6b4-45fe-a20b-19b0e23f3293) which came in effect in January 2016, authorizes voluntary biodiesel blends above the B7 mandate for several heavy duty fleets like long haul trucks, buses, rail transportation and agricultural machinery. However, if requested by the end

users, the Ministry of Mines and Energy will have the authority not only to authorize but also set the actual voluntary blend to be used by the fleet.

On March 23, 2016, President Dilma Rousseff sanctioned Law #13.263/2016 (http://www.planalto.gov.br/ccivil_03/ Ato2015-2018/2016/Lei/L13263.htm) previously approved by both houses of Congress. The bill increases the biodiesel-use mandate gradually from seven percent (B7) to ten percent (B10) by 2019, as follows:

- Eight percent (B8) in March 2017;
- Nine percent (B9) in March 2018;
- Ten percent (B10) in March 2019.

Bill # 3.834/2015 also instructs the National Council for Energy Policy to conduct tests over the next 36 months in diesel engines to check the feasibility for a fifteen percent blend (B15). If results are positive, the fifteen percent (B15) biodiesel-use mandate could be an option in the near future.

2.2.2. Biodiesel Import Tariff

According to the Secretariat of Foreign Trade, the import tariff applied to biodiesel (NCM 3826.00.00) is fixed at 14 percent.

2.2.3 Tax Incentives

The GOB sets federal tax exemptions and incentives, according to the nature of the raw material, size of producer and region of production, in order to encourage the production of biodiesel and to promote social inclusion. In February 2013, the GOB set the incentives as follows:

Federal Taxes for Biodiesel and Mineral Diesel (R\$/m3)					
	Biodiesel B100				Diesel
Producer Type	Family Agriculture (PRONAF)		All Other Producers		
Region	North, Northeast & Semi-Arid Zones	All Other Regions	North, Northeast & Semi-Arid Zones	All Others	
Feedstock	Any	Palm Oil or Castor Oil	Palm Oil or Castor Oil		
PIS/PASEP	0.00	10.39	22.48	26.41	53.08 - 44.17
COFINS	0.00	47.85	103.51	121.59	244.92 - 203.83

Source: Brazilian Government, July 2016.

3. Gasoline and Diesel Use

Fuel consumption in Brazil, as reported by the Petroleum, Natural Gas and Biofuels National Agency (ANP), follows.

Brazilian Fuel Consumption Matrix (000 m3)						
	2011	2012	2013	2014	2015	2016 1/
Diesel *	52,264	55,900	58,572	60,032	57,211	26,666
Gasoline C**	35,491	39,698	41,426	44,364	41,137	20,889
Hydrated Ethanol	10,899	9,850	11,755	12,994	17,863	7,222
Source: ANP. * Diesel includes Bx Biodiesel as of 2008. ** Gasoline C includes 18-27.5% of anhydrous ethanol. 1/ 2016 refers to January-June.						

As reported by ANP, gasoline consumption for January-June 2016 is 20.89 billion liters, similar to the same period in 2015 (20.44 billion liters). Hydrated ethanol prices have become not competitive with gasoline, resulting in additional gasoline consumption. Diesel consumption during January-June 2016 is 26.66 billion liters, down five percent compared to the same period in 2015 as a consequence of the current economic recession Brazil is experiencing.

The tables below show fuel use history and projections. Sales by fuel distributors as informed by ANP for 2015 and January-June 2016 are used as the baseline for ATO/Sao Paulo projections, which also assumed a -3.3 percent growth for the Brazilian Gross Domestic Production (GDP) for 2016 and a modest 1 percent growth for the 2017 GDP, as projected by the Brazilian Central Bank (BACEN) and the majority of the financial institutions. Diesel use breakdown is reported by Fuels Industry Syndicate (SINDICOM) based on figures provided by ANP. No diesel breakdown is available before 2014.

Projections as of 2018 were based on the "Ten-Year Plan for Energy Expansion – 2024" conducted by the Minister of Mines and Energy, Energy Research Enterprise (MME/EPE) and released in January 2016. Figures from the MME/EPE study were adjusted to reflect updated statistics. Diesel use projections take into account the economic scenario, all means of transportation using diesel and more specifically the size of the fleets, specific consumption, average mileage/year, occupancy factor, number of passengers/mileage, tonnage/mileage, etc. Diesel breakdown is based on the share by type of use reported in 2014 and 2015. Note that diesel use is strongly correlated with GDP growth.

Gasoline use projections take into account the economic scenario, number of automobile licensed for use, domestic ethanol supply, gasoline price in the domestic market; consumers choice between gasoline and ethanol; evolution of the vehicle efficiency; the ethanol blend to gasoline, among others. Note that gasoline consumption is strongly correlated with household consumption.

Fuel Use History (Million Liters)											
Calendar Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Gasoline Total	23,553	24,008	24,325	25,175	25,409	29,844	35,491	39,698	41,426	44,364	41,137
Diesel Total	39,167	39,008	41,558	44,764	44,298	49,239	52,264	55,900	58,572	60,032	57,211
On-road	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	43,283	41,813
Agriculture	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	720	687
Construction & Mining	n/a	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	n/a
Industry	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	4,863	4,405
Heating	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	3,062	2,918
Jet Fuel Total	4,429	4,466	4,891	5,227	5,428	6,250	6,955	7,292	7,225	7,470	7,355

Total Fuel Markets	67,1 50	67,4 82	70,7 74	75,1 66	75,1 36	85,3 33	94,7 11	102,8 90	107,2 24	111,8 66	105,7 03
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Fuel Use Projections (Million Liters)											
Calendar Year	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Gasoline Total	41,77 7	42,19 5	43,11 1	44,02 7	45,29 6	46,56 5	47,83 4	49,10 3	50,37 3	51,64 2	52,91 1
Diesel Total	54,36 4	54,90 8	56,00 6	57,40 6	59,12 8	60,90 2	62,72 9	64,61 1	66,54 9	68,54 6	70,60 2
On-road	39,41 4	39,80 8	40,60 4	41,61 9	42,86 8	44,15 4	45,47 9	46,84 3	48,24 8	49,69 6	51,18 7
Agriculture	652	659	672	689	710	731	753	775	799	823	847
Construct & Mining	n/a	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	n/a
Industry	4,349	4,393	4,480	4,592	4,730	4,872	5,018	5,169	5,324	5,484	5,648
Heating	2,773	2,800	2,856	2,928	3,016	3,106	3,199	3,295	3,394	3,496	3,601
Jet Fuel Total	6,823	6,890	7,028	7,203	7,420	7,642	7,871	8,108	8,351	8,601	8,859
Total Fuel Markets	102,96 4	103,99 3	106,14 5	108,63 7	111,84 4	115,10 9	118,43 5	121,82 2	125,27 3	128,78 9	132,37 3

4. Ethanol

4.1. Brazilian Ethanol Production, Supply and Demand (PS&D) Tables

Ethanol is an alcohol made by fermenting sugar components of plant materials such as corn and wheat starch, sugarcane, sugar beet, sorghum, and cassava. Sugarcane is virtually the sole source of feedstock for ethanol production in Brazil. The table below shows the Brazilian ethanol supply and demand (PS&D) spreadsheet for Ethanol Used as Fuel and Other Industrial Chemicals, excluding ethanol for beverages for calendar years 2008 through 2017. For more information on these tables, see Notes on Statistical Data – Ethanol (Section 7.1.).

ATO/Sao Paulo historically reported all figures related to the sugar-ethanol industry in marketing years (MY) and made necessary adjustments to convert from marketing to calendar years. The official Brazil marketing year for sugarcane, sugar and ethanol production as determined by the Brazilian government is April-March for the center-south producing states, although sugarcane crushing has started as early as late March in past years. The official marketing year for the north-northeast is September-August.

No Brazilian government entity or trade source maintains production figures on use “for fuel” or “other uses.” All ethanol production figures are reported solely as hydrous and anhydrous volumes. According to ATO/Sao Paulo contacts, ethanol plants produce different specifications of hydrous and/or anhydrous, but make no distinction between fuel and other uses. The actual use for fuels and other uses (industrial, refined, or neutral) are determined at end-use.

Ethanol Used as Fuel, Other Industrial Chemicals (Million Liters)										
Calendar Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Beginning Stocks	4,82 9	5,78 3	4,04 8	5,91 6	6,89 1	7,09 4	8,19 5	9,36 7	7,45 2	9,55 1

Fuel Begin Stocks	4,46 8	5,42 2	3,68 3	5,54 9	6,48 8	6,69 0	7,79 0	8,91 3	6,98 5	9,06 4
Production	27,14 0	26,10 5	27,96 5	22,89 3	23,50 9	27,64 2	28,55 3	30,38 5	30,37 2	30,14 8
Fuel Production	23,58 2	22,20 1	24,51 6	20,21 2	20,73 9	24,37 7	25,58 5	27,55 2	28,02 2	27,77 8
>of which is cellulosic	0	0	0	0	0	0	0	2	6	8
Imports	0	4	76	1,136	554	132	452	513	550	550
Fuel Imports	0	0	74	1,100	553	131	403	500	530	530
Exports	5,124	3,296	1,906	1,964	3,055	2,917	1,398	1,867	1,400	1,400
Fuel Exports	3,044	1,118	562	1,083	2,500	1,952	780	1,184	750	750
Consumption	21,06 2	24,54 8	24,26 7	21,09 0	20,80 5	23,75 6	26,43 5	30,94 6	27,42 3	27,70 0
Fuel Consumption	19,58 4	22,82 3	22,16 2	19,29 0	18,59 0	21,45 6	24,08 5	28,79 6	25,72 3	25,98 0
Ending Stocks	5,783	4,048	5,916	6,891	7,094	8,195	9,367	7,452	9,551	11,14 9
Fuel Ending Stocks	5,422	3,683	5,549	6,488	6,690	7,790	8,913	6,985	9,064	10,64 2
Total Balance Check	0	0	0	0	0	0	0	0	0	0
Fuel Balance Check	0	0	0	0	0	0	0	0	0	0
Production Capacity, First Generation Ethanol										
Number of Refineries	407	426	430	418	408	399	383	382	383	383
Nameplate Capacity	38,30 0	35,60 0	41,36 0	42,80 0	41,60 0	40,70 0	37,96 0	38,00 0	39,65 0	39,65 0
Capacity Use (%)	71	73	68	53	57	68	75	80	77	76
Production Capacity, Cellulosic Ethanol										
Number of Refineries	0	0	0	0	0	0	1	3	3	3
Nameplate Capacity	0	0	0	0	0	0	82	127	127	127
Capacity Use (%)	0	0	0	0	0	0	0	2	5	6
Co-product Production for All Ethanol (1,000 MT)										
Bagasse	113,0 85	108,7 71	116,5 19	95,38 8	97,95 4	115,1 75	118,9 71	126,0 08	125,9 42	125,0 00
Feedstock Use (1,000 MT)										
Sugarcane	339,2 55	326,3 14	349,5 57	286,1 63	293,8 63	345,5 25	356,9 13	378,0 25	377,8 25	375,0 00
Bagasse from Sugarcane for Cellulosic Ethanol for Fuel Only	0	0	0	0	0	0	0	0.011	0.033	0.044
Corn	0	0	0	0	0	0	0	343,9 02	341,4 63	341,4 63
Market Penetration (Million Liters)										
Fuel Ethanol	19,58 4	22,82 3	22,16 2	19,29 0	18,59 0	21,45 6	24,08 5	28,79 6	25,72 3	25,98 0

Hydrous	13,290	16,471	15,074	10,899	10,650	11,755	12,994	17,862	14,443	14,587
Anhydrous	6,294	6,352	7,088	8,391	7,940	9,701	11,091	10,934	11,280	11,393
Gasoline (incl. ethanol)	25,175	25,409	29,844	35,491	39,698	41,426	44,364	41,137	41,777	42,195
Blend Rate Anhydrous	25.0%	25.0%	23.7%	23.6%	20.0%	23.4%	25.0%	26.6%	27.0%	27.0%
Blend Rate Overall	77.8%	89.8%	74.3%	54.4%	46.8%	51.8%	54.3%	70.0%	61.6%	61.6%

4.2. Production

A. Production Estimates

ATO/Sao Paulo projections are based on industry sources. To be in accordance with the actual feedstock production cycle, the following narrative describes sugarcane and ethanol production in marketing years. ATO/Sao Paulo estimates the MY (April-March) 2016/17 Brazilian sugarcane crushing ranges between 670 and 680 million MT, up one percent compared to MY 2015/16 (667 million MT). The center-south region is expected to harvest 620-625 million MT of sugarcane, similar to previous season (618 million MT), due to a marginal increase in yields. Post projects north-northeast production for MY 2016/17 at 50-55 million MT, a one to six million MT increase compared to MY 2015/16, due to better weather conditions. See [GAIN Report BR16003](#) for further information about the sugarcane crop.

Total ethanol production for 2016 is estimated at 30.372 billion liters, similar to revised figure for 2015 (30.385 billion liters). Total ethanol for fuels production is estimated at 28.022 billion liters, up two percent from the previous calendar year.

Sugar-ethanol mills are expected to divert less sugarcane to ethanol production in the current crop – approximately 55 percent of the sugarcane volume as opposed to 59 percent in 2015/16, due to favorable sugar prices in the international and domestic markets favored by the world deficit in sugar supply.

It is early to predict MY 2017/18 production. More accurate numbers should be available in the first quarter of 2017 with the development of feedstock from new sugarcane plantings and recovery from current harvested areas; in other words, sugarcane from second, third, fourth, fifth and older cuts; as well as projections for sugar and ethanol demand in both the domestic and international markets.

Current production forecast is based on the assumption that regular weather conditions will prevail throughout the sugarcane production cycle in all producing regions, lower than average pace of sugarcane field renewals and that the world deficit in sugar supply will remain in 2017.

Post projects sugarcane production for MY 2017/18 stable at 680 million MT. ATO/Sao Paulo projects 2017 total ethanol production at 30.148 billion liters, down 1 percent from 2016. Ethanol for fuel production is forecast at 27.778 billion liters for 2017, a 1 percent drop over 2016.

Total cellulosic ethanol production for 2016 is forecast at 6 million liters from sugarcane bagasse, which represents an insignificant fraction of total ethanol production in Brazil. Total ethanol production from corn for 2016 is projected at 140 million liters, or 0.4 percent of total ethanol projected production. Post contacts expect production should come from a few plants in the states of Goias and Mato Grosso.

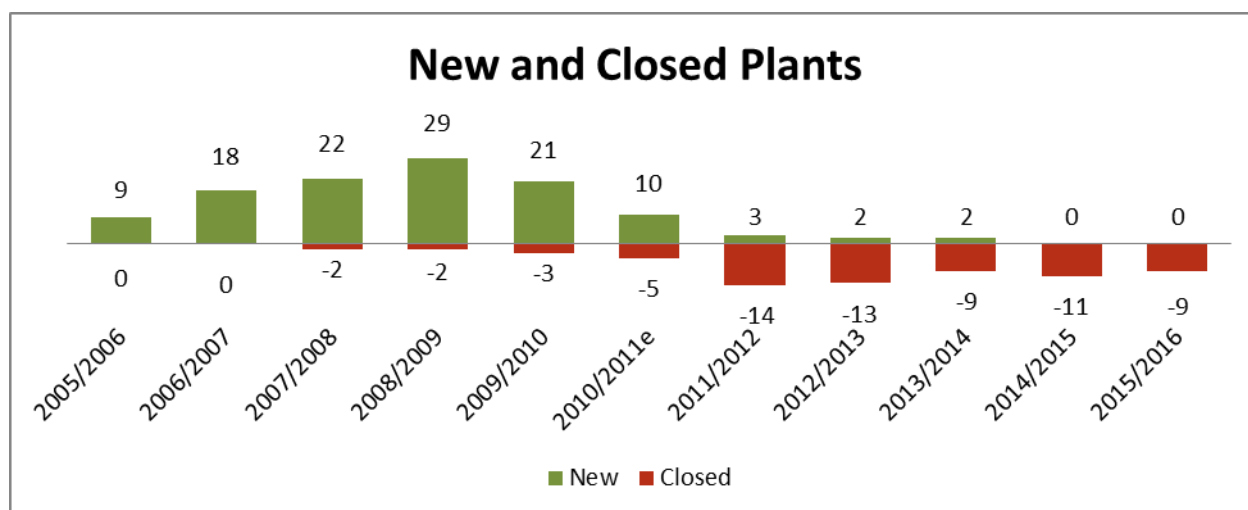
B. Industrial Capacity

Hydrated ethanol production capacity for 2016 is estimated at 39.65 billion liters, up 1.65 billion liters from 2015. This figure reflects the authorized hydrated ethanol production capacity of 214,470 m³/day as reported by ANP and an average of 185 crushing days.

Ethanol installed industrial capacity depends on annual decisions made by individual plants to produce sugar and/or ethanol. Post contacts report that the industry responds to the theoretical ratio of 40:60 to switch between sugar to ethanol production or vice versa from harvest to harvest. Once producing units adjust their plants to produce a set ratio of sugar/ethanol in a given year, there is much less flexibility to change it during the crushing season.

C. New Investments/Shut Down of Ethanol Plants

The total number of sugar-ethanol mills in 2016 is estimated at 383 units, according to updated information from ANP. The graphs below show revised data for the evolution of new and closed ethanol and sugar-ethanol plants since MY 2005/06 as reported by UNICA.



D. Sugarcane and Ethanol Cost of Production and Prices Received by Producers

According to industry sources, sugarcane represents between 60 to 70 percent of the cost of producing ethanol. Sugarcane prices received by third party suppliers for major producing states are based on a formula that takes into account prices for sugar and ethanol prices both in the domestic and international markets. The State of Sao Paulo Sugarcane, Sugar and Ethanol Growers Council (CONSECANA) was the first to develop this formula for the state of São Paulo, the major producing state comprising roughly 60 percent of the center-south production.

Cumulative CONSECANA price (March-June 2016) for the state of Sao Paulo for the 2016/17 crop was R\$0.5926 per kg of TRS or approximately R\$73.24 per ton of sugarcane. Note that CONSECANA's prices are based on both sugar and ethanol prices in domestic and international markets.

The Ethanol Indexes released by the University of Sao Paulo's College of Agriculture "Luiz de Queiroz" (ESALQ) follow. The indexes track anhydrous and hydrous ethanol for fuel prices received by producers in the domestic spot market.

Price for Fuel Anhydrous Ethanol - State of São Paulo (R\$/000 liters).					
Period	2012	2013	2014	2015	2016
January	1270.30	1302.50	1456.10	1458.20	1,996.70
February	1184.60	1352.70	1520.50	1552.50	2,083.00
March	1278.80	1374.50	1610.20	1420.40	2,113.70
April	1259.70	1394.80	1522.00	1401.50	1,602.40
May	1294.30	1329.10	1366.40	1363.10	1,536.44
June	1234.00	1285.20	1359.20	1352.40	--
July	1232.50	1271.20	1373.90	1328.80	--
August	1198.70	1227.30	1346.00	1300.70	--
September	1198.90	1277.10	1362.40	1358.30	--
October	1140.00	1315.40	1290.00	1658.30	--
November	1234.90	1342.80	1329.90	1870.40	--
December	1287.20	1440.00	1407.10	1888.10	--
Source: USP/ESALQ/CEPEA.					

Price for Fuel Hydrated Ethanol - State of São Paulo (R\$/000 liters).					
Period	2012	2013	2014	2015	2016
January	1159.00	1144.60	1284.80	1325.60	1,824.40
February	1119.80	1232.00	1368.60	1384.70	1,916.40
March	1204.40	1226.40	1419.50	1261.30	1,906.60
April	1191.40	1244.30	1338.50	1261.60	1,396.60
May	1140.10	1110.20	1200.90	1226.50	1,391.00
June	1082.80	1140.20	1214.90	1216.20	--
July	1059.90	1114.50	1229.10	1199.00	--
August	1041.70	1088.60	1207.00	1175.50	--
September	1062.40	1148.50	1200.60	1273.40	--
October	1010.60	1164.00	1138.30	1528.80	--
November	1095.90	1204.70	1218.20	1709.00	--
December	1132.50	1281.10	1265.50	1704.60	--
Source: USP/ESALQ/CEPEA.					

4.3. Consumption

Total domestic demand for ethanol for calendar year 2017 is forecast at 27.7 billion liters, up 277 million liters relative to the revised figure for 2016 (27.423 billion liters), based on the current recession in the economy and expected negative growth of Brazilian GDP for 2016 and marginal GDP growth for 2017.

Brazil is an important user of ethanol for fuel consumption. Total ethanol consumption for use as fuel is estimated at 25.723 billion liters for 2016, down 3.07 billion liters compared to the previous year due the current recession in the economy and expected negative growth of Brazilian GDP for 2016.

Consumer decisions are driven by the ratio between ethanol and gasoline prices. The 70 percent ratio between ethanol and gasoline prices is the rule of thumb in determining whether flex car owners will choose to fill up with ethanol (price ratio below 70 percent) or gasoline (price ratio above 70 percent).

The tables below show ethanol and gasoline prices as well as the price ratio for selected states, cities, and months. Note that the 2016 harvest season started in April and the price ratio between ethanol and gasoline was favorable for gasoline in the majority of the selected areas even before the beginning of the crushing.

Gasoline and Ethanol Prices in Selected States (average price, R\$/liter)									
		Gasoline				Ethanol			
		2013	2014	2015	2016	2013	2014	2015	2016
Sao Paulo State	Jan	2.644	2.835	2.918	3.520	1.829	1.909	1.935	2.601
	Feb	2.767	2.837	3.150	3.544	1.875	1.946	2.101	2.682
	Jun	2.726	2.868	3.128	3.464	1.787	1.902	1.969	2.271
	Aug	2.705	2.856	3.095		1.741	1.874	1.897	
Sao Paulo City	Jan	2.628	2.803	2.878	3.486	1.818	1.903	1.914	2.588
	Feb	2.739	2.800	3.100	3.507	1.869	1.935	2.069	2.658
	Jun	2.699	2.835	3.074	3.414	1.751	1.869	1.935	2.245
	Aug	2.674	2.674	3.042		1.718	1.841	1.862	
Minas Gerais	Jan	2.824	2.976	3.025	3.707	2.095	2.134	2.198	2.781
	Feb	2.923	2.963	3.304	3.741	2.125	2.149	2.363	2.907
	Jun	2.903	2.952	3.366	3.683	2.105	2.210	2.232	2.522
	Aug	2.875	2.969	3.340		2.035	2.173	2.152	
Belo Horizonte (MG Capital)	Jan	2.740	2.859	2.902	3.571	2.083	2.098	2.135	2.704
	Feb	2.824	2.847	3.225	3.616	2.106	2.110	2.312	2.884
	Jun	2.782	2.851	3.296	3.555	2.065	2.155	2.244	2.457
	Aug	2.732	2.846	3.245		1.947	2.115	2.098	
Rio Janeiro State	Jan	2.898	3.082	3.214	3.869	2.243	2.352	2.500	3.242
	Feb	3.002	3.085	3.453	3.899	2.268	2.378	2.662	3.363
	Jun	3.005	3.132	3.516	3.907	2.303	2.468	2.649	3.071
	Aug	2.994	3.128	3.516		2.257	2.454	2.635	
Rio Janeiro Capital	Jan	2.866	3.052	3.187	3.849	2.231	2.340	2.485	3.233
	Feb	2.967	3.056	3.433	3.880	2.251	2.372	2.661	3.372
	Jun	2.974	3.109	3.490	3.898	2.280	2.451	2.624	3.060
	Aug	2.959	3.098	3.497		2.231	2.430	2.618	
Porto Alegre (RS Capital)	Jan	2.695	2.897	2.967	3.963	2.316	2.387	2.389	3.501
	Feb	2.847	2.882	3.297	3.959	2.336	2.396	2.586	3.586
	Jun	2.751	2.884	3.289	3.810	2.396	2.384	2.491	3.352
	Aug	2.760	2.872	3.316		2.387	2.337	2.487	
Goiania (GO Capital)	Jan	2.743	3.136	3.220	3.650	1.937	2.225	2.181	2.629
	Feb	2.836	3.111	3.431	3.384	1.951	2.175	2.339	2.837
	Jun	2.794	3.085	3.170	3.782	1.849	2.100	1.974	2.659
	Aug	2.784	3.134	3.224		1.811	2.166	2.043	

Fortaleza (CE Capital)	Jan	2.675	2.891	3.151	3.876	2.220	2.335	2.572	3.073
	Feb	2.850	2.879	3.347	3.867	2.280	2.342	2.601	3.091
	Jun	2.856	2.952	3.370	3.968	2.337	2.471	2.609	3.274
	Aug	2.780	2.984	3.369		2.332	2.491	2.608	

Source: Petroleum, Natural Gas and Biofuels National Agency (ANP).

Ratio Ethanol/Gasoline Prices					
		2013	2014	2015	2016
Sao Paulo State	Jan	69%	67%	66%	74%
	Feb	68%	69%	67%	76%
	Jun	66%	66%	63%	66%
	Aug	64%	66%	61%	
Sao Paulo City	Jan	69%	68%	67%	74%
	Feb	68%	69%	67%	76%
	Jun	65%	66%	63%	66%
	Aug	64%	69%	72%	
Minas Gerais	Jan	74%	72%	73%	75%
	Feb	73%	73%	72%	78%
	Jun	73%	75%	66%	68%
	Aug	71%	73%	64%	
Belo Horizonte (MG Capital)	Jan	76%	73%	74%	76%
	Feb	75%	74%	72%	80%
	Jun	74%	76%	68%	69%
	Aug	71%	74%	65%	
Rio Janeiro State	Jan	77%	76%	78%	84%
	Feb	76%	77%	77%	86%
	Jun	77%	79%	75%	79%
	Aug	75%	78%	75%	
Rio Janeiro Capital	Jan	78%	77%	78%	84%
	Feb	76%	78%	78%	87%
	Jun	77%	79%	75%	79%
	Aug	75%	78%	75%	
Porto Alegre (RS Capital)	Jan	86%	82%	81%	88%
	Feb	82%	83%	78%	91%
	Jun	87%	83%	76%	88%
	Aug	86%	81%	75%	
Goiania (GO Capital)	Jan	71%	71%	68%	72%
	Feb	69%	70%	68%	84%
	Jun	66%	68%	62%	70%
	Aug	65%	69%	63%	
Fortaleza (CE Capital)	Jan	83%	81%	82%	79%
	Feb	80%	81%	78%	80%
	Jun	82%	84%	77%	83%
	Aug	84%	83%	77%	

Source: Petroleum, Natural Gas and Biofuels National Agency (ANP).

Gray Area means gasoline prices more attractive than ethanol

The size of the Brazilian light vehicle fleet also plays a role in encouraging ethanol consumption. The fleet is estimated at 35.3 million units in July 2016 and pure hydrous ethanol and flex fuel powered vehicles together represent approximately 72 percent (25.58 million units) of the total fleet.

The table below shows the licensing of flex fuel vehicles (FFV) and hydrous ethanol powered cars, as reported by the Brazilian Association of Vehicle Manufacturers (ANFAVEA). Sales of FFV currently represent over 90 percent of total monthly vehicle sales. The slowdown of the Brazilian economy in 2016 has sharply affected the purchasing of new flex-fuel cars.

Licensing of Ethanol Powered Vehicles (pure ethanol & flex fuel units)						
2010	2011	2012	2013	2014	2015	2016 1/
2,876,173	2,848,071	3,162,824	3,169,111	2,940,508	2,194,020	837,793
Source: National Association of Vehicle Manufacturers (ANFAVEA) 1/ January-June						

4.4. Trade

A. Exports

Brazilian total ethanol exports for 2017 are forecast at 1.4 million liters, similar to 2016 (1.4 million). Fuel ethanol exports for 2016 are estimated at 750 million liters, mostly to the United States. The tables below show ethanol exports (NCM 2207.10 through 2207.20.19) for 2015 and 2016 (January-June), as reported by the Brazilian Secretariat of Foreign Trade (SECEX).

Brazilian Ethanol Exports (NCM 2207.10, 2207.20.11 & 2207.20.19, MT, 000 Liters, US\$ 1,000 FOB)						
	CY 2015			CY 2016 1/		
Country	Volume	Weight	Value	Volume	Weight	Value
United States	925,801	732,292	451,034	447,893	353,998	231,503
South Korea	464,771	375,450	213,459	384,300	310,436	174,030
Japan	48,914	38,609	26,183	58,225	46,050	29,948
Netherlands	63,560	50,909	27,945	46,825	37,826	20,617
India	91,547	74,046	36,392	44,356	35,868	15,535
China	120,255	95,417	54,212	35,320	28,092	16,115
Nigeria	46,370	37,475	19,908	22,375	18,097	8,871
Turkey	19,317	15,557	9,026	12,859	10,348	6,157
United Kingdom	15,998	12,635	7,940	8,145	6,429	3,946
Angola	4,879	3,819	3,386	5,875	4,707	3,133
Other	65,786	53,200	30,990	17,250	13,999	10,237
Total	1,867,199	1,489,408	880,475	1,083,423	865,849	520,091
Source : Brazilian Foreign Trade Secretariat (SECEX)						
Note: Numbers may not add due to rounding 1/January-June.						

B. Imports

Brazilian total ethanol imports for 2017 are projected at 550 million liters, similar to 2016, almost exclusively for fuel use. The majority of imports come from the United States. The tables below show ethanol imports (NCM 2207.10 through 2207.20.19) for 2015 and 2016 (January-June), as reported by the Brazilian Secretariat of Foreign Trade (SECEX).

Brazilian Ethanol Imports (NCM 2207.10, 2207.20.11 & 2207.20.19, MT, 000 Liters, US\$ 1,000 FOB)						
	CY 2015			CY 2016 1/		
Country	Volume	Weight	Value	Volume	Weight	Value
United States	495,140	406,863	253,623	298,856	235,920	129,852
Paraguay	4,070	3,221	1,917	2,000	1,583	898
Jamaica	313	270	1,057	71	71	260
Germany	23	33	229	17	29	183
Mexico	7	7	60	6	4	36
France	4	8	67	4	5	32
Trinidad and Tobago	25	20	29	25	20	29
Barbados	25	20	28	23	24	28
Poland	47	39	61	26	21	24
Spain	4	3	14	1	3	12
Others	13,224	10,435	7,006	0	0	4
Total	512,881	420,920	264,091	301,028	237,679	131,357
Source : Brazilian Foreign Trade Secretariat (SECEX)						
Note : Numbers may not add due to rounding 1/January - June						

4.5. Ending Stocks

Beginning stocks for ethanol for Ethanol Used as Fuel and Other Industrial Chemicals, excluding ethanol for beverages are based on information from MAPA and reflect all stocks at ethanol plants on January 1, 2006. Beginning stocks for ethanol "For Fuel Only" are estimated based on historical average use of bioethanol for fuel/other uses.

On average, ethanol for fuel has represented 87 percent of total ethanol disappearance (consumption and exports), therefore Post assumed this percentage to calculate the theoretical beginning stocks for fuel in January 1, 2006. All other stock figures were calculated based on the difference between total supply and disappearance.

ATO/Sao Paulo projects ending stocks for fuel ethanol at 10.642 billion liters for 2017, up 1.578 billion liters from 2016. Ending stocks measured on December 31 of each year do not actually reflect the supply and demand balance. In general, ethanol plants in the center-south are nearing the end of the crushing season, while ethanol plants in the northeast are fully operating. As a result, stock levels are expected to be high.

Stock figures measured on April 1, after subtracting the disappearance (consumption and exports) during the first quarter of the year, will likely show a more realistic picture about product availability in the beginning of the new crop season (April).

5. Biodiesel

Biodiesel is a trans-esterified vegetable oil also known as fatty acid methyl ester produced from soy oil, cottonseed oil, rapeseed, oil, other vegetable oils, animal fats, and recycled cooking oils.

5.1. Brazilian Biodiesel Production, Supply and Demand (PS&D) Table

The table below shows Brazil's biodiesel supply and demand (PS&D) table for calendar years (CY) 2008 through 2017.

Biodiesel (Million Liters)										
Calendar Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Beginning Stocks	45	90	135	60	132	54	42	52	46	111
Production	1,167	1,608	2,386	2,673	2,717	2,955	3,460	4,010	3,870	4,400
Imports	5	4	9	18	0	0	0	0	0	0
Exports	1	3	8	6	0	39	40	12	0	20
Consumption	1,125	1,565	2,462	2,613	2,795	2,928	3,410	4,004	3,805	4,301
Ending Stocks	90	135	60	132	54	42	52	46	111	190
Balance Check	0	0	0	0	0	0	0	0	0	0
Production Capacity										
Number of Biorefineries	62	63	66	65	65	64	58	57	51	53
Nameplate Capacity	3,600	4,350	5,837	6,742	7,400	7,900	7,722	7,860	7,191	8,097
Capacity Use (%)	32.4	37.0	40.9	39.6	36.7	37.4	44.8	51.0	53.8	54.3
Feedstock Use for Fuel (1,000 MT)										
Soyoil, crude	720	1,124	1,762	1,934	1,834	1,925	2,293	2,730	2,712	3,084
Animal Fat	198	247	317	352	461	586	702	724	668	759
Market Penetration (Million Liters)										
Biodiesel, on-road use	n/a	n/a	n/a	n/a	n/a	n/a	2,458	2,927	2,759	3,117
Diesel, on-road use	n/a	n/a	n/a	n/a	n/a	n/a	43,283	41,813	39,414	39,808
Blend Rate (%)	n/a	n/a	n/a	n/a	n/a	n/a	5.7%	7.0%	7.0%	7.8%
Diesel, total use	44,764	44,298	49,239	52,264	55,900	58,572	60,032	57,211	54,364	54,908

5.2. Production

A. Feedstock

Biodiesel can be produced from several raw materials such as soybeans, cottonseed, animal fat, castor seed (*Ricinus communis*), African palm oil ("dendê"), "pinhao manso" (*Jatropha curcas*), sunflower, peanut, fried oil or others.

According to updated information reported by the Petroleum, Natural Gas and Biofuels National Agency (ANP), soybean oil currently represents 78 percent of total biodiesel feedstock, followed by animal tallow (18 percent). The table below shows biodiesel production by raw material according to ANP and the Brazilian Association of Vegetable Oil Industry (ABIOVE).

Biodiesel Production by Raw Material (m3)					
Raw Material	2012	2013	2014	2015	2016 1/
Soybean Oil	2,041,667	2,142,990	2,551,813	3,038,835	1,222,347
Animal Tallow	481,231	611,215	731,935	755,075	278,434
Cottonseed	123,247	65,960	81,666	78,786	15,686
Others	71,338	97,331	54,424	57,807	54,760
Total	2,717,483	2,917,495	3,419,838	3,930,503	1,571,227
Source: ANP/ABIOVE. 2016 1/ data refers to January to May.					

B. Production Estimates

Biodiesel production remains regulated by the government. Biodiesel production in 2015 was 4.01 billion liters, a 16 percent increase from 2014 supported by the increase of the biodiesel use mandate to 7 percent as of November 2014.

In 2016, total Brazilian biodiesel production is projected at 3.87 billion liters, down 3 percent compared to the revised estimate for 2015 (4.01 billion liters). The projections take into account the current recession of the Brazilian economy and the consequent decrease of diesel consumption, according to updated information released by ANP. The agency reports a total 26.67 billion liters of diesel consumed between January and June 2016, down 5 percent from the same period in 2015. Biodiesel production for 2017 is forecast at 4.4 billion liters based on modest recovery of the Brazilian economy and the increase of the biodiesel use mandate to 8 percent as of March 2016.

According to ANP, cumulative January-June 2016 production is approximately 1.86 billion liters. Biodiesel production is reported below.

Brazilian Biodiesel Monthly Production/Deliveries (000 liters)						
Month	2011	2012	2013	2014	2015	2016
January	186,327	193,006	226,505	245,215	319,546	271,388
February	176,783	214,607	205,738	240,529	303,594	300,065
March	233,465	220,872	230,752	271,839	322,692	323,158
April	200,381	182,372	253,591	253,224	324,526	348,485
May	220,484	213,021	245,934	242,526	338,851	328,814

June	231,573	214,898	236,441	251,517	322,185	292,772
July	249,897	230,340	260,671	302,971	341,094	--
August	247,934	254,426	247,610	314,532	344,038	--
September	233,971	252,243	252,714	312,665	330,388	--
October	237,885	251,416	277,992	321,603	359,166	--
November	237,189	245,321	265,176	315,448	324,662	--
December	216,870	244,962	214,364	347,769	306,526	--
Total	2,672,760	2,717,483	2,917,488	3,419,838	3,937,269	1,864,683
Source: ANP.						

ANP reports that as of June 2016, Brazil has 51 plants authorized to produce biodiesel. According to ANP, the authorized industrial capacity for 2016 is estimated at 19.976 million liters/day or approximately 7.2 billion liters/year, based on a 360 day operation cycle. This represents approximately 1.9 times the mandatory biodiesel production to be blended in mineral diesel in 2016; and a four percent decrease compared to the authorized industrial capacity for the same period in 2015 (20.72 million liters/day).

ATO/Sao Paulo projects a total of 53 biodiesel plants for 2017 with an industrial capacity of 8.1 billion liters per year (22.49 million liters/day), up 13 percent from current industrial capacity. Projections are based on information for authorized plants and requests for authorization provided by ANP and industry sources.

C. Cost of Production and Market Prices

The biodiesel market remains regulated by the government through a public auction system (see GAIN Reports [BR10006](#) and [BR11013](#) – Brazilian Biofuels Annual Reports for 2010 and 2011, respectively, for more information) which gives preference to producers with the Social Fuel Stamp. The Social Fuel Stamp provides incentives for poorer farmers (family farmers) in disadvantaged areas.

The tables below updates the results of the 37rd through the 43rd auctions from June 2014 to June 2015 as well as provides information for the 44th through 49th auctions from August 2015 to June 2016. Additional auctions should take place in August and October 2016 to guarantee supply for the remaining months of the year.

Biodiesel Auctions				
Auction	37th Auction	38th Auction	39th Auction	39th Auction 2/
Date	June-14	Aug-14	Oct-14	Nov-14
Number of Suppliers	35	39	36	17
Offered Quantity (m3)	814,987	739,040	702,420	76,064

Purchased Quantity (m3)	638,455	625,732	645,230	56,184
Opening/Reference Price (R\$/m3)	2115.00-2365.00	1975.00-2225.00	2010.00-2290.00	2010.00-2290.00
Average Price (R\$/m3) 1/	1,884.15	1,913.71	2,104.61	2,051.84
Delivery Date	July-Aug/14	Sept-Oct/14	Nov-Dec/14	Dec-14
Source: ANP 1/ Price FOB, including PIS/PASEP and COFINS, excluding ICMS, including Petrobras margin. 2/ Supplemental auction.				

Biodiesel Auctions				
Auction	40th Auction	41st Auction	42nd Auction	43rd Auction
Date	Dec-14	Feb-15	Apr-15	Jun-15
Number of Suppliers	38	37	34	33
Offered Quantity (m3)	764,560	810,980	824,680	824,967
Purchased Quantity (m3)	667,876	699,354	671,288	661,545
Opening/Reference Price (R\$/m3)	2206.00-2520.00	2350.00-2650.00	2390.00-2675.00	2350.00-2650.00
Average Price (R\$/m3) 1/	2,194.47	1,975.15	2,021.78	2,171.77
Delivery Date	Jan-Feb/15	Mar-Apr/15	May-Jun/15	July-Aug/15
Source: ANP 1/ Price FOB, including PIS/PASEP and COFINS, excluding ICMS, including Petrobras margin.				

Biodiesel Auctions				
Auction	44th Auction	45th Auction	46th Auction	47th Auction
Date	Ago-15	Out-15	Dec-15	Fev-16
Number of Suppliers	32	33	34	32
Offered Quantity (m3)	850,727	827,787	729,777	956,970
Purchased Quantity (m3)	696,852	657,752	580,597	639,567
Opening/Reference Price (R\$/m3)	2545.00-2840.00	2605.00-2890.00	2810.00-3140.00	3,070.00-3,385.00
Average Price (R\$/m3) 1/	2,162.46	2,406.20	2,696.39	2,564.75
Delivery Date	Set-Out/15	Nov-Dec/15	Jan-Feb/16	Mar-Apr/16
Source: ANP 1/ Price FOB, including PIS/PASEP and COFINS, excluding ICMS, including Petrobras margin.				

Biodiesel Auctions				
Auction	48th Auction	49th Auction	50th Auction	51st Auction
Date	Apr-16	Jun-16	--	--
Number of Suppliers	32	30	--	--
Offered Quantity (m3)	902,023	848,454	--	--
Purchased Quantity (m3)	643,216	646,647	--	--
Opening/Reference Price (R\$/m3)	2,880.00-3,220.00	2,950.00-3,330.00	--	--
Average Price (R\$/m3) 1/	2,440.50	2,406.61	--	--
Delivery Date	May-Jun/16	Jul-Ago/16	--	--

Source: ANP 1/ Price FOB, including PIS/PASEP and COFINS, excluding ICMS, including Petrobras margin.

Biodiesel prices received by producers are determined by the public auction system (see Average Price in the tables above). The government sets the opening/reference price for different Brazilian regions and biodiesel producers bid for the lowest price. Producers are not allowed to change the sales price set at the auctions and consequently must search for low cost raw material or hedge their activities to offset risk.

Industry sources report that raw materials represent approximately 80 percent of biodiesel production cost whereas other inputs such as methanol, additives and catalyzers represent 10 percent of the total cost. Given that over 78 percent of biodiesel production still results from the use of soybean oil, the profitability of the sector is highly dependent on oilseed prices.

The tables below show the price for soybean oil in 2015 and 2016 (January-June). The average crude price in the state of Sao Paulo is R\$ 2,920/ton for January-June 2016, up 30 percent compared to the same period in 2015 (R\$2,250/ton).

Soybean Oil, Crude - Prices (2015)						
Location	Jan	Feb	Mar	Apr	May	Jun
Chicago (US\$/ton)	709	695	689	690	716	743
Premium (US\$/ton)	31	25	-29	-19	-1	-36
Port of Paranaguá - Fob (US\$/ton)	740	720	660	671	716	707
São Paulo - (US\$/ton with ICMS 12%)	840	780	693	742	706	754
Elaborated by ABIOVE based on several sources.						

Soybean Oil, Crude - Prices (2015)						
Location	Jul	Aug	Sep	Oct	Nov	Dec
Chicago (US\$/ton)	697	622	589	632	624	681
Premium (US\$/ton)	-42	5	26	47	39	-15
Port of Paranaguá - Fob (US\$/ton)	654	627	615	679	662	666
São Paulo - (US\$/ton with ICMS 12%)	681	673	656	720	750	759
Elaborated by ABIOVE based on several sources.						

Soybean Oil, Crude - Prices (2016)						
Location	Jan	Feb	Mar	Apr	May	Jun
Chicago (US\$/ton)	661	688	713	753	714	702
Premium (US\$/ton)	-14	-9	-26	-7	8	6
Port of Paranaguá - Fob (US\$/ton)	648	680	687	746	722	708
São Paulo - (US\$/ton with ICMS 12%)	764	735	815	855	797	853
Elaborated by ABIOVE based on several sources.						

5.3. Consumption

Biodiesel domestic consumption remains regulated by GOB, thus the sector must comply with the biodiesel mandate which requires all mineral diesel to have a seven percent biodiesel blend (B7) as of November 1 2014. Based on industry estimates for mineral diesel domestic demand, ATO/Sao

Paulo estimates total biodiesel domestic consumption for both 2015 and 2016 at 4 and 3.8 billion liters, respectively.

Biodiesel consumption for 2017 is forecast at 4.3 billion liters based on modest recovery of the Brazilian economy and the increase of the biodiesel blend to 8 percent (B8) as of March 2017.

5.4. Trade

Export figures by country of destination for biodiesel (NCM 3826.00.00) for the years 2014, 2015 and 2016 (January-June), according to SECEX, are shown below. Exports represent a fraction of total domestic biodiesel production. No import has been registered under tariff code NCM 3826.00.00. Brazil virtually does not import biodiesel given that the country has systematically underused total domestic production capacity.

Brazilian Biodiesel Exports by Country of Destination (kg, US\$ FOB)						
	CY 2014		CY 2015		CY 2016 1/	
Country	Quantity	Value	Quantity	Value	Quantity	Value
Malaysia	0	0	0	0	4	20
Spain	13,164,940	12,506,693	0	0	0	0
United States	9,179	66,453	21,986	69,782	0	0
Gibraltar	10,024,518	9,974,430	0	0	0	0
Japan	71	7,108	0	0	0	0
Netherlands	12,068,340	11,428,700	10,337,666	7,613,381	0	0
Total	35,267,048	33,983,384	10,359,652	7,683,163	4	20
Source : Brazilian Secretariat of Foreign Trade SECEX - Note: NCM 3826.00.00 - 1/ Jan-June						

Brazilian Biodiesel Imports by Country of Destination (kg, US\$ FOB)						
	CY 2014		CY 2015		CY 2016 1/	
Country	Quantity	Value	Quantity	Value	Quantity	Value
France	0	0	0	0	360	133
Source : Brazilian Secretariat of Foreign Trade SECEX - Note: NCM 3826.00.00 - 1/ Jan-June						

5.5. Stocks

ATO/Sao Paulo forecasts biodiesel ending stocks for 2017 at 190 million liters, up 79 million liters from 2016 (111 million liters), based on the difference between total supply and disappearance (consumption and exports).

6. Advanced Biofuels

Although Brazil started the production of advanced biofuels in 2014, it is not yet economically feasible to produce on a large scale due to the high cost of the technology to produce cellulosic ethanol, and the cost of the enzymes used in the process, among others. There are currently three cellulosic ethanol plants in Brazil: (1) Bioflex 1 in the state of Alagoas from Granbio (82 million liters production capacity); (2) Raizen – Costa Pinto Unit in the state of Sao Paulo (42.2 million liter production capacity); and (3) Centro de Tecnologia Canavieira (CTC) demonstration plant in the state of Sao Paulo (3 million liters production capacity). Raizen – Costa Pinto Unit is the only one producing at relatively large scale. Total production projected for 2016 is 6 million liters of cellulosic ethanol from sugarcane bagasse. Note that total cellulosic ethanol production is still an insignificant fraction of total ethanol production in Brazil.

7. Notes on Statistical Data

7.1. Ethanol

The beginning stocks for the Ethanol Used as Fuel and Other Industrial Chemicals table (excluding ethanol for beverages) is based on information from the Ministry of Agriculture, Livestock and Supply (MAPA) and reflect all stocks at the ethanol plants as of January 1, 2006. Beginning Stocks for the ethanol “For Fuel Only” table is estimated based on historical average use of bioethanol for fuel/other uses. On average, ethanol for fuel has represented 87 percent of the total ethanol disappearance (use), therefore Post assumed this percentage to calculate the theoretical beginning stocks for fuel in January 1, 2006. All other stock figures were calculated based on the difference between total supply and disappearance (consumption and exports).

Ethanol production estimates for Fuel and Other Industrial Chemicals were provided by MAPA and are consistent with previous ATO/Sao Paulo GAIN reports submitted by marketing year. Production estimates “For Fuel Only” are taken as the difference between “production for all uses” minus estimates for “disappearance for other uses” (domestic consumption and exports) given that all Brazilian official publications and industry sources report production in hydrous/anhydrous ethanol only.

Trade figures were based on the Brazilian Secretariat of Foreign Trade (SECEX). SECEX breaks down trade numbers in four categories as described below:

- NCM 2207.10.10 – undenatured ethylic alcohol with ethanol content equal or over 80 percent. With water content equal or below 1 percent vol. Undenatured alcohol is defined as pure ethanol with no additives and suitable for consumption.
- NCM 2207.10.90 – undenatured ethylic alcohol with ethanol content equal or over 80 percent. Others. Undenatured alcohol is defined as pure ethanol with no additives and suitable for consumption.
- NCM 2207.20.11 – denatured ethylic alcohol with any ethanol content. With water content equal or below 1 percent vol. Denatured alcohol is defined as [ethanol](#) with additives which make it [poisonous](#) and/or unpalatable, thus, no suitable for human consumption. Denatured alcohol is used as a [solvent](#) and as fuel for spirit burners and camping stoves. Different additives like methanol are used to make it difficult to use [distillation](#) or other simple processes to reverse the denaturation.
- NCM 2207.20.19 – denatured ethylic alcohol with any ethanol content. Others. Denatured alcohol is defined as [ethanol](#) with additives which make it [poisonous](#) and/or unpalatable,

thus, no suitable for human consumption. Denatured alcohol is used as a [solvent](#) and as fuel for spirit burners and camping stoves. Different additives like methanol are used to make it difficult to use [distillation](#) or other simple processes to reverse the denaturation.

There are no figures for ethanol exports for fuel and/or other uses. Post estimated ethanol “for fuel” based on the type of ethanol that is usually imported by the final destination, as reported by UNICA. Thus, the United States, the Caribbean countries and Sweden usually import ethanol for fuel; whereas Japan, Korea and several other importing countries, including the European Union import ethanol for industrial and other uses.

Domestic consumption figures were taken from information provided by Datagro, the Petroleum, Natural Gas and Biofuels National Agency (ANP), UNICA and other post contact information.

The number of bio refineries is taken from MAPA and UNICA up to 2013. As of 2014, ANP started to report total number of units. Ethanol production capacity was based on production figures as reported by UNICA up to 2013. Post took the highest ethanol production figure in a given 15-day period, as reported by the institution, and extrapolated to the entire Center-South crushing season. A similar procedure was performed for Northeast production based on MAPA reports. As of 2014, ANP became the source. ANP provides the industrial daily capacity for hydrated ethanol production and ATO/Sao Paulo multiples by 185 days (average day for the sugarcane crushing).

Sugarcane crushed for ethanol production was calculated based on the actual production breakdown for sugar/ethanol as described in previous GAIN reports. Note that on average, one metric ton of sugarcane produces 80 liters of ethanol.

7.2. Biodiesel

Production numbers are based on figures reported by ANP and forecasts are based on projections for diesel consumption and the results from the public auctions. Biodiesel market continues to be regulated by the government through a public auction system which sets the volume of biodiesel that should be produced and delivered to fuel distributors in a particular period.

Consumption figures are based on mineral diesel consumption and the mandatory mixture of biodiesel (B2 through B8) in mineral diesel set by Brazilian legislation.

Trade figures were based on the Brazilian Secretariat of Foreign Trade (SECEX), as reported below:

- From 2006 through 2011 - NCM 3824.90.29 – Other industrial fatty acid derivatives, mixtures and preparations containing fatty alcohols or carboxylic acids or their derivatives.
- As of 2012 – NCM 3826.00.00 – biodiesel and their blends.

The number of bio refineries and production capacity are based on ANP reports. Feedstock use for biodiesel consumption is based on the following conversion rates:

- 0.875 metric ton of biodiesel = 1,000 liters of biodiesel
- 1 metric ton of soy oil, crude = 1,113 liters of biodiesel
- 1 metric ton of animal fat/grease = 1,043 liters of biodiesel

Exchange Rate (R\$/US\$1.00 - official rate, last day of period)							
Month	2010	2011	2012	2013	2014	2015	2016
January	1.87	1.67	1.74	1.99	2.43	2.66	4.04
February	1.81	1.66	1.71	1.98	2.33	2.88	3.98
March	1.78	1.62	1.82	2.01	2.26	3.21	3.56
April	1.77	1.57	1.89	2.00	2.24	2.98	3.45
May	1.81	1.57	2.02	2.13	2.24	3.18	3.60
June	1.80	1.57	2.02	2.22	2.20	3.10	3.21
July	1.75	1.56	2.05	2.29	2.27	3.39	3.27
August	1.75	1.59	2.04	2.37	2.24	3.65	
September	1.69	1.85	2.03	2.23	2.45	3.98	
October	1.70	1.69	2.03	2.20	2.44	3.86	
November	1.71	1.81	2.10	2.32	2.56	3.85	
December	1.66	1.88	2.04	2.34	2.66	3.90	

Source : Brazilian Central Bank (BACEN)