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Brazil

Biofuels Annual

2018

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Report Highlights:

The RenovaBio Program became the National Biofuels Policy of Brazil in December 2017, and more information about the creation of the program is slowly becoming available. Brazil's total ethanol production for 2018 is estimated at 30.755 billion liters, an increase of nine percent compared to the revised figure for 2017. Total domestic demand for ethanol (fuel and other uses) for 2018 is estimated at 28.72 billion liters. Total Brazilian biodiesel production for 2018 is estimated at 5.4 billion liters, an increase of 26 percent compared to 2017, based on the increase of the biodiesel blend to 10 percent (B10) in March 2018 and the projected 1.5 percent growth of the Brazilian economy in 2018. In May 2018, Brazil's truckers launched a strike in protest to rising fuel and diesel costs. The government brokered a short term solution to end the strike, and while a longer term solution has yet to be reached, the strike is not expected to have a lasting impact on Brazil's fuels market in 2018.

I. Executive Summary

As a result of the 21st Conference of the Parties (COP21) commitments and several voluntary goals set internally, Brazil committed to reduce domestic emissions of GHG by 37 percent by 2025 and by 43 percent by 2030, both based on 2005 levels. To help meet those commitments, the Government of Brazil (GOB) launched the RenovaBio Program in December, 2016, and it was instituted as the “National Biofuels Policy” in December, 2017.

RenovaBio operation is based on three main instruments:

1. Annual carbon intensity reduction targets (gCO₂/MJ) for a minimum period of ten years. The annual targets will be deployed for all fuel distributors in proportion to their respective market share in the commercialization of fossil fuels. Distributors that fail to meet the targets are subject to fees and fines.
2. Certification of biofuels by efficiency in reducing GHG emissions.
3. Decarbonization Credits (CBIO).

Ethanol

No changes have been made to the current ethanol mandate, which remains at 27 percent (E27) for Gasoline C (gasolina comum, more commonly referred to simply as “gasoline.”) since March 16, 2015. Similarly, no changes were made to the 600 million liter annual ethanol import tariff rate quota (TRQ), or 20 percent out-of-quota tariff. The TRQ will be reevaluated 24 months after implementation, or September 1, 2019.

Total ethanol production for 2018 is estimated at 30.755 billion liters, an increase of nine percent compared to the revised figure for 2017 (28.254 billion liters). Total ethanol production for fuel use is estimated at 27.805 billion liters, up eight percent from the previous calendar year. Sugarcane diverted to ethanol production in the current crop is estimated at 61 percent, compared to 53.6 percent in 2017. This higher rate is attributed to the expectation of a continued surplus of sugar on the world market in 2018/19, thus making world sugar markets less attractive. In addition, the increased domestic demand for ethanol influenced by consistent high gasoline prices also encouraged sugar-ethanol plant decisions to divert more sugarcane to ethanol production.

Ethanol production from corn in 2018 is estimated at 830 million liters, an increase of 305 million liters compared to 2017. Although a significant increase compared to the previous season, ethanol from corn represents less than two percent of total ethanol production. Total cellulosic ethanol production for 2018 is estimated at 25 million liters, and represents an insignificant share of total ethanol production in Brazil. No significant changes have been made to the current status of advanced biofuels research, development and production in Brazil. Total domestic demand for ethanol (fuel and other uses) for calendar year 2018 is estimated at 28.72 billion liters. Ethanol is mainly used for fuel in Brazil.

Brazil’s total ethanol exports for 2018 are estimated at 1.12 billion liters, down eighteen percent from 2017. Brazil’s total ethanol imports for 2018 are projected at approximately two billion liters, an increase of 255 million liters compared to 2017. Brazil’s increased but limited

domestic supply will likely not be sufficient to meet projected demand, therefore encouraging ethanol imports. Ethanol imports are only for fuel use and originate almost entirely from the United States.

Biodiesel

Biodiesel production remains tightly regulated by the government. Biodiesel production in 2017 was 4.3 billion liters, an increase of 13 percent compared to 2016, due to the slight increase in diesel consumption and the increase of the biodiesel blend to eight percent (B8) in March 2017. Total Brazilian biodiesel production for 2018 is estimated at 5.4 billion liters, an increase of 26 percent compared to 2017, based on the increase of the biodiesel blend to 10 percent (B10) in March 2018 and the projected 1.5 percent growth of the Brazilian economy in 2018. Post estimates total domestic biodiesel consumption for 2018 at approximately 5.37 billion liters, an increase of 25 percent relative to 2017 (4.3 billion liters).

In May 2018, Brazil's truckers launched a strike in protest to rising fuel and diesel costs. The government brokered a short term solution to end the strike, and while a longer term solution has yet to be reached, the strike is not expected to have a lasting impact on Brazil's fuels market in 2018.

II. Policy and Programs

Renewable Energy and Greenhouse Gas Emissions

In December 2015, Brazil joined the 21st Conference of the Parties (COP21) of the United Nations Framework Convention on Climate Change (UNFCCC) in Paris, where governments from 190 countries discussed potential agreement on preventing global climate change. Each country submitted their plan to reduce domestic emissions of greenhouse gases (GHG), called an "Intended Nationally Determined Contribution (iNDC)," with the intention of limiting the rise of global temperatures to a maximum of 2°C by 2100.

As a result of COP21 commitments and several voluntary goals set internally, Brazil committed to reduce domestic emissions of GHG by 37 percent by 2025 and by 43 percent by 2030, both based on 2005 levels. With regard to energy production and use, the Brazilian iNDC makes the following commitments:

- Increase the share of sustainable bioenergy in the Brazilian energy matrix to approximately 18 percent by 2030 by expanding biofuel consumption and increasing ethanol supply - including by increasing the proportion of advanced biofuels (second generation) - and increasing the share of biodiesel in the diesel mix;
- Achieve an estimated 45 percent share of renewables in the energy matrix by 2030;
- Obtain at least a 66 percent share of hydropower in electricity generation by 2030, not considering self-produced electricity;
- Expand the use of renewable energy sources other than hydropower in the total energy mix to between 28 percent to 33 percent by 2030;
- Expand the domestic use of non-fossil energy sources domestically, increasing the share of renewables (other than hydropower) in the power supply to at least 23 percent by 2030, including by raising the share of wind, biomass, and solar;
- Achieve 10 percent of efficiency gains in the electricity sector by 2030.

RenovaBio Program

The RenovaBio Program is a new program designed to support Brazil's COP21 goals. RenovaBio was launched in December, 2016 by the Ministry of Mines and Energy (MME) and was instituted as the "National Biofuels Policy" with the enactment of Bill #13,576, on December 26, 2017.

As stated in Bill #13,576, RenovaBio goals include:

1. To contribute to meeting the country's commitments under the COP21 Paris Agreement under the United Nations Framework Convention on Climate Change;
2. To contribute to the adequate ratio between energy efficiency and reduction of GHG emissions in the production, commercialization, and use of biofuels, including mechanisms for lifecycle assessment;
3. To promote the adequate expansion of the production and use of biofuels in the national energy matrix, emphasizing the continuity of fuels supply; and
4. To contribute predictability for the competitive share of the various biofuels in the national fuel market.

RenovaBio operation is based on three main instruments:

1. Annual carbon intensity reduction targets (gCO₂/MJ) for a minimum period of ten years. The annual targets will be deployed for all fuel distributors in proportion to their respective market share in the commercialization of fossil fuels. Distributors that fail to meet the targets are subject to fees and fines. (see GHG Emission Reduction Targets below).
2. Certification of biofuels by efficiency in reducing GHG emissions.
3. Decarbonization Credits (CBIO).

The GOB is currently working on numbers 2 and 3 above, and Post expects more information to be available soon.

According to the enacting legislation, biofuels producing "units" should voluntarily participate in the RenovaBio Program. Units will undergo a certification process in which a certifying company accredited by the Agency of Petroleum, Natural Gas and Biofuels (ANP), assesses the aspects related to the production / importation of biofuels, according to carbon intensity. Biofuels production units must meet three eligibility criteria:

- Certified raw material must not originate from deforested area after December 26, 2017 (date of signature of the RenovaBio law);
- Sugarcane producers must have their Rural Environmental Register (CAR – "Cadastro Ambiental Rural") updated or at least pending in the CAR system;
- The cultivation areas must respect the agro-ecological zoning for sugarcane (ZAE Cana) and palm oil.

The certifying companies will issue an "Efficiency Production Certificate for Biofuels" and will validate the Energy-Environmental Efficiency Grade from each unit, according to a formula that will be provided in the RenovaBio Program. The grade is a value given on the Efficiency

Production Certificate, which represents the difference between the carbon intensity of the substituted fossil fuel and the biofuels carbon intensity set during the certification process. The Efficiency Production Certificate must be renewed every four years.

The CBIO is intended to be a financial asset that can be sold or traded in a new organized market. Its amount will vary according to the volume of biofuels traded with distributors; and the Energy-Environmental Efficiency Grade from each primary issuer or unit. Thus, the lower the carbon intensity in the lifecycle of biofuels, the greater the value of CBIO to be issued for a given marketed volume. As Post understands it, with set decarbonization targets, the GOB hopes to create an additional incentive for the production of biofuels, which will in turn increase the search for CBIO within the dedicated CBIO market. With such economic signals, plants are expected to be encouraged to produce more biofuels more efficiently, increasing the supply of CBIOs and regulating its price in the market where it will be traded. This mechanism should ensure the necessary security for investments in new ethanol and biodiesel plants, as CBIOs will offer more revenue to producers.

The theoretical rationale behind RenovaBio is the recognition that the biofuels sector, in addition to offering a basket of goods in the fuel market (ethanol, biodiesel, biogas, bio-kerosene, etc.) also provides a reduction of GHG emissions, which is not currently valued due to the absence of a specific market. By creating a market CBIO, RenovaBio aims to formalize recognition of the environmental benefits of biofuels and remuneration of the sector for its role in reducing GHG emissions. ANP is currently drafting the regulations for accrediting the certifying companies as well as regulations to govern the sale or trading of CBIOs.

GHG Emission Reduction Targets

On May 5, 2018, ANP launched Public Consultation #46 proposing the annual compulsory targets to GHG emission reductions for biofuels trade. The targets aim to reduce the carbon intensity (CI) of transportation fuels by 10.1 percent by 2028, starting from a base in 2017 of IC of 74.25 gCO₂/MJ, reaching 66.75 g CO₂/MJ in 2028. On June 5, the National Council for Energy Policy (CNPE) published Resolution #5, which approved the compulsory targets. If these targets are reached, the RenovaBio Program projects that Brazil is likely to reduce emissions from transportation fuel by 591 million metric tons by 2028, or by 77.33 million tons per year by 2025. This would mean Brazil met its COP21 commitment to reduce GHG emissions by 37 percent in 2025, based on 2005 emission levels.

Annual compulsory GHG emission reduction targets for fuel commercialization will be based on the improvement of the carbon intensity of the Brazilian fuel matrix over a 10-year period. The National Biofuels Policy legislation states that the compulsory targets must be enforced by December 19, 2018 (180 days from the June 22, 2018 enactment date of the law). The individual annual compulsory targets for GHG emission reductions for individual fuel distributors must be compiled and assessed 18 months after enactment, or by December, 2019. Several assumptions were made to set the compulsory target for GHG emissions reduction. These included that the ethanol mandate currently set at 27 percent will remain unchanged and that the biodiesel mandate will increase by one percent per year, beginning in 2020, reaching 25 percent in 2025. This also assumes the biodiesel increase is technically feasible after studies that are still being conducted by the GOB.

The approved targets for carbon intensity reduction indicate that the share of biofuels in Brazil’s fuel matrix is expected to increase from the current 20 percent to 28.6 percent in 2028. If targets are reached, Brazil will be less reliant on imported petroleum and imports are expected to decrease from 11.5 percent to 7 percent by 2028. On the other hand, biofuels demand is expected to increase. The fuel ethanol market is projected to increase from roughly 26.7 billion liters in 2018 to 47.1 billion liters in 2028 (11.1 billion liters of anhydrous ethanol, and 36.0 billion liters of hydrous ethanol), and the market for biodiesel will grow from 5.7 to 11.1 billion liters by 2028. Industry contacts report that in order to meet these compulsory targets, roughly US\$ 20 billion should be invested in the development and expansion of ethanol and corn mills, soybean oil extracting plants, and others, creating 1.4 million additional jobs by 2030.

Government Support Programs for Ethanol

Anhydrous Ethanol Use Mandate

No changes have been made to the current ethanol mandate, which remains at 27 percent (E27) for Gasoline C (gasolina comum, more commonly referred to simply as “gasoline.”) since March 16, 2015. Gasolina comum is the official term used in Brazil for ethanol-blended gasoline which uses anhydrous ethanol. The only other fuel used for Brazil’s light duty fleet is pure E100 “hydrous” ethanol. There is no market for unblended fossil gasoline in Brazil.

The ethanol-use mandate has been mandatory since 1977, when legislation required a 4.5 percent blend of anhydrous 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. The table below was created by ATO Sao Paulo based on GOB regulations and shows the history since 2006.

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

Tax Incentives for Ethanol

No changes have been made to the tax incentives for ethanol flex-fuel vehicles compared to gasoline vehicles from 2016 to 2017. Please refer to [BR17006](#) for historical information.

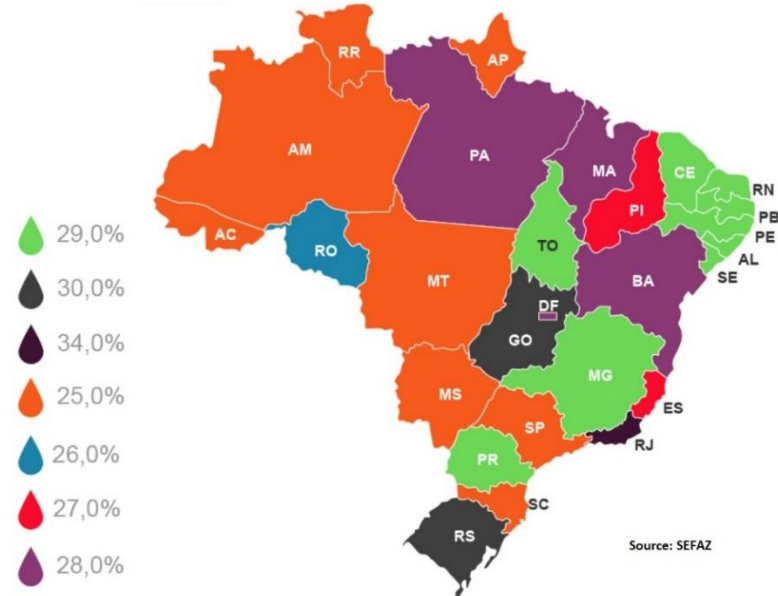
Taxes Applied to Ethanol, Flex-Fuel and Gasoline Vehicles (Percentage)						
Year	Taxes	1000 cc	1001-2000 cc		Over 2000 cc	
		Gas 1/ /Eth/Flex	Gas 1/	Eth/Flex	Gas 1/	Eth/Flex
2015/2017	IPI	7	13	11	25	18
	ICMS	12	12	12	12	12
	PIS/COFINS	11.6	11.6	11.6	11.6	11.6
	% of Avg MSRP	27.1	30.4	29.2	36.4	33.1

Source: National Association of Motor Vehicle Manufacturers (ANFAVEA) 1/ Gas = Gasoline

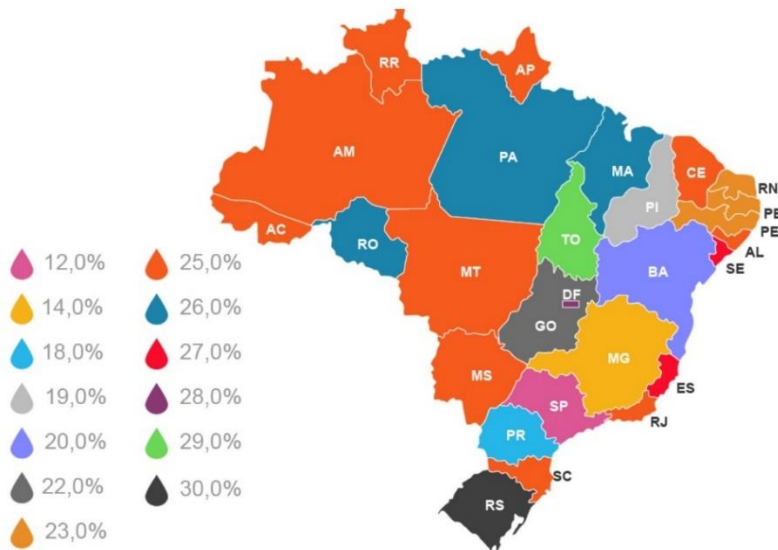
The GOB has a complex tax system including several taxes at the federal, state, and municipal level. Depending on the economic and financial strategies pursued by policymakers, the GOB can provide incentives for gasoline and/or ethanol at the pump. Currently, the GOB provides preferential treatment for 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. No changes have been made on CIDE and PIS/COFINS for ethanol or gasoline. See [BR15006](#) and [BR17006](#) for latest information on CIDE and on PIS/COFINS, respectively.

In addition, governments from several Brazilian states provide differential treatment for ethanol by using the state tax for circulation of goods and services (ICMS) for ethanol and gasoline. The ICMS tax charged on ethanol varies from 12 to 30 percent. ICMS for gasoline varies from 25 to 34 percent. The tax rate can vary based on a number of state-level factors and largely depends on the state's overall tax revenue and budget for a given year. The figures below show the current ICMS set by each Brazilian state as reported by the Ministry of Finance.

ICMS Gasoline C (Avg = 28%)



ICMS Hydrated Ethanol (Avg = 24%)



Credit Lines

In July 2018, the Ministry of Agriculture, Livestock and Supply (MAPA) announced the Brazilian Agricultural Crop and Livestock Plan for 2018/19. A total of R\$194.3 billion will be released to fund agricultural and livestock programs. Total funds for credit lines specific to the ethanol sector, Prorenova and PASS, have not been released yet. Both are credit lines from the National Bank for Social and Economic Development (BNDES). Prorenova is the credit line for new greenfields and sugarcane renewal in existing fields whereas PASS is the support program for the sugar-ethanol sector for ethanol storage.

Ethanol Import Tariff

No changes were made to the ethanol import tariff. In August 2017, the Ministry of Development, Industry and Commerce (MDIC)/Chamber of Foreign Trade (CAMEX) imposed an annual tariff rate quota (TRQ) of 600 million liters on ethanol imports effective September 1, 2017. Any volume above the quota is subject to the 20 percent Common External Tariff under the Mercosul agreement. The TRQ is administered by CAMEX on a quarterly basis, with 150 million liters entering duty free each quarter. The TRQ will be reevaluated 24 months after implementation, or September 1, 2019.

Ethanol Supply Contracts

The National Agency of Petroleum, Natural Gas and Biofuels (ANP) has regulated the ethanol sector since April, 2011 with the enactment of Provisional Measure #532. Under the resolution, ANP monitors the trade of anhydrous ethanol between producers and distributors.

On February 22, 2018, ANP Resolution #719 announced that agents who import biofuels must meet the same obligations to maintain minimum stocks and proof of capacity to meet market demands that are required of Brazilian ethanol producers, thus altering Resolution #67 from 2011. Both producers and importers are now required to hold stock equivalent of 25 percent of the previous year's sales as of January 31, unless they have already contracted 70 percent of the previous year's sales with distributors. This measure was intended to level the playing field between imports and domestic production.

Government Support Programs for Biodiesel

Biodiesel Use Mandate

The biodiesel mandate that applies to all mineral diesel consumed has been set at ten percent since March 1, 2018. The use mandate is required by National Energy Policy Council (CNPE) Resolution #23 of November 2017, which actually sped up adoption of the blend mandate by one percent for 2018 (the original target was B9 in 2018 according to Law #13.263/2016).

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 the economically disadvantaged North and Northeast of Brazil.

Federal Law [#11.097/2005](#) 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.

CNPE [Resolution #3](#) of September 21, 2015, went into effect in January 2016 and 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 has the authority not only to authorize but also set the actual voluntary blend to be used by the fleet.

Biodiesel Import Tariff

According to the Secretariat of Foreign Trade (SECEX), the import tariff applied to biodiesel blends above B30 and including pure (B100) biodiesel (NCM 3826.00.00) is fixed at 14 percent, and the import tariff for petroleum oils containing biodiesel up to and including B30 (NCM 2710.20) is zero. Both rates are unchanged.

III. Gasoline and Diesel Pools

The Ministry of Mines and Energy/Energy Research Enterprise (MME/EPE) provides a projection for fuel use based on the Ten Year Plan for Energy Expansion (PDE). The most recent PDE report was released in 2017, with projections through 2026. The next PDE report is likely to be released in December, 2018. For information on official fuel use projections through 2027, please refer to the Brazil Biofuels Annual Report [BR17006](#). The table below shows fuel use history for gasoline C (gasoline A + anhydrous ethanol), diesel (diesel A + biodiesel), and jet fuels.

Fuel Use History (Million Liters)										
Calendar Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018f
Gasoline C Total	25,409	29,844	35,491	39,698	41,426	44,364	41,137	43,019	44,150	39,815
Diesel Total	44,298	49,239	52,264	55,900	58,572	60,032	57,211	54,279	54,772	55,594
On-road	n/a	n/a	n/a	n/a	n/a	43,283	41,813	39,402	39,761	40,357
Agriculture	n/a	n/a	n/a	n/a	n/a	720	687	n/a	n/a	n/a
Construction & Mining	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Shipping & Rail	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Industry	n/a	n/a	n/a	n/a	n/a	4,863	4,405	n/a	n/a	n/a
Heating	n/a	n/a	n/a	n/a	n/a	3,062	2,918	n/a	n/a	n/a
Jet Fuel Total	5,428	6,250	6,955	7,292	7,225	7,470	7,355	6,765	6,694	6,967
Total Fuel Markets	75,136	85,333	94,711	102,890	107,224	111,866	105,703	104,062	105,616	102,376

Source: The Petroleum, Natural Gas and Biofuels National Agency (ANP) f = forecast by ATO/Sao Paulo

ANP reports current and historical fuel consumption in Brazil. As reported by ANP, gasoline consumption for January-May 2018 was 16.59 billion liters, an 11-percent drop compared to the same period in 2017 (18.65 billion liters). Hydrated ethanol prices have become more competitive compared to gasoline in several Brazilian states, especially those with lower ICMS tax applied to ethanol, thus resulting in additional ethanol consumption, 6.59 billion liters from January-May 2018 as opposed to 4.79 billion liters during the same period in 2017. Diesel consumption from January-May 2018 was 21.47 billion liters, slightly down in comparison to the same period in 2017 (21.6 billion liters).

Brazilian Fuel Consumption Matrix (000 m3)						
	2013	2014	2015	2016	2017	2018 1/
Diesel *	58,572	60,032	57,211	54,279	54,772	21,476
Gasoline C**	41,426	44,364	41,137	43,019	44,150	16,588
Hydrated Ethanol	11,755	12,994	17,863	14,586	13,642	6,593

Source: ANP. * Diesel includes Bx Biodiesel since 2008. ** Gasoline C includes 18-27.5% anhydrous ethanol. 2018 1/ refers to January-May.

IV. Ethanol

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

Sugarcane is the main source of feedstock for ethanol production in Brazil, followed by corn. The table below shows the Brazilian ethanol production, supply and demand (PS&D) spreadsheet for Ethanol Used as Fuel and Other Industrial Chemicals (excluding ethanol for beverages) for calendar years 2009 through 2018. For more information on these tables, see Notes on Statistical Data – Ethanol (Section VII).

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 and Other Industrial Chemicals (Million Liters)										
Calendar Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018f
Beginning Stocks	5,783	4,048	5,916	6,891	7,094	8,195	9,367	7,452	7,266	8,871
Fuel Begin Stocks	5,422	3,683	5,549	6,488	6,690	7,790	8,913	6,985	6,774	8,374
Production	26,105	27,965	22,893	23,509	27,642	28,553	30,385	28,439	28,254	30,755
Fuel Production	22,201	24,516	20,212	20,739	24,377	25,585	27,268	25,580	25,847	27,805
>of which is cellulosic (a)	0	0	0	0	0	0	2	6	17	25
Imports	4	76	1,136	554	132	452	513	835	1,750	2,005
Fuel Imports	0	74	1,100	553	131	403	500	810	1,745	2,000
Exports	3,296	1,906	1,964	3,055	2,917	1,398	1,867	1,789	1,367	1,120
Fuel Exports	1,118	562	1,083	2,500	1,952	780	900	400	430	320
Consumption	24,548	24,267	21,090	20,805	23,756	26,435	30,946	27,671	27,032	28,720
Fuel Consumption	22,823	22,162	19,290	18,590	21,456	24,085	28,796	26,201	25,562	26,570
Ending Stocks	4,048	5,916	6,891	7,094	8,195	9,367	7,452	7,266	8,871	11,791
Fuel Ending Stocks	3,683	5,549	6,488	6,690	7,790	8,913	6,985	6,774	8,374	11,289
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 (Million Liters)

Number of Refineries	426	430	418	408	399	382	382	383	384	384
Nameplate Capacity	35,600	41,360	42,800	41,600	40,700	37,930	38,050	39,677	40,012	40,012
Capacity Use (%)	73%	68%	53%	57%	68%	75%	80%	72%	71%	77%
Production Capacity, Cellulosic Ethanol (Million Liters)										
Number of Refineries	0	0	0	0	0	1	3	3	3	3
Nameplate Capacity	0	0	0	0	0	82	127	127	127	127
Capacity Use (%)	--	--	--	--	--	0%	2%	5%	13%	20%
Co-product Production (1,000 MT)										
Bagasse	108,771	116,519	95,388	97,954	115,175	118,971	126,008	117,492	115,467	124,583
DDGs	0	0	0	0	0	0	108	179	401	634
Corn Oil	0	0	0	0	0	0	10	17	37	59
Feedstock Use for Fuel (1,000 MT)										
Sugarcane	277,514	306,450	252,650	259,238	304,713	319,813	340,850	319,750	323,088	347,563
Corn	0	0	0	0	0	0	344	573	1,280	2,024
Bagasse for Cellulosic Fuel	0	0	0	0	0	0	0.011	0.033	0.094	0.139
Market Penetration (Million Liters)										
Fuel Ethanol	22,823	22,162	19,290	18,590	21,456	24,085	28,796	26,201	25,562	26,570
Hydrous for Fuel	16,471	15,074	10,899	10,650	11,755	12,994	17,862	14,586	13,642	15,820
Anhydrous in Gasoline C	6,352	7,088	8,391	7,940	9,701	11,091	10,934	11,615	11,920	10,750
Gasoline C (includes anhydrous)	25,409	29,844	35,491	39,698	41,426	44,364	41,137	43,019	44,150	39,815
Gasoline C Blend Rate	25.0%	23.7%	23.6%	20.0%	23.4%	25.0%	26.6%	27.0%	27.0%	27.0%
Blend Rate Overall	54.5%	49.3%	41.6%	36.9%	40.3%	42.0%	48.8%	45.5%	44.2%	47.8%

Production

Ethanol is an alcohol, nearly all of which is made by fermenting sugar components of plant materials such as corn and wheat starch, sugarcane, sugar beet, sorghum, and cassava. Sugarcane is the feedstock used for vast majority of Brazil's ethanol production. Total ethanol production for 2018 is estimated at 30.755 billion liters, an increase of nine percent compared to the revised figure for 2017 (28.254 billion liters). Total ethanol production for fuel use is estimated at 27.805 billion liters, up eight percent from the previous calendar year.

The Agricultural Trade Office (ATO) in Sao Paulo's 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. Post projects Brazil's marketing year (MY April-March, unless otherwise stated) 2018/19 sugarcane crush at 610 million metric tons (mmt), down 29 mmt from MY 2017/18 (639 mmt). The Center-South region is expected to harvest 563 mmt of sugarcane, a decrease of five percent compared to the previous crop (595 mmt). Weather related problems, especially dry weather in the Sao Paulo and Parana in the

center-south for more than four months negatively affected sugarcane stocks. In addition, a lower than average sugarcane renewal rate in the fields contributed to lower supply. Several renewed sugarcane fields show sprouting failures, which were not adequately replaced due to cost constraints. Financial constraints have also limited investment in crop management, therefore resulting in higher pest and weed pressures. The North-Northeastern production for MY 2018/19, which has just begun, is projected at 47 mmt, an increase of three mmt vis-à-vis the previous crop due to improved crop conditions.

Sugarcane diverted to ethanol production in the current crop is estimated at 61 percent, compared to 53.6 percent in 2017. This higher rate is attributed to the expectation of a continued surplus of sugar on the world market in 2018/19 (roughly 6.5 million metric tons), thus making world sugar markets less attractive. In addition, the increased domestic demand for ethanol influenced by consistent high gasoline prices also encouraged sugar-ethanol plant decisions to divert more sugarcane to ethanol production.

Total ethanol production from corn in 2018 is estimated at 830 million liters, an increase of 305 million liters compared to 2017. Although a significant increase compared to the previous season, ethanol from corn represents less than two percent of total ethanol production. There are currently four plants producing ethanol from corn in Brazil in the states of Mato Grosso and Goias. Two are flex-plants, producing ethanol from both sugarcane and corn, and the remaining two are dedicated corn-only plants. Six additional plants are under construction in the two states and should be operational within 2-3 years.

Total cellulosic ethanol production for 2018 is estimated at 25 million liters, an increase of eight million liters compared to 2017, assuming that the existing plants are able to overcome current operational/mechanical challenges at the plant level. This amount represents an insignificant share of total ethanol production in Brazil.

Industrial Capacity

The total number of sugar-ethanol mills in 2018 remains unchanged at 384 units. Hydrated ethanol production capacity for 2018 is also reported unchanged at 40.012 billion liters. This figure reflects the authorized hydrated ethanol production capacity of 216,883 m³ per day, as reported by ANP, and assumes 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 and 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.

Sugarcane and Ethanol Prices Received by Producers

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 in both 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 Sao Paulo, the major

producing state, accounting for roughly 60 percent of the center-south production. The cumulative CONSECANA price (April-June 2018) for the state of Sao Paulo for the 2018/19 crop was R\$0.5718 per kg of TRS or approximately R\$76 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 Sao Paulo (R\$/000 liters).					
Period	2014	2015	2016	2017	2018
January	1456.10	1458.20	1996.70	2047.10	2015.70
February	1520.50	1552.50	2083.00	1916.90	2050.90
March	1610.20	1420.40	2113.70	1697.60	2076.10
April	1522.00	1401.50	1602.40	1635.30	1807.40
May	1366.40	1363.10	1536.40	1610.30	
June	1359.20	1352.40	1678.10	1509.90	
July	1373.90	1328.80	1636.60	1424.70	
August	1346.00	1300.70	1726.30	1552.30	
September	1362.40	1358.30	1796.80	1592.80	
October	1290.00	1658.30	2018.30	1669.70	
November	1329.90	1870.40	2086.60	1806.70	
December	1407.10	1888.10	2075.70	1928.80	
Source: USP/ESALQ/CEPEA.					

Price for Fuel Hydrated Ethanol - State of Sao Paulo (R\$/000 liters).					
Period	2014	2015	2016	2017	2018
January	1284.80	1325.60	1824.40	1815.80	1836.20
February	1368.60	1384.70	1916.40	1686.10	1852.20
March	1419.50	1261.30	1906.60	1526.40	1868.20
April	1338.50	1261.60	1396.60	1471.80	1538.70
May	1200.90	1226.50	1391.00	1414.20	
June	1214.90	1216.20	1501.90	1327.70	
July	1229.10	1199.00	1501.50	1304.00	
August	1207.00	1175.50	1559.70	1406.40	
September	1200.60	1273.40	1665.90	1442.30	
October	1138.30	1528.80	1857.90	1533.90	
November	1218.20	1709.00	1869.30	1651.10	
December	1265.50	1704.60	1867.90	1748.00	
Source: USP/ESALQ/CEPEA.					

Consumption

Total domestic demand for ethanol (fuel and other uses) for calendar year 2018 is estimated at 28.72 billion liters. Ethanol is mainly used for fuel in Brazil. No changes have been made to the current ethanol mandate which was set at 27 percent (E27) for Gasoline C as of March 16, 2015. Total ethanol consumption for use as fuel is estimated at 26.57 billion liters in 2018, an increase of four percent compared to 2017. This is primarily attributed to increased demand for hydrous ethanol at the pump influenced by steady high gasoline prices in several Brazilian states.

Note that consumer decisions to buy hydrous ethanol or gasoline at the pump are mainly driven by the ratio between hydrous ethanol and gasoline prices. The 70 percent ratio between hydrous ethanol and gasoline prices is the rule of thumb in determining whether flex car owners choose to fill up with hydrous ethanol (price ratio below 70 percent) or gasoline (price ratio above 70 percent). This decision is tied to the energy content of each fuel and the fact that ethanol's energy content is approximately 36 percent lower than pure fossil gasoline.

The tables below show ethanol and gasoline prices as well as the price ratio for selected states, cities, and months. Comparing the month of June 2018 with June 2017, the ethanol-gasoline price ratio has become more favorable for hydrous ethanol fueling in some major states with large automobile fleets (Sao Paulo, Minas Gerais, and Goias as sampled by ATO/Sao Paulo), thus increasing overall demand for hydrous ethanol.

Gasoline C and Hydrated Ethanol Prices in Selected States (average price, R\$/liter)									
		Gasoline				Ethanol			
		2015	2016	2017	2018	2015	2016	2017	2018
Sao Paulo State	Jan	2.918	3.520	3.628	3.998	1.935	2.601	2.777	2.858
	Feb	3.150	3.544	3.615	4.004	2.101	2.682	2.740	2.884
	Jun	3.128	3.464	3.327	4.340	1.969	2.271	2.266	2.768
	Aug	3.095	3.446	3.560		1.897	2.284	2.415	
Sao Paulo City	Jan	2.878	3.486	3.588	3.944	1.914	2.588	2.757	2.834
	Feb	3.100	3.507	3.584	3.954	2.069	2.658	2.748	2.865
	Jun	3.074	3.414	3.237	4.294	1.935	2.245	2.220	2.760
	Aug	3.042	3.394	3.507		1.862	2.237	2.391	
Minas Gerais	Jan	3.025	3.707	3.850	4.393	2.198	2.781	2.947	3.123
	Feb	3.304	3.741	3.827	4.438	2.363	2.907	2.944	3.186
	Jun	3.366	3.683	3.618	4.860	2.232	2.522	2.577	3.087
	Aug	3.340	3.684	3.871		2.152	2.548	2.684	
Belo Horizonte (MG Capital)	Jan	2.902	3.571	3.731	4.263	2.135	2.704	2.888	3.095
	Feb	3.225	3.616	3.723	4.327	2.312	2.884	2.902	3.187
	Jun	3.296	3.555	3.521	4.839	2.244	2.457	2.534	3.057
	Aug	3.245	3.560	3.733		2.098	2.482	2.613	
Rio Janeiro State	Jan	3.214	3.869	4.042	4.647	2.500	3.242	3.546	3.624
	Feb	3.453	3.899	4.024	4.671	2.662	3.363	3.535	3.688
	Jun	3.516	3.907	3.921	4.974	2.649	3.071	3.163	3.592
	Aug	3.516	3.890	4.151		2.635	3.055	3.199	
Rio Janeiro Capital	Jan	3.187	3.849	4.033	4.648	2.485	3.233	3.566	3.631

	Feb	3.433	3.880	3.999	4.651	2.661	3.372	3.526	3.693
	Jun	3.490	3.898	3.896	4.942	2.624	3.060	3.137	3.582
	Aug	3.497	3.869	4.130		2.618	3.038	3.181	
Porto Alegre (RS Capital)	Jan	2.967	3.963	3.813	4.351	2.389	3.501	3.697	3.932
	Feb	3.297	3.959	3.797	4.357	2.586	3.586	3.714	3.996
	Jun	3.289	3.810	3.731	4.698	2.491	3.352	3.439	4.039
	Aug	3.316	3.886	3.946		2.487	3.352	3.438	
Goiania (GO Capital)	Jan	3.220	3.650	3.902	4.464	2.181	2.629	3.023	2.890
	Feb	3.431	3.384	3.742	4.427	2.339	2.837	2.810	2.880
	Jun	3.170	3.782	3.771	4.840	1.974	2.659	2.689	2.935
	Aug	3.224	3.795	3.970		2.043	2.693	2.779	
Fortaleza (CE Capital)	Jan	3.151	3.876	3.980	4.302	2.572	3.073	3.288	3.453
	Feb	3.347	3.867	3.974	4.066	2.601	3.091	3.276	3.420
	Jun	3.370	3.968	3.845	4.726	2.609	3.274	3.255	3.770
	Aug	3.369	3.941	3.883		2.608	3.244	3.200	
Source: Petroleum, Natural Gas and Biofuels National Agency (ANP).									

Ratio Ethanol/Gasoline Prices		2015	2016	2017	2018
Sao Paulo State	Jan	66%	74%	77%	71%
	Feb	67%	76%	76%	72%
	Jun	63%	66%	68%	64%
	Aug	61%	66%	68%	
Sao Paulo City	Jan	67%	74%	77%	72%
	Feb	67%	76%	77%	72%
	Jun	63%	66%	69%	64%
	Aug	61%	66%	68%	
Minas Gerais	Jan	73%	75%	77%	71%
	Feb	72%	78%	77%	72%
	Jun	66%	68%	71%	64%
	Aug	64%	69%	69%	
Belo Horizonte (MG Capital)	Jan	74%	76%	77%	73%
	Feb	72%	80%	78%	74%
	Jun	68%	69%	72%	63%
	Aug	65%	70%	70%	
Rio Janeiro State	Jan	78%	84%	88%	78%
	Feb	77%	86%	88%	79%
	Jun	75%	79%	81%	72%
	Aug	75%	79%	77%	
Rio Janeiro Capital	Jan	78%	84%	88%	78%
	Feb	78%	87%	88%	79%
	Jun	75%	79%	81%	72%
	Aug	75%	79%	77%	
Porto Alegre (RS Capital)	Jan	81%	88%	97%	90%
	Feb	78%	91%	98%	92%

	Jun	76%	88%	92%	86%
	Aug	75%	86%	87%	
Goiania (GO Capital)	Jan	68%	72%	77%	65%
	Feb	68%	84%	75%	65%
	Jun	62%	70%	71%	61%
	Aug	63%	71%	70%	
	Jan	82%	79%	83%	80%
Fortaleza (CE Capital)	Feb	78%	80%	82%	84%
	Jun	77%	83%	85%	80%
	Aug	77%	82%	82%	
	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 plays a strong role in encouraging ethanol consumption. In fact, it is the primary factor considered by ANP when projecting fuel use for Brazil. The fleet was estimated at 36.5 million units in June 2018 and pure hydrous ethanol and flex fuel powered vehicles together represent 77 percent (28.1 million units) of the total fleet, an increase of one million units over last year.

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. Purchasing of new flex-cars has not reached pre-economic recession levels, however shows a modest recovery from the sales low recorded in 2015.

Licensing of Ethanol Powered Vehicles (pure ethanol & flex fuel units)						
2012	2013	2014	2015	2016	2017	2018 /1
3,162,824	3,169,111	2,940,508	2,194,020	1,750,754	1,927,221	986,998
Source: National Association of Vehicle Manufacturers (ANFAVEA) 1/ January-June						

Trade

Exports

Brazil's total ethanol exports for 2018 are estimated at 1.12 billion liters, down eighteen percent from 2017. The increased but limited supply to meet the expected increase in domestic demand has posed a constraint toward exports. The tables below show ethanol exports (NCM 2207.10 through 2207.20.19) for 2016, 2017, and 2018 (January-June), as reported by the Brazilian Secretariat of Foreign Trade (SECEX). Previously, SECEX reported ethanol exports by volume, weight, and value. However due to a recent system change over the last year, SECEX no longer reports trade in ethanol by volume.

Brazilian Ethanol Exports (NCM 2207.10, 2207.20.11 & 2207.20.19, MT, US\$ 1,000 FOB)						
	CY 2016		CY 2017		CY 2018 1/	
Country	Weight	Value	Weight	Value	Weight	Value

United States	629,311	421,649	782,053	578,079	274,257	218,694
South Korea	514,418	300,267	226,510	136,864	106,145	66,347
Japan	64,972	44,619	67,189	50,299	29,309	23,751
Netherlands	65,259	37,181	36,258	22,888	15,303	12,256
Colombia	12,339	8,377	8,073	6,348	5,969	4,304
Paraguay	110	115	162	200	3,198	2,657
Angola	5,514	3,817	1,302	1,152	526	430
Uruguay	2,238	1,592	1,787	1,280	428	316
Cote D'Ivoire	197	169	823	710	342	290
France	0	0	388	653	116	204
Others	140,435	78,556	10,596	8,385	521	522
Total	1,434,793	896,343	1,135,142	806,856	436,114	329,770

Source : Brazilian Foreign Trade Secretariat (SECEX)

Note : Numbers may not add due to rounding 1/Jan-Jun.

Imports

Brazil's total ethanol imports for 2018 are projected at approximately two billion liters, an increase of 255 million liters compared to 2017. Brazil's increased but limited domestic supply will likely not be sufficient to meet projected demand, therefore encouraging ethanol imports. Ethanol imports are only for fuel use and originate almost entirely from the United States. Note that even with the 20 percent import tariff paid on imports above the quarterly 150 million liter tariff-rate quota (TRQ), the price arbitrage still favors U.S. ethanol exports to Brazil. For more information on Brazil's TRQ for imported ethanol, see Section II.

The tables below show ethanol imports (NCM 2207.10 through 2207.20.19) for 2016, 2017 and 2018 (January-June), as reported by SECEX. However due to a recent system change over the last year, SECEX no longer reports trade in ethanol by volume.

Brazilian Ethanol Imports (NCM 2207.10, 2207.20.11 & 2207.20.19, MT, US\$ 1,000 FOB)						
Country	CY 2016		CY 2017		CY 2018 1/	
	Weight	Value	Weight	Value	Weight	Value
United States	655,378	392,779	1,451,906	896,266	962,245	515,554
Germany	48	354	100	645	44	280
Poland	80	105	63	83	58	84
Mexico	6	47	8	62	2	16
Spain	3	14	2	15	1	10
France	9	65	12	91	1	4
Japan	0	5	0	0	0	3
United Kingdom	0	0	0	1	0	1
Greece	0	0	0	0	0	1
Denmark	0	0	0	0	0	0
Others	1,741	1,315	512	629	0	0
Total	657,264	394,684	1,452,603	897,792	962,351	515,954

Source : Brazilian Foreign Trade Secretariat (SECEX)

Numbers may not add due to rounding 1/Jan-Jun.

V. Biodiesel

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) 2009 through 2018.

Biodiesel (Million Liters)										
Calendar Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018f
Beginning Stocks	90	135	60	132	54	42	52	46	47	36
Production	1,608	2,386	2,673	2,717	2,955	3,460	4,010	3,801	4,291	5,400
Imports	4	9	18	0	0	0	0	0	0	0
Exports	3	8	6	0	39	40	12	0	0	0
Consumption	1,565	2,462	2,613	2,795	2,928	3,410	4,004	3,800	4,302	5,374
Ending Stocks	135	60	132	54	42	52	46	47	36	62
Balance Check	0	0	0	0	0	0	0	0	0	0
Production Capacity (Million Liters)										
Number of Biorefineries	63	66	65	65	64	58	57	51	51	51
Nameplate Capacity	4,350	5,837	6,742	7,400	7,900	7,722	7,860	7,191	8,140	8,400
Capacity Use (%)	37.0%	40.9%	39.6%	36.7%	37.4%	44.8%	51.0%	52.9%	52.7%	64.3%
Feedstock Use for Fuel (1,000 MT)										
Soy oil, Crude	1,124	1,762	1,934	1,834	1,925	2,294	2,703	2,615	2,702	3,598
Animal Fat (tallow)	247	317	352	461	586	702	759	612	696	986
Market Penetration (Million Liters)										
Biodiesel, on-road use	n/a	n/a	n/a	n/a	n/a	2,458	2,927	2,759	3,123	3,901
Diesel, on-road use	n/a	n/a	n/a	n/a	n/a	43,283	41,813	39,402	39,761	40,357
Blend Rate (%)	n/a	n/a	n/a	n/a	n/a	5.7%	7.0%	7.0%	7.9%	9.7%
Diesel, total use	44,298	49,239	52,264	55,900	58,572	60,032	57,211	54,279	54,772	55,594

Production

Biodiesel is a trans-esterified vegetable oil, also known as fatty acid methyl ester (FAME), produced from plant and animal oils and fats. According to updated information reported by the Petroleum, Natural Gas and Biofuels National Agency (ANP), about 70 percent of biodiesel produced is currently made from soybean oil, and 17 percent is made from animal fat (tallow). The remaining feedstocks used are "others," used cooking oil, and cottonseed oil.

Biodiesel production remains regulated by the government. Biodiesel production in 2017 was 4.3 billion liters, an increase of 13 percent compared to 2016, due to the slight increase in diesel consumption and the increase of the biodiesel blend to eight percent (B8) in March 2017. Total Brazilian biodiesel production for 2018 is estimated at 5.4 billion liters, an increase of 26 percent

compared to 2017, based on the increase of the biodiesel blend to 10 percent (B10) in March 2018 and the projected 1.5 percent growth of the Brazilian economy in 2018. According to ANP, cumulative January-May 2018 production is approximately 2.42 billion liters. Biodiesel production by month is reported below.

According to industry contacts, Brazil has 51 plants authorized to produce biodiesel. According to ANP, the authorized industrial capacity for 2017 is estimated at 8.14 billion liters/year, based on a 360-day operational cycle. ATO/Sao Paulo estimates a total of 51 biodiesel plants for 2018 with an industrial capacity of 8.4 billion liters per year, up three percent from the current industrial capacity, based on the requests by biodiesel companies to ANP to add new capacity to existing plants. This represents approximately 1.56 times the mandatory biodiesel production to be blended in mineral diesel in 2018.

Brazilian Biodiesel Monthly Production/Deliveries (000 liters)						
Month	2013	2014	2015	2016	2017	2018
January	226,505	245,215	319,546	271,388	255,361	337,818
February	205,738	240,529	303,594	300,065	259,812	338,420
March	230,752	271,839	322,692	323,158	335,069	452,310
April	253,591	253,224	324,526	348,485	347,603	446,164
May	245,934	242,526	338,851	328,814	369,316	383,126
June	236,441	251,517	322,185	292,772	359,236	466,918
July	260,671	302,971	341,094	337,435	387,236	
August	247,610	314,532	344,038	327,183	399,997	
September	252,714	312,665	330,388	313,309	398,707	
October	277,992	321,603	359,166	341,024	409,344	
November	265,176	316,627	324,662	321,560	386,941	
December	214,364	348,962	306,526	296,145	382,671	
Total	2,917,488	3,422,210	3,937,269	3,801,339	4,291,294	2,424,755

Source: ANP.

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 update the results of the 56th through the 61st auctions from August 2017 July 2018, as published by ANP.

Biodiesel Auctions			
Auction	56th Auction	57th Auction	58th Auction
Date	Aug-17	Out-17	Dec-17
Number of Suppliers	33	35	35
Offered Quantity (m3)	885,217	872,710	879,786
Purchased Quantity (m3)	796,004	759,935	713,376
Max Reference Price (R\$/m3)	3,080	3,195	3,270
Average Price (R\$/m3) 1/	2,317	2,334	2,400

Delivery Date	Sep-Out/17	Nov-Dec/17	Jan-Feb/18
Source: ANP 1/ Price FOB, including PIS/PASEP and COFINS, excluding ICMS, including PetroBras margin.			

Biodiesel Auctions			
Auction	59th Auction	60th Auction	61th Auction
Date	Feb-18	Apr-18	Jun-18
Number of Suppliers	38	38	38
Offered Quantity (m3)	1,013,227	1,033,000	1,040,000
Purchased Quantity (m3)	903,225	928,138	1,010,000
Opening/Reference Price (R\$/m3)	2,970	2,910	3,070
Average Price (R\$/m3) 1/	2,590	2,423.00	2,631.00
Delivery Date	Mar-Apr/18	May-Jun/18	Jul-Aug/18
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 and hedge their activities to offset risk.

Industry sources report that raw materials represent approximately 75-80 percent of biodiesel production cost whereas other inputs such as methanol and additives represent 10 percent of the total cost. Given that over 70 percent of biodiesel production still uses soybean oil as the feedstock, the profitability of the sector is highly dependent on soybean oil prices. The tables below show the price for soybean oil in 2017 and 2018 (January-May). The average crude price in the state of Sao Paulo is US\$ 735/ton for January-May 2018, a decrease of 14 percent compared to the same period in 2017, partially due to the devaluation of the Brazilian real in 2018.

Soybean Oil, Crude - Prices (2017)						
Location	Jan	Feb	Mar	Apr	May	Jun
Chicago (US\$/ton)	783	748	731	698	713	702
Premium (US\$/ton)	10	18	-2	13	19	35
Port of Paranaguá - Fob (US\$/ton)	793	765	730	710	732	737
São Paulo - (US\$/ton com ICMS 12%)	938	891	840	793	789	866
Elaborated by ABIOVE based on several sources.						

Soybean Oil, Crude - Prices (2017)						
Location	Jul	Aug	Sep	Oct	Nov	Dec

Chicago (US\$/ton)	738	751	762	739	765	734
Premium (US\$/ton)	11	8	21	26	17	13
Port of Paranaguá - Fob (US\$/ton)	749	759	783	765	782	747
São Paulo - (US\$/ton com ICMS 12%)	867	863	862	845	868	746
Elaborated by ABIOVE based on several sources.						

Soybean Oil, Crude - Prices (2018)						
Location	Jan	Feb	Mar	Apr	May	Jun
Chicago (US\$/ton)	730	708	704	691	685	--
Premium (US\$/ton)	26	37	36	59	21	--
Port of Paranaguá - Fob (US\$/ton)	756	745	741	750	706	--
São Paulo - (US\$/ton com ICMS 12%)	767	748	736	733	692	--
Elaborated by ABIOVE based on several sources.						

Consumption

Biodiesel domestic consumption in Brazil remains tightly regulated by the government, and is a function of two variables, the mandatory blend rate and overall diesel consumption, which is closely correlated to GDP. The current biodiesel mandate, which went into effect in March 2018, requires all mineral diesel to have a ten percent biodiesel blend (B10). The Brazilian economy is expected to post a modest recovery in 2018, with expected GDP growth of 1.5 percent. Diesel consumption for 2018, which strictly follows GDP growth, is therefore estimated at 55.6 billion liters, up 822 million liters compared to 2017. Based on these factors, Post estimates total domestic biodiesel consumption for 2018 at approximately 5.37 billion liters, an increase of 25 percent relative to 2017 (4.3 billion liters). For more information on potential future increases in biodiesel consumption as a result of the RenovaBio Program, please see Section II.

Recent Trucker Strike

On May 21, 2018, hundreds of thousands of Brazil's nearly two million truck drivers began an 11-day strike to protest high diesel prices, a move that slowed Brazil's economy, crippled transportation-dependent industries, and caused estimated losses of US\$ 1.75 billion to Brazil's agricultural sector.

The strike was spurred by rapidly rising fuel prices (diesel prices in May were up 43 percent since July 2017), combined with the effects of the Brazilian real continuing to weaken against the U.S. dollar. Last year, Brazil's state-controlled oil company Petrobras changed its pricing policies allow daily fluctuations of fuel prices pegged to the international oil market and scrapped subsidies that had kept domestic fuel prices lower. Most Brazilian truck drivers are largely self-employed and daily increases in fuel costs had begun to cut deeply into their incomes. To end the strike the Brazilian government agreed to reduce diesel prices by 0.46 reais per liter by reducing taxes, hold prices stable for 60 days, and reduce tolls for large trucks. The measures largely worked, with most truckers returning to the road and deliveries of food, fuel, and medicine beginning to flow again, albeit at a slower, more unreliable pace. No long term solution has yet been reached between the truckers union and the GOB, and with presidential

elections in October 2018, industry contacts are left to speculate on a final resolution. However, standardized freight rates are currently under discussion, and the strike is not expected to impact total diesel consumption in 2018.

Trade

Brazil does not export any significant amounts of biodiesel. In general, this is because it is not price competitive compared to diesel, and traders report it makes no economic sense to export biodiesel. The following tables depict Brazil's exports of biodiesel by country of destination in 2016, 2017, and 2018 (January – June) for HS code NCM 3826.00.00, according to SECEX. To date, there has been no significant trade.

Brazilian Biodiesel Exports by Country of Destination (kg, US\$ FOB)						
	CY 2016		CY 2017		CY 2018 1/	
Country	Quantity	Value	Quantity	Value	Quantity	Value
Japan	130	8,000	0	0	44	4,000
Turkey	0	0	97,200	69,871	0	0
Peru	0	0	16,560	48,060	0	0
Malaysia	4	20	0	0	0	0
Total	134	8,020	113,760	117,931	44	4,000

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 2016		CY 2017		CY 2018 1/	
Country	Quantity	Value	Quantity	Value	Quantity	Value
France	360	133	0	0	0	0

Source : Brazilian Secretariat of Foreign Trade SECEX - Note: NCM 3826.00.00 - 1/ Jan-June

Similarly, trade under NCM 2710.20 remains insignificant. In 2017, Brazil exported only 2.32 metric tons, biodiesel equivalent basis, a 26 percent drop compared to 2016. Imports for 2017 were 9.4 metric tons, an increase of 33 percent vis-a-vis the previous year.

Brazil imports almost no biodiesel by design. The National Biodiesel Production Program (PNPB) was created in 2004 and is regulated by ANP through an auction system. The PNPB requires that only domestically produced biodiesel is eligible for the auction. Businesses, including heavy duty fleets like long haul trucks, buses, rail transportation and agricultural machinery, are allowed to use higher blends than those set by the current legislation and could potentially import biodiesel. However, they do not in practice because the price of imported product is not competitive with domestically produced biodiesel. This is partially, but not entirely, attributed to the 14% import tariff on biodiesel. For more information on the PNPB program, please refer to Section II.

VI. Advanced Biofuels

No significant changes have been made to the current status of advanced biofuels research, development and production in Brazil. 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. 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. Advanced ethanol production capacity is estimated at 127 million liters, whereas actual production for 2018 is projected at 27 million liters, all from sugarcane bagasse. Note that total cellulosic ethanol production is still an insignificant fraction of total ethanol production in Brazil.

VII. Notes on Statistical Data

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 reflects all stocks at the ethanol plants as of January 1. 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).

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.

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. Given that all Brazilian official publications and industry sources report production in hydrous/anhydrous ethanol only, 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).

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 volume. 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 industry sources.

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. Using UNICA’s source material, 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 with no adjustments needed. 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. Feedstock use and co-product data are consistent with fuel ethanol production figures and based on the following conversion rates:

1 metric ton of sugarcane = 80 liters of ethanol
 1 metric ton of corn = 410 liters of ethanol
 1 metric ton of corn yields 313 kg of DDGs

Note that 1 metric ton of ethanol = 1,167 liters of ethanol

Biodiesel

Historical 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. The 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 in mineral diesel set by Brazilian legislation.

Trade figures are 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 – pure biodiesel (B100) and their blends above B30
- As of 2012 – NCM 2710.20 – petroleum oils containing biodiesel up to and including 30% by volume. The following assumption was made: 1 metric ton of petroleum oils and oils obtained from bituminous minerals which falls under NCM 2710.20 is equivalent to 0.15 metric tons of pure biodiesel (B100).

The number of bio refineries and production capacity are based on ANP reports. Feedstock use data are consistent with biodiesel production figures and based on the following conversion rates:

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

Note that 1 metric ton of biodiesel = 1,136 liters of biodiesel

APPENDIX

I. Brazil's Geographic Division

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



II. Exchange Rate

Exchange Rate (R\$/US\$1.00 - official rate, last day of period)							
Month	2012	2013	2014	2015	2016	2017	2018
January	1.74	1.99	2.43	2.66	4.04	3.13	3.16
February	1.71	1.98	2.33	2.88	3.98	3.10	3.24
March	1.82	2.01	2.26	3.21	3.56	3.17	3.32
April	1.89	2.00	2.24	2.98	3.45	3.20	3.48
May	2.02	2.13	2.24	3.18	3.60	3.26	3.73
June	2.02	2.22	2.20	3.10	3.21	3.30	3.85
July	2.05	2.29	2.27	3.39	3.24	3.13	3.75
August	2.04	2.37	2.24	3.65	3.24	3.14	
September	2.03	2.23	2.45	3.98	3.25	3.16	
October	2.03	2.20	2.44	3.86	3.18	3.27	
November	2.10	2.32	2.56	3.85	3.40	3.26	
December	2.04	2.34	2.66	3.90	3.47	3.30	

Source : Brazilian Central Bank (BACEN)