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Report Highlights:

Total ethanol production for 2020 is estimated at 31.35 billion liters, a decrease of 16 percent relative to the revised figure for 2019 (37.38 billion liters), mainly because sugar-ethanol plants are diverting more sugarcane towards sugar production. Biodiesel production remains tightly regulated by the government. Total Brazilian biodiesel production in 2020 is estimated at 6.27 billion liters, an increase of six percent compared to the previous year. The Renovabio Program officially went into effect last December and it is designed to support Brazil's 21st Conference of the Parties (COP21) goals. On April 27, 2020, the Brazilian Stock Exchange (B3) started to trade Decarbonization Credits (CBios) as prescribed under the program. However, the COVID-19 pandemic and the expected negative impact in the Brazilian Otto-cycle fuel consumption (gasoline and ethanol) in the next couple of years, forced the Ministry of Mines and Energy (MME) to propose the review of compulsory targets under RenovaBio.

I. Executive Summary

The RenovaBio Program is designed to support Brazil's 21st Conference of the Parties (COP21) goals. RenovaBio was announced in December 2016 by the Ministry of Mines and Energy (MME). The RenovaBio operation is based on three main instruments:

- 1) Annual carbon intensity reduction targets (CO₂/MJ) for a minimum period of ten years.
- 2) Certification of biofuels by efficiency in reducing Greenhouse Gases (GHG) emissions.
- 3) Decarbonization Credits (CBio).

The COVID-19 pandemic and the expected negative impact in the Brazilian Otto-cycle fuel consumption (gasoline and ethanol) in the next couple of years, forced MME to propose the review of compulsory targets. The new revised compulsory CBio targets should be finalized by mid-August, after MME analyses the several proposals for reductions from the industry.

On April 27, 2020 the Brazilian Stock Exchange (B3) started to trade CBios, as prescribed under the RenovaBio program. According to information provided by B3, the stock exchange has 5.06 million CBios for purchase as of August 5. Although, trading of CBios has improved since mid-June, the overall trading volume remains far short of proposed goals for 2020. B3 reports that 153,199 CBios have been traded until August 4. The trading of CBios formalize the recognition of the environmental benefits of biofuels and provides additional remuneration for biofuels producers enrolled in the program. CBios are not intended and will likely not reduce the price of ethanol for producers. On the contrary, they are meant to be an extra revenue stream for producers.

No changes have been made to the current ethanol mandate, which remains at 27 percent (E27) for Gasoline C (*Gasolina comum*) since March 16, 2015. No changes have been made on the Contribution for Intervention in Economic Domain (CIDE) and Contribution to the Social Integration Program/Contribution for Financing Social Security (PIS/COFINS) taxes for ethanol or gasoline. The Brazilian government (GOB) instituted an annual 600 million liter tariff-rate quota (TRQ) in September 2017. Two years later, it was revised to 750 million liters on ethanol imports from September 1, 2019 through August 31, 2020. Any volume above the quota is subject to the 20 percent Common External Tariff under the Mercosur agreement. The GOB has not released any official communication regarding the removal of the TRQ and/or the import tariff on ethanol.

Total ethanol production for 2020 is estimated at 31.35 billion liters, a decrease of 16 percent relative to the revised figure for 2019 (37.38 billion liters), mainly because sugar-ethanol plants are diverting more sugarcane towards sugar production. Total ethanol consumption for use as fuel in 2020 is estimated at 26.78 billion liters, a significant decrease of 18 percent relative to 2019 (32.85 billion liters), due to social distancing measures and the economic downturn related to the COVID-19 pandemic. The drop in consumption for hydrous and anhydrous ethanol is estimated at 19 and 17 percent, respectively. Ethanol exports for 2020 are estimated at 1.9 billion liters, whereas imports are estimated at 1.5 billion liters.

Biodiesel production remains tightly regulated by the government. Total Brazilian biodiesel production in 2020 is estimated at 6.27 billion liters, an increase of six percent compared to the previous year. The increase is due to the higher biodiesel blend-mandate (B12) and the projected estimate for diesel consumption (52.9 billion liters). Biodiesel trade is nearly inexistent.

II. Policy and Programs

RenovaBio Program

The RenovaBio Program is designed to support Brazil's 21st Conference of the Parties (COP21) of the United Nations Framework Convention on Climate Change (UNFCCC) goals. COP21 was held in Paris and each one of the 190 participating countries submitted their plan to reduce domestic emissions of greenhouse gases (GHGs), called an "Intended Nationally Determined Contribution (INDC). Brazil voluntarily committed to reduce domestic emissions of GHGs by 37 percent by 2025 and by 43 percent by 2030, from 2005 levels (see "[Brazilian Biofuels Annual Gain Report 2018](#)" for additional information).

RenovaBio was announced 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's goals include:

1. Contributing to meet the country's commitments under the COP21 Paris Agreement under the UNFCCC.
2. Contributing 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. Promoting the adequate expansion of the production and use of biofuels in the national energy matrix, emphasizing the continuity of fuels supply.
4. Contributing to the predictability of biofuels in the national fuel market.

The RenovaBio operation is based on three main instruments:

1. Annual carbon intensity reduction targets (CO₂/MJ) for a minimum period of ten years.
2. Certification of biofuels by efficiency in reducing GHG emissions.
3. Decarbonization Credits (CBio).

The 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, etc), provides a reduction of GHG emissions, which is not currently valued due to the absence of a specific market. By creating a market for CBios, the RenovaBio program aims to formalize recognition of the environmental benefits of biofuels and remuneration for the sector's role in reducing GHG emissions.

RenovaBio Program's Updates

This report updates the "[Brazilian Biofuels Annual Gain Report 2018](#)" and the "[Brazilian Biofuels Annual Gain Report 2019](#)" illustrating the progress of the RenovaBio program.

In June 2019, MME/National Council for Energy Policy (CNPE) Resolution #15 approved the compulsory targets to be met by fuel distributors for the 2020-2029 cycles. Later in late December 2019, the RenovaBio program was officially launched. Under the program, the compulsory targets aim to reduce the carbon intensity (CI) of transportation fuels to 66.1 g CO₂/MJ (a reduction of 10.2 percent) by 2029 from the 2018 base of CI of 73.6 g CO₂/MJ. In order to guarantee the proposed targets, MME estimated that 95.5 million CBios would need to be traded in 2029 (see table below).

Year	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Annual Target (in millions of CBios)	16.8	28.7	41.0	49.8	59.6	66.9	73.3	79.5	85.1	90.1	95.5
Tolerance Interval	-	-	45.5	54.3	64.1	71.4	77.8	84.0	89.6	94.6	100
	-	-	36.5	45.3	55.1	62.4	68.8	75.0	80.6	85.6	91.0

Each CBio corresponds to one metric ton of carbon saved through the utilization of biofuels versus fossil fuels. The National Agency for Petroleum, Natural Gas and Biofuels' (ANP) Resolution #791/2019 breaks down the annual compulsory target for carbon intensity reduction for each individual distributor based on the fossil fuel (gasoline and diesel) traded by a company in the previous year. Distributors with no previous year sales are not required to meet any target.

Under RenovaBio, certified producers and importers of biofuels are able to sell CBios. The program is voluntary for biofuels producers/importers, but mandatory of fuel distributors. The number of CBios that each party is able to sell depends on the volume of biofuel sold and its environmental/energy efficiency rating. RenovaCalc, the program's analytical tool that measures the biofuels CI in g CO₂/MJ, provides the rating. It compares the CI to the equivalent fossil fuel to double-check the environmental performance from biofuels production.

There are roughly ten auditing/certifying companies currently registered under RenovaBio to provide certification for plants aiming to issue CBios. The companies are Green Domus, SGS, Instituto Totum, Fundacao Vanzolini, KPMG, Benri, Verifit, Intertek, ABNT, and PricewaterhouseCoopers (PwC).

CBios must be negotiated on Brazil's B3, the stock exchange, by fuel distributors, which are required to achieve individual decarbonization goals based on their market share. While fuel distributors are obligated to purchase CBios, producers and investors can trade them as well. On April 27, 2020, B3 started to trade CBios, as prescribed under the program. The rules for commercialization of CBios are reported in Bill #13,576 adopted on December 26, 2017. There are current discussions at the Brazilian Congress with regard to taxes that should be applied to CBios.

The COVID-19 pandemic and the expected negative impact in the Brazilian Otto-cycle fuel consumption (gasoline and ethanol) in the next couple of years, forced MME to propose the review of compulsory targets. In addition, the Association of Fuel Distributors (Brasilcom), which represents part of the fuel distributors, argued that the distributors decarbonization targets need to be redefined because the pandemic has changed the projections for fuel supply and demand in Brazil. Brasilcom also claimed that some technical problems and questioning on operational parameters used by RenovaBio have negatively affected the industry since the beginning of the program.

As a result, MME held a public comment period from June 5 through July 4, 2020 to redefine the decarbonization targets for fuel distributors previously set in June 2019 (see compulsory targets table above). MME's proposed reducing by 18 percent the targeted number of CBios to be sold from 2020 through 2030, from a total of approximately 759 million CBios (as originally set in June 2019) to approximately 620 million CBios. MME also proposed a more drastic reduction in the first two years of the program, reducing by nearly 50 percent the targeted number of CBios to be sold in 2020. The suggested reduction was from 28.7 million to 14.53 million CBios, reducing by 40 percent the current target for 2021, from 41 million to 24.86 million CBios. The new revised compulsory CBio targets is pending approval from the Presidential Office.

The private sector's proposals were more aggressive than MME. For instance, Brasilcom suggested dropping the 2020 target to just 5 million CBios. The Sugarcane Industry Union (UNICA) suggested a target of 16 million CBios for 2020 based on the availability of certified biofuel. For 2021, UNICA suggests a target of 33.6 million CBios. The U.S. ethanol industry represented by U.S. Grains Council, the Renewable Fuels Association, and Growth Energy, also submitted a suggestion at MME's public comment period. For the U.S. ethanol industry, the target reduction should be concentrated in 2020 and 2021 since the impacts of the COVID-19 pandemic will likely be less pronounced in later years. They proposed dropping the target for 2020 to 17 million CBios and the target for 2021 to 35 million CBios to adequately reflect reduced fuel demand due to the COVID-19 pandemic and the implementation and certification delays of the RenovaBio program. The U.S. ethanol industry also requested that the targets are kept unchanged as of 2022.

As of June 30, there were approximately 220 biofuels plants (sugarcane ethanol, corn ethanol, and biodiesel) certified and authorized to request the issuance of CBios. The aforementioned units have the aggregated potential to generate approximately 33.87 million CBios. The start of CBios trade in the B3 stock exchange highlights that the RenovaBio regulatory and legal processes have been concluded successfully and there is a significant voluntary adherence from producers to the certification process.

According to information provided by B3, the stock exchange has 5.058 million CBios for purchase as of August 5. Although, trading of CBios has improved since mid-June, the overall trading volume remains far short of proposed goals for 2020. B3 reports that 153,199 CBios have been traded as of August 4, 2020. Trading levels have ranged from R\$15 to R\$22/mt of carbon, which with current exchange rate translates to a range of US\$2.88 to US\$4.20/mt of carbon.

Note that by creating a market for CBios, RenovaBio aims to formalize recognition of the environmental benefits of biofuels and addition remuneration for producers enrolled in the program. CBios are not intended and will likely not reduce the price of ethanol for producers. On the contrary, they are meant to be an additional revenue stream for producers.

The Revocation of Sugarcane Agri-ecological Zoning (“ZAE-Cana”)

In November 2019, President Bolsonaro signed Decree #10.084, revoking ZAE-Cana, which stands for the Sugarcane Agroecological Zoning. ZAE-Cana was originally launched in 2009 to promote sustainable sugarcane growth and development, while preserving the environment. ZAE-Cana is a thorough study of all Brazilian geographical regions; taking into account not only soil and weather patterns, but also environmental, economic and social aspects, to guide the sustainable development of the industry. This policy change will allow sugarcane cultivation in the Amazon and Pantanal regions. For additional information on ZAE-Cana, refer to the “[Brazilian Biofuels Annual Report 2010](#)”.

The sugarcane industry reacted to the cancelling of ZAE-Cana reporting that it was fundamental in the past to protect the Amazon. However, the industry claims that RenovaBio will provide additional benefits than ZAE-Cana.

Government Support for Ethanol Programs

Anhydrous Ethanol Use Mandate for Gasoline C

No changes have been made to the current ethanol mandate, which remains at 27 percent (E27) for Gasoline C (*Gasolina comum*) 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 shows the ethanol-use mandate since 2006.

Anhydrous 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

Source: MME

Tax Incentives for Ethanol Fuel

Brazil 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 Brazilian Government (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 the Contribution for Intervention in Economic Domain (CIDE) and the 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 the Tax for Circulation of Goods and Services (ICMS) for ethanol and gasoline.

The recent downturn in Brazilian fuel demand due to the COVID-19 pandemic and consequent decrease in fuel demand pushed the Brazilian ethanol industry to request the government support. UNICA, the growers' association representing ethanol producers from Brazil's Center-South region, pressed the federal government to support the sector. UNICA's three main requests have been:

1. The temporary waving of the PIS and COFINS.
2. A credit line to finance ethanol inventories.
3. An increase in the CIDE tax charged on gasoline.

In spite of initial rumors that the ethanol industry would succeed in their requests, President Jair Bolsonaro positioned himself against any tax changes, mentioning that increasing the CIDE tax charged on gasoline would not be fair with the oil industry. As of the date of this report, no effective measures have been announced.

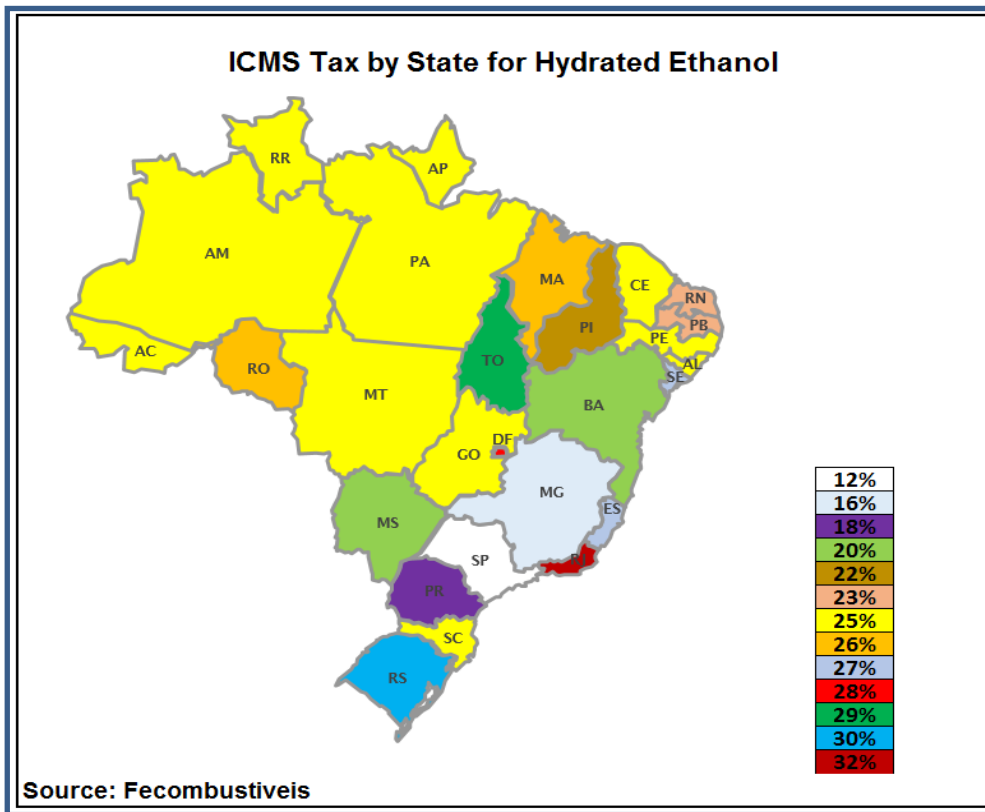
The current taxes applied to ethanol and gasoline are:

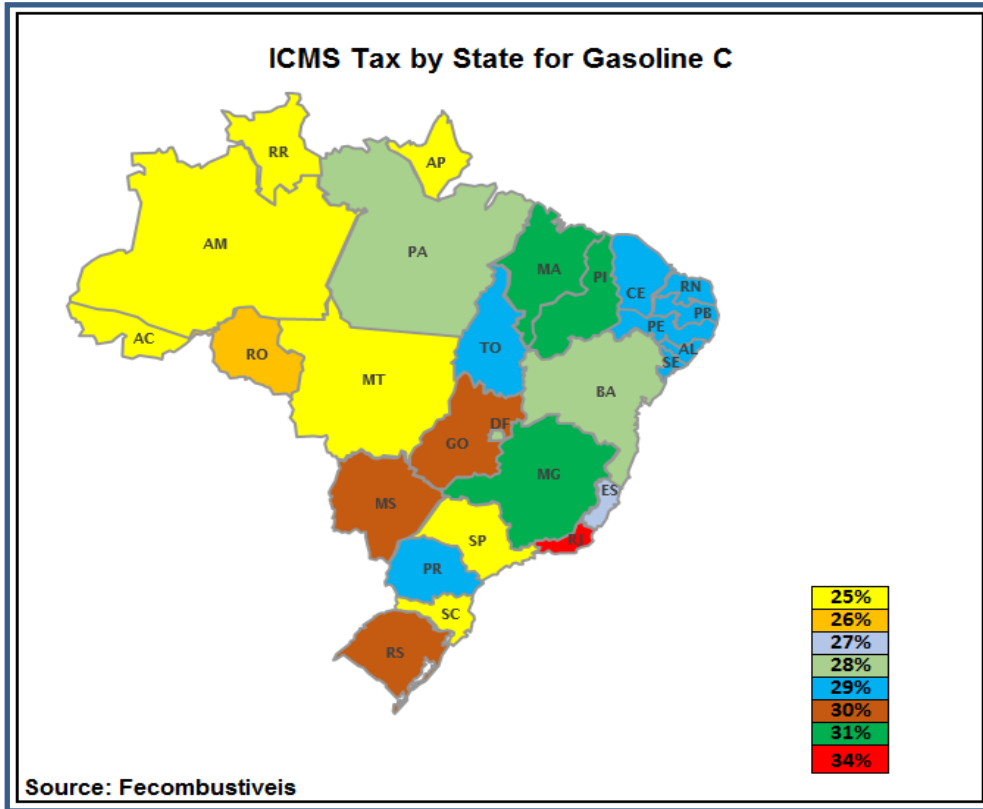
1. Contribution for Intervention in Economic Domain (CIDE): CIDE was created in December 2001 by Bill # 10.336 to tax oil and derivatives, natural gas and derivatives, and fuel ethanol. The tax was created to finance infrastructure works and maintenance of the transportation system, as well as to finance environmental projects related to the oil and natural gas industry. It was also established to pay for distribution subsidies, if determined by specific legislation to ethanol, natural gas, and oil derivatives. CIDE for ethanol, while an applicable tax, has been fixed to zero since May 2004, according to Presidential Decree # 5,060 of April 2014. For gasoline, Presidential Decree # 8,395 of January 2015 increased the CIDE from zero to R\$ 0.10/liter. No changes have been made on the CIDE for ethanol and gasoline since 2015. See the "[Brazilian Biofuels Annual Gain Report 2015](#)" for historical information on CIDE.
2. Contribution to the Social Integration Program (PIS) and Contribution for Financing Social Security (COFINS): PIS/COFINS are federal taxes created by Supplemental Bills # 7 and # 8 and Supplemental Bill 70 from December 1991, respectively. They were both created to finance the Brazilian social security system including payment of unemployment salary support, social support, and the public health system. PIS and COFINS follow similar tax regimes and are usually charged together. Generally, they are charged as a percentage of the gross sales, but they can also be applied as a set amount per volume of fuel.

In July 2017, the PIS/COFINS tax for gasoline rose from R\$0.38 cents/liter to R\$0.79 cents/liter. The increase for ethanol producers rose from R\$0.12 cents/liter to R\$0.13 cents/liter, while for ethanol distributors, it increased from zero to R\$0.11 cents/liter. The lower increase for ethanol compared to gasoline tends to favor the competitiveness of hydrous ethanol, given that the difference in PIS/COFINS for gasoline and ethanol is now R\$0.55 cents/liter. According to the current Brazilian legislation, the PIS/COFINS applied to ethanol is restricted to a maximum tax of 9.25 percent of the average retail price. No changes have been made on PIS/COFINS for

ethanol or gasoline since 2017. See the [“Brazilian Biofuels Annual Gain Report 2017”](#) for historical information on PIS/COFINS.

3. Tax for Circulation of Goods and Services (ICMS): ICMS is a state tax that varies from state to state. The payment of ICMS is also related to different tax regimes depending on the state. As reported by the National Federation for Fuel and Lubricant Commerce (Fecombustiveis) in July 2020, the current ICMS tax charged on ethanol varies from 12 to 32 percent, whereas 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.





Direct Sales of Hydrated Ethanol

Last June, Brazil's National Energy Council (CNPE) approved a resolution that establishes rules allowing producers of hydrated ethanol fuel to sell directly from the mill to gas station owners. The resolution allows producers to bypass fuel distribution companies, which had been mandatory before. The National Agency for Petroleum, Gas, and Biofuels (ANP) will now be required to establish regulations to govern the process before the policy goes into effect.

The Brazilian Ministry of Economy has been working on the tax-related regulation to make the direct sale feasible. The recent decision has raised questions about taxation. Mills and distributors share payment of the federal PIS/COFINS taxes on ethanol. It is expected that mills will likely absorb the taxes in full if they sell directly to gas stations. Direct sales should reduce ethanol prices for consumers and increase profit margins for producers in some Brazilian states and in areas relatively close to producing mills.

Tax Incentives for Ethanol and Flex-Fuel Vehicles

Tax incentives played an important role in supporting ethanol consumption since the introduction of flex-fuel vehicles in 2003. 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 vehicles have been lowered compare to gasoline only powered vehicles.

The table below updates taxes applied to ethanol, flex-fuel, and gasoline vehicles for 2019. No changes have been made to the tax incentives for ethanol-flex-fuel vehicles compared to gasoline vehicles last year. Please refer to the [“Brazilian Biofuels Annual Gain Report 2015”](#) for historical information since 2004.

Taxes Applied to Ethanol, Flex-Fuel and Gasoline Vehicles (Percentage)						
Year	Taxes	1000 cc	1001-2000 cc		Over 2000 cc	
		Gasoline 1/ Ethanol/ Flex	Gasoline 1/	Ethanol / Flex	Gasoline 1/	Ethanol / Flex
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
2015/2019	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)

* The tax of 3% refers to flex fuel vehicles; MSRP = Manufacturer Suggested Retail Price. The aggregation of the individual taxes does not necessarily add up to the percentage of the Average Retail Price (fourth row) because each individual tax applies to different steps of the production chain and not to the final retail price. During 2013, the Brazilian government offered temporary tax breaks to some categories.

Credit Lines

The Ministry of Agriculture, Livestock and Supply (MAPA) announced the Brazilian Agricultural Crop and Livestock Plan for 2020/21 in June 2020. A total of R\$236.3 billion will be released to fund agricultural and livestock programs, an increase of 6 percent relative to the last season. The plan includes a specific credit line for the Green House Gases Emission Reduction Program (“Programa ABC”) to support agricultural sustainable practices. The “Programa ABC” credit line is set at R\$ 2.5 billion (as opposed to only R\$ 400 million last season) at a six percent interest rate.

Sugarcane producers and sugar-ethanol mills will also have access to funds in support to the industry, which were impacted by the COVID-19 pandemic. Growers and millers will have access to credit to hold ethanol inventories and negotiate the product later at better market conditions. Funds come from the “Crop Management and Commercialization credit line” set at R\$ 179 billion.

Moreover, the Brazilian National Economic and Social Development Bank (BNDES) recently approved the creation of a credit line of R\$3 billion to finance the building of storage facilities for ethanol at sugar and ethanol plants. BNDES will provide up to half of the total credit line, R\$1.5 billion, and private banks should make the remaining amount available. The industry reports that this amount can guarantee the storage of up to six billion liters of ethanol, or about 20 percent of national production.

Ethanol Import Tariff-Rate Quota (TRQ)

On August 31, 2019, the Secretary of Foreign Trade & International Affairs published Ordinance No. 547, which approved a 20 percent import tax on ethanol imports above 750 million liters per year. This duty-free tariff-rate quota (TRQ) will expire on August 31, 2020. The renewed quota is higher than the previous one, which had a limit of 600 million liters per year and lasted for two years (August 31, 2017 through August 30, 2019). Please refer to "[Brazilian Biofuels Annual Gain Report 2017](#)" for thorough information about the TRQ set in August 2017.

The sugar and ethanol industry in Brazil's northeast region complained about the decision last August and lobbied the Brazilian Congress to overturn the executive action taken to extend and increase the TRQ. As a result, Congressional members from the Northeast led efforts to fast-track a bill to reverse the TRQ decision in September 2019. In order to minimize the effects of the new TRQ for the ethanol industry in the Northeast, Resolution #41 from the Brazilian Ministry of Economy/Chamber of Foreign Trade (CAMEX) entered into force on October 21, 2019 and set the distribution rules for the 750 million liter TRQ for ethanol imports.

According to the resolution, between August 31, 2019 and February 28, 2020, only 200 million liters were allowed to enter duty-free under the TRQ. This period coincided with the sugarcane-crushing season in North-Northeastern Brazil. In the following two quarters, during the crushing offseason in the North-Northeast, the TRQ was raised to 275 million liters each quarter. The resolution allowed only producers to take advantage of the TRQ. Quarterly allocations were distributed on a first-come, first-served basis limited at 2.5 million liters per producer. Individual producers could request new allocations upon confirmation of initial import volumes.

At this point, the Brazilian Government has not released any official communication about removing the TRQ and/or the 20 percent out-of-quota import tariff after August 31, 2020. The Brazilian sugar and ethanol industry advocates that the United States should increase its own TRQ for Brazilian sugar, which was initially set at 152,692 metric tons for Fiscal Year (FY) 2020. Producer associations like UNICA and Novabio, the Sugar, Ethanol and Bioenergy Producers Association, are heading the effort. The U.S. TRQ for sugar accounts for a small fraction of Brazilian exports, which are expected to reach nearly 30 million metric tons this marketing year. The Brazilian industry says it is unsatisfied with what they see as a disproportionate allocation for the U.S. sugar quota to other countries, noting that Brazil is by far the largest sugar producer worldwide.

The EU-MERCOSUR Free Trade Agreement (FTA)

On June 28, 2019, the European Union (EU) and Mercosur reached a provisional agreement on a FTA, concluding two decades of talks. The EU will become the first major partner with whom Mercosur has struck a trade agreement. The European Union is already Mercosur's biggest trade and investment partner. According to the provisional agreement, the EU will establish a duty-free TRQ of 562 million liters of ethanol for industrial use per year and an additional TRQ of 250 million liters at reduced tariff rates. The EU will also establish a duty-free TRQ for 180,000 metric tons for sugar imports. See "[Brazilian Biofuels Annual Report 2019](#)" for further details.

The four Mercosur governments, all EU member states, and the European Parliament will have to ratify the deal before it enters force. During the "Cúpula do Mercosur 2020", the annual meeting among Mercosur countries held in July 2020, the EU representative for Foreign Affairs declared that the final negotiations are expected to be over by the end 2020.

Government Support for Biodiesel Programs

The National Biodiesel Production Program (PNPB) and the Biodiesel Use Mandate

The latest increase in the biodiesel mandate took effect on March 1, 2020, when Brazil increased the volume of biodiesel blended with diesel sold at the pump to 12 percent (B12). However, in order to ensure the adequate supply/demand of biodiesel during the uncertainties caused by the COVID-19 pandemic, ANP approved a brief temporary reduction in the mandatory biodiesel blend rate from 12 to 10 percent between June 16 and June 21, 2020.

The 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.

The biodiesel mandate that applies to all mineral diesel consumed has been set at 10 percent since March 1, 2018. The National Energy Policy Council (CNPE) Resolution #16, from October 2018, authorizes ANP to set the addition of biodiesel in diesel up to B15 based on engine tests. In practice, CNPE recommends the annual increase of the biodiesel blend by one percent, from B11 in June 2019 up

to B15 by March 2023, conditioned to the aforementioned tests made in diesel engines. The table below shows the biodiesel use mandate as reported by ANP.

Biodiesel Use Mandate	
Year	Mandate
2003	optional
Jan/2008	B2
Jul/2008	B3
Jul/2009	B4
Jan/2010	B5
Aug/2014	B6
Nov/2014	B7
Mar/2017	B8
Mar/2018	B10
Sep/2019	B11
Mar/2020	B12

Source: ANP

Please refer to the various Brazilian Biofuels Annual GAIN Reports (www.fas.usda.gov) for detailed information in the changes made to the PNPB program and in the biodiesel blend over the years. The paragraphs below show a summary of the biodiesel program in Brazil.

Social Fuel Stamp

Under the PNPB program, the biodiesel Social Fuel Stamp is a mechanism created by the GOB to provide incentives for family farmers in disadvantaged areas. Resolution #1 and #2 of 2005 set by the former Ministry of Agrarian Development (MDA) state that biodiesel producers must comply with the following requirements to obtain the stamp:

- Purchase minimum raw material percentages from family farmers.
- Guarantee the purchase of available quantities.
- Set contracts with farmers, provide technical assistance and training.

Biodiesel Import Policy

Post contacts report that there is no formal restrictions to biodiesel imports, other than paying the import tariff. However, the PNPB program requires that only domestically produced biodiesel be eligible to participate in the auction system used to regulate the market. The public auction system ultimately sets the volume of biodiesel that should be produced and delivered to fuel distributors in a particular period of the year to supply the market. Note that the auction system also provides preference to biodiesel producers eligible for the Social Fuel Stamp described above.

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

III. Gasoline and Diesel Pools

The table below shows fuel use history and the 2020 demand estimates for Gasoline C (Gasoline A + anhydrous ethanol), diesel (diesel A + biodiesel), and jet fuel. ATO/Sao Paulo estimates the fuel demand figures for 2020 based on:

1. Current projection for the Brazilian gross domestic product (GDP).
2. Data released by ANP from January thru June 2020.
3. A study prepared by the Ministry of Mines and Energy/Energy Research Enterprise (MME/EPE) showing the impact of the COVID-19 pandemic on fuel demand.

Fuel Use (Million Liters)										
Calendar Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020f
Gasoline Pool 1/ 2/	35,491	39,698	41,426	44,364	41,137	43,019	44,150	38,352	38,165	31,600
Diesel Pool 2/	52,264	55,900	58,572	60,032	57,211	54,279	54,772	55,629	57,298	52,900
On-road	37,938	40,578	42,518	43,283	41,813	39,402	39,761	40,383	41,593	38,400
Agriculture	n/a	n/a	n/a	n/a	720	687	n/a	n/a	n/a	n/a
Construction & Mining	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Shipping & Rail	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Industry	n/a	n/a	n/a	n/a	4,863	4,405	n/a	n/a	n/a	n/a
Heating	n/a	n/a	n/a	n/a	3,062	2,918	n/a	n/a	n/a	n/a
Jet Fuel Pool 1/ 3/	6,955	7,292	7,225	7,470	7,355	6,765	6,694	7,164	6,980	2,800
Fuel Pools Total 2/	94,711	102,890	107,224	111,866	105,703	104,062	105,616	101,145	102,444	87,300

Notes 1/ Excludes 'aviation' gasoline; 2/ Fuel pools are defined as fossil fuels plus all "bio-components" (biofuels); 3/ Interior flights + outbound international flights. f/forecast
Source: ATO/Sao Paulo based on the National Agency for Petroleum, Natural Gas and Biofuels

In December 2019, the Brazilian Central Bank (BACEN) projected the growth of the Brazilian GDP for 2020 at 2.2 percent as opposed to 1.1 percent in 2019. In June 2020, BACEN revised the GDP projection to a 6.4 percent contraction.

ANP reports historical and current fuel consumption in Brazil. As reported by ANP, Gasoline C consumption for January through June 2020 was 16.56 billion liters, a 11 percent drop compared to the same period in 2019 (18.49 billion liters). Hydrated ethanol consumption for January through May 2020 was 8.96 billion liters, a 17 percent drop relative to the same period in 2019 (9.03 billion liters). Furthermore, diesel consumption also decreased three percent during the same period in 2020 (26.72 billion liters) compared to the same period in 2019 (27.43 billion liters). The table below shows ANP fuel consumption figures up to 2020 (January through June).

Brazilian Fuel Consumption Matrix (million liters)						
	2015	2016	2017	2018	2019	2020***
Diesel *	57,211	54,279	54,772	55,629	57,298	26,719
Gasoline C**	41,137	43,019	44,150	38,352	38,165	16,457
Hydrated Ethanol	17,863	14,586	13,642	19,385	22,544	8,964

Source: ANP. * Diesel includes Bx Biodiesel as of 2008.
Gasoline C includes 18-27.5% of anhydrous ethanol. *2020 refers to January-June.

Therefore, Otto-cycle fuel (gasoline and ethanol) consumption in Brazil has significantly dropped since the beginning of the COVID-19 pandemic, especially after mid-March. Several social isolation measures were taken by the Brazilian states such as the closure of non-essential commercial businesses, limiting public transportation, restricting the flow of vehicles and people in the cities, among others. Additionally, schools were closed, industrial plants were closed, and companies have adopted more telework policies. Diesel consumption has also declined, but at a lower rate because transportation of goods in diesel trucks is essential for the country.

Whereas ANP reports historical and current fuel consumption data, MME's Energy Research Enterprise (EPE) provides a projection for fuel use based on the Ten-Year Plan for Energy Expansion (PDE). The most recent PDE report is "[Plano Decenal de Expansão de Energia 2029](#)" (PDE2029) released in February 2020, with projections through 2029. Therefore, PDE2029 was released based on assumptions and scenarios that did not consider the consequences of the COVID-19 pandemic in Brazil and worldwide. Note that EPE has been working on the early release of PDE2030 to incorporate the effects of the COVID-19 pandemic in the 10-year forecast for the Brazilian energy industry. No updated figures have been released up to August 5 (please refer to "[PDE2030 to be released](#)") for additional information.

Following the developments of the pandemic, EPE released in July a study incorporating the impact of the COVID-19 pandemic in the Brazilian demand for fuel in the upcoming years (see "[Nota Técnica – Impactos da pandemia de Covid-19 no mercado brasileiro de combustíveis](#)"). EPE projections analyze fuel demand for 2020 through 2022 and considers three different scenarios: Prometeu (pessimistic), Cronos (intermediate), and Atlas (optimistic). The assumptions for the scenarios are:

- **Prometeus scenario:** the COVID-19 pandemic will persist resulting in social distance measures for a longer period (seven months). There will be changes in people's behavior such as lower movement of people to work, increase of telework, increase of e-commerce and home deliveries, and slow return of economic activities.
- **Cronos scenario:** social distance measures will last four months, the COVID-19 pandemic will decrease in a slow pace, and there will be a progressive increase in the circulation of people during the second semester of 2020. The scenario also considers changes in social habits such as the increase of teleworking and the increase of e-commerce and home deliveries.
- **Atlas scenario:** economic activities will resume in 2020, social distant measures will last three months, and the negative consequences of the pandemic will be mitigated in a short period. There will not be changes in social habits.

Major conclusions from the EPE study are:

- Social mobility restrictions have sharply affected the Otto-cycle fuel consumption (Gasoline C and hydrous ethanol) with a projected 13 and 12 percent reduction in consumption in 2020, respectively, compared to 2019 (using the Cronos scenario). Hydrous ethanol consumption should recover faster than Gasoline C. Gasoline C should not reach 2019 levels in none of the three scenarios. Hydrous ethanol consumption in 2022 is forecast similar or higher than 2019 assuming the Cronos and Atlas scenario, respectively.
- Jet fuel consumption is expected to deeply drop in 2020 due to the dramatic reduction in domestic and international flights. EPE projects a 40 to 66 percent reduction in jet fuel use in 2020 compared to 2019. The return to 2019 consumption level in 2022 is a forecast that assumes the Atlas scenario through 2022.
- Diesel consumption will be less affected by the COVID-19 pandemic given that it is widely used for road transportation. A two to eight percent drop in consumption is expected for 2020 depending on the scenario. A gradual recovery to 2019 volumes is expected towards 2022 considering the Cronos and Atlas scenarios.

The table below summarizes the main results for fuel consumption through 2022, according to the three scenarios.

COVID-19 Impacts on the Brazilian Fuel Market, 2020 - 2022 Projections (billion liters)				
	Scenario	2020	2021	2022
Gasoline C	Prometeu	31.6	32.0	32.1
	Cronos	33.5	34.7	34.9
	Atlas	35.1	36.6	36.9
Diesel B (diesel A + biodiesel)	Prometeu	52.9	54.8	56.3
	Cronos	54.4	56.2	57.6
	Atlas	55.9	57.3	58.7
Jet Fuel	Prometeu	2.8	4.3	5.5
	Cronos	3.9	5.1	6.2
	Atlas	4.6	6.6	7.2

Source: Ministry of Mines and Energy/Energy Research Enterprise (MME/EPE)

The COVID-19 pandemic continues to impact several states in Brazil. At the same time, social isolation measures have been relaxed around the country, resulting in increasing economic activity. However, health specialists report that it may not be until at least November for the pandemic to start to be controlled. Based on these factors, ATO/Sao Paulo projections for fuel use through 2022 are based on the EPE's Prometeu scenario (pessimistic).

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 Uses (Industrial and Chemicals, excluding ethanol for beverages) for calendar years 2011 - 2020. 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 and chemical, refined, and/or neutral) are determined at end-use.

Ethanol Used as Fuel and Other Industrial Chemicals (Million Liters)										
Calendar Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020 ^f
Beginning Stocks	5,916	6,891	7,894	8,995	10,167	8,232	8,012	8,973	10,401	12,327
Fuel Begin Stocks	5,549	6,488	7,490	8,590	9,713	7,765	7,520	8,475	9,899	11,820
Production	22,893	23,509	27,642	28,553	30,365	28,405	28,142	33,078	37,383	31,350
Fuel Production	20,212	20,739	24,377	25,585	27,248	25,546	25,170	30,233	34,407	28,662
>of which is cellulosic (a)	0	0	0	0	2	6	17	25	30	32
Imports	1,136	554	132	452	513	835	1,796	1,775	1,457	1,500
Fuel Imports	1,100	553	131	403	500	810	1,791	1,770	1,452	1,495
Exports	1,964	3,055	2,917	1,398	1,867	1,789	1,380	1,685	1,941	1,900
Fuel Exports	1,083	2,500	1,952	780	900	400	443	840	1,090	1,000
Consumption	21,090	20,005	23,756	26,435	30,946	27,671	27,597	31,740	34,973	28,570
Fuel Consumption	19,290	17,790	21,456	24,085	28,796	26,201	25,562	29,740	32,848	26,782
Ending Stocks	6,891	7,894	8,995	10,167	8,232	8,012	8,973	10,401	12,327	14,707
Fuel Ending Stocks	6,488	7,490	8,590	9,713	7,765	7,520	8,475	9,899	11,820	14,195
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

Source: Prepared by ATO/Sao Paulo based on MAPA, SECEX, Datagro, ANP, UNICA and industry sources. f/ forecast

Ethanol Used as Fuel and Other Industrial Chemicals (Million Liters)										
Calendar Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020 ^f
Refineries Producing First Generation Fuel Ethanol (Million Liters)										
Number of Refineries	418	408	399	382	382	383	384	369	359	360
Nameplate Capacity	42,800	41,600	40,700	37,930	38,050	39,677	40,012	43,105	43,105	42,800
Capacity Use (%)	47%	50%	60%	67%	72%	64%	63%	70%	80%	67%
Refineries Producing Cellulosic Fuel Ethanol (Million Liters)										
Number of Refineries	0	0	0	1	3	3	3	3	3	3
Nameplate Capacity	0	0	0	82	127	127	127	127	127	127
Capacity Use (%)	0%	0%	0%	0%	2%	5%	13%	20%	24%	25%
Co-product Production (1,000 MT)										
Bagasse	95,388	97,954	115,175	118,971	126,008	117,492	115,467	134,721	150,096	120,077
DDGs	0	0	0	33	91	151	310	541	998	1,876
Corn Oil	0	0	0	2	5	9	18	31	57	108
Feedstock Use for Fuel Ethanol (1,000 MT)										
Sugarcane	252,650	259,238	304,713	319,257	339,063	316,738	309,250	368,600	413,088	326,630
Corn	0	0	0	107	291	481	990	1,727	3,190	5,995
Bagasse for Cellulosic Fuel	0.000	0.000	0.000	0.000	0.011	0.033	0.094	0.139	0.167	0.178
Market Penetration (Million Liters)										
Fuel Ethanol Use	19,290	17,790	21,456	24,085	28,796	26,201	25,562	29,740	32,848	26,782
Hydrous Ethanol for Fuel	10,899	9,850	11,755	12,994	17,862	14,586	13,642	19,385	22,544	18,250
Anhydrous Ethanol in Gasoline C	8,391	7,940	9,701	11,091	10,934	11,615	11,920	10,355	10,304	8,532
Gasoline C (includes anhydrous)	35,491	39,698	41,426	44,364	41,137	43,019	44,150	38,352	38,165	31,600
Gasoline C Blend Rate	23.6%	20.0%	23.4%	25.0%	26.6%	27.0%	27.0%	27.0%	27.0%	27.0%
Ethanol Blend Rate Overall	41.6%	35.9%	40.3%	42.0%	48.8%	45.5%	44.2%	51.5%	54.1%	53.7%
Source: Prepared by ATO/Sao Paulo based on MAPA, SECEX, Datagro, ANP, UNICA and industry sources. ^{f/} forecast										

Production

Ethanol is an alcohol, made by fermenting sugar components of plant materials such as corn and wheat starch, sugarcane, sugar beet, sorghum, and cassava. Total ethanol production for 2020 is estimated at 31.35 billion liters, a decrease of 16 percent relative to the revised figure for 2019 (37.38 billion liters). The reduction is based on sugar-ethanol plant's decisions to divert more sugarcane towards sugar production. Therefore, ethanol production for fuel use is estimated at 28.66 billion liters, a 17 percent drop relative to the previous calendar year.

To be in accordance with the actual feedstock production cycle, the following narrative describes sugarcane and ethanol production in marketing years. Post currently projects Brazil's marketing year (MY April through March, unless otherwise stated) 2020/21 sugarcane crush at 650 million metric tons (mmt), relatively unchanged compared to MY 2019/20 (647 mmt).

The Center-South (CS) region is expected to harvest 600 mmt of sugarcane, marginally up by five (5) mmt compared to the revised figure for the previous season (595 mmt). Good rainfall volumes during January-March 2020 offset any initial concerns about the dry spell in sugarcane fields during the August-October 2019 period. Sugarcane development in some fields is delayed by one to two months; however, it's been steadily recovering.

The crushing started in March 2020 and Post contacts report that plants are adopting preventive measures against the COVID-19 pandemic. There were initial concerns about the measures that would be taken by the governors of the State of Sao Paulo and Goias to restrict several economic activities. However, decrees signed by the aforementioned governors, included the sugar-ethanol-energy industry as essential activity for the states; therefore, granting a waiver to sugar-ethanol plants to operate.

North-Northeastern (NNE) production for MY 2020/21 is projected at 50 mmt, a decrease of two (2) mmt compared to the previous crop (52 mmt), assuming that regular weather conditions prevail until the beginning of the harvest in the second half of the year.

The COVID-19 pandemic and the steady reduction in world oil prices have drastically changed the dynamics for the Brazilian sugar/ethanol industry during the MY 2020/21. The ethanol market has been negatively affected by:

1. A decrease in the Otto cycle fuels demand (gasoline and hydrous ethanol) due to the social mobility restrictions as well as the resulting slowdown of the Brazilian economy.
2. Hydrous ethanol losing competitiveness relative to Gasoline C due to the steady reduction in world oil prices and a decision not to change the tax structure between ethanol and gasoline.

As a consequence, sugar-ethanol plants are diverting more sugarcane towards sugar production during the MY 2020/21. ATO/Sao Paulo projection for the total sucrose (total reducing sugar, TRS) content diverted to sugar and ethanol production for MY 2020/21 is set at 46 and 54 percent, respectively, as opposed to 35 and 65 percent, respectively, for MY 2019/20.

Corn Ethanol Production

Corn ethanol production is steadily growing. Total ethanol production from corn in 2020 is estimated at 2.5 billion liters, an increase of 1.17 million liters compared to revised figure for 2019, based on information from the Corn Ethanol National Union (UNEM). Ethanol from corn represents approximately eight percent of total ethanol production. UNEM forecasts that Brazil should produce 8 billion liters of corn ethanol by 2028. If realized, this would amount to one-fifth of the country's ethanol production by 2028 based on EPE's long-term modeling of the ethanol market under RenovaBio prior to the pandemic.

Post contacts report that there are currently eleven plants producing ethanol from corn in Brazil, mainly in the state of Mato Grosso, but also in Goias and Parana. Nine units are full-plant type (dedicated corn

only plants) and two units are flex-plants¹ (producing ethanol from sugarcane and corn). These plants have a joint production capacity to produce 2.50 billion liters of corn ethanol per year.

There are two full-plants and one flex-fuel plant under construction, which should start operations in one to two years. They are all located in Mato Grosso and have a combined production capacity of 1.4 billion liters of corn ethanol per year. Industry sources report that seven other corn-ethanol plant projects (all full-plants) are at different stages of development. If all these ongoing projects are built as planned, overall combined corn ethanol production capacity will be roughly 5.5 billion liters per year.

The potential for corn ethanol expansion remains limited by local fuel demand, profitability, and logistic challenges. Demand is currently limited to corn producing areas in the Center-West, but it could potentially reach other North-Northern states in Brazil. Southern states may also benefit from this expansion if logistical obstacles are overcome. Currently, corn ethanol can head south from Rondonópolis (southern Mato Grosso) by railway. There are projects to expand the railway north from Rondonópolis to Lucas do Rio Verde (one of the major corn producing areas in Brazil).

The map below illustrates the Logum pipeline system, which currently connects Brazil's principal ethanol-producing regions with major fuel consumer centers such as the cities of Sao Paulo and Rio de Janeiro. The closest Logum terminal to the corn ethanol producing areas in the Center-West is Uberaba (in southwestern Minas Gerais). There are plans to extend the pipeline to Rondonópolis in the future. Note that the pipeline was already used to move corn ethanol from Uberaba to the state of Sao Paulo.

Logum Ethanol Pipeline



Source: Logum

Advanced Ethanol Production

Total cellulosic ethanol production for 2020 is estimated at 32 million liters, similar to 2019 (30 million liters). Plants have not reached full capacity due to operational/mechanical challenges. This amount still represents an insignificant share of total ethanol production in Brazil.

¹ Flex ethanol plants have the advantage to produce ethanol from corn, which is extremely price competitive in the Center-West region. These plants also benefit from the energy co-generated by the burning of bagasse in the sugarcane facility to power the corn plant.

Industrial Capacity

The total number of ethanol mills in 2020 is 360 units, one additional unit compared to the revised figure for 2019 (359 units). The map below shows the location of the ethanol plants in the country. Hydrated ethanol production capacity for 2020 is reported at 42.8 billion liters. This figure reflects the authorized hydrated ethanol production capacity of 178,270 m³ per day, as reported by ANP, and assumes an average of 240 crushing days. Anhydrous ethanol production capacity is reported by ANP at 94,836 m³ per day or 22.8 billion liters assuming a 240-day crushing cycle

Distribution of Ethanol Plants in Brazil



Source: ANP

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 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 considers 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, which accounts for roughly 60 percent of

Center-South production. The cumulative CONSECANA price (March 2019 through June 2020) for the state of Sao Paulo for the 2019/20 crop was R\$0.6834 per kg of TRS or approximately R\$91.88 per ton of sugarcane. Note that CONSECANA's prices are based on both sugar and ethanol prices in domestic and international markets.

The tables below include the latest information publicly available for the Ethanol Indexes released by the University of Sao Paulo's College of Agriculture "Luiz de Queiroz" (ESALQ). 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	2015	2016	2017	2018	2019	2020
January	1,458.20	1,996.70	2,047.10	2,015.70	1,798.80	2,241.90
February	1,552.50	2,083.00	1,916.90	2,050.90	1,811.80	2,294.80
March	1,420.40	2,113.70	1,697.60	2,076.10	2,010.10	2,134.40
April	1,401.50	1,602.40	1,635.30	1,807.40	1,984.70	1,556.10
May	1,363.10	1,536.40	1,610.30	1,697.40	1,878.60	-
June	1,352.40	1,678.10	1,509.90	1,817.90	1,798.20	-
July	1,328.80	1,636.60	1,424.70	1,632.30	1,822.70	-
August	1,300.70	1,726.30	1,552.30	1,557.20	1,906.40	-
September	1,358.30	1,796.80	1,592.80	1,817.70	1,865.40	-
October	1,658.30	2,018.30	1,669.70	1,957.90	1,943.70	-
November	1,870.40	2,086.60	1,806.70	1,856.60	2,052.50	-
December	1,888.10	2,075.70	1,928.80	1,829.60	2,165.70	-

Source: USP/ESALQ/CEPEA.

Price for Fuel Hydrated Ethanol - State of Sao Paulo (R\$/000 liters).						
Period	2015	2016	2017	2018	2019	2020
January	1,325.60	1,824.40	1,815.80	1,836.20	1,605.60	2,067.70
February	1,384.70	1,916.40	1,686.10	1,852.20	1,677.10	2,118.20
March	1,261.30	1,906.60	1,526.40	1,868.20	1,776.40	1,875.10
April	1,261.60	1,396.60	1,471.80	1,538.70	1,814.80	1,360.60
May	1,226.50	1,391.00	1,414.20	1,568.00	1,644.90	-
June	1,216.20	1,501.90	1,327.70	1,633.70	1,617.70	-
July	1,199.00	1,501.50	1,304.00	1,457.90	1,673.60	-
August	1,175.50	1,559.70	1,406.40	1,461.60	1,729.10	-
September	1,273.40	1,665.90	1,442.30	1,678.00	1,714.60	-
October	1,528.80	1,857.90	1,533.90	1,792.80	1,803.00	-
November	1,709.00	1,869.30	1,651.10	1,648.70	1,908.90	-
December	1,704.60	1,867.90	1,748.00	1,664.80	1,998.50	-

Source: USP/ESALQ/CEPEA.

Consumption

Otto-cycle fuel (gasoline and ethanol) consumption in Brazil has significantly dropped since the beginning of the COVID-19 pandemic due to social mobility restrictions and the slowdown of the Brazilian economy. The gradual reopening of the economy as of June will partially offset the drop in consumption; however, not enough to recover the 2019 consumption patterns.

ATO/Sao Paulo estimates total domestic demand for ethanol (fuel and other uses) for calendar year 2020 at 28.57 billion liters, a 6.4 billion liter drop compared to the revised figure for the previous year. Total ethanol consumption for use as fuel in 2020 is estimated at 26.78 billion liters, a significant decrease of 18 percent relative to 2019 (32.85 billion liters). Note that 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.

In 2018 and 2019, consumption patterns show a significant increase in hydrous ethanol consumption at the expense of Gasoline C (and anhydrous ethanol which is blended to gasoline) due to overall high domestic Gasoline C prices. However, ATO/Sao Paulo estimates an expected reduction in consumption for both hydrous and anhydrous ethanol in 2020 due to the COVID19 pandemic.

The drop in consumption for 2020 is estimated at 19 percent for hydrous ethanol used as fuel and 17 percent for anhydrous ethanol. Note that the likely higher drop in hydrous consumption compared to anhydrous ethanol refers to the fact that hydrous ethanol has been losing competitiveness relative to Gasoline C (which includes 27 percent of anhydrous ethanol) due to the steady reduction in world oil prices since mid-March, which has reduced domestic Gasoline C prices.

Note that consumer decisions to buy hydrous ethanol or Gasoline C at the pump are mainly driven by the ratio between hydrous ethanol and Gasoline C prices. The 70 percent ratio between hydrous ethanol and Gasoline C 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 C (price ratio above 70 percent). This decision is tied to the energy content of each fuel and the fact that ethanol's calorific content is approximately 36 percent lower than pure fossil gasoline.

The tables below show ethanol and Gasoline C prices at the pump as well as the price ratio for selected states, cities, and months. Note that nearly all hydrous ethanol/Gasoline C price ratios for 2020 are higher than 2019 due to the overall increase in hydrous ethanol prices during the off-harvest period (January thru March) and the steady reduction in Gasoline C prices as of mid-March. Hydrous ethanol prices are traditionally more competitive in the States of Sao Paulo and Minas Gerais because they charge a lower ICMS tax compared to other Brazilian states.

Gasoline and Ethanol Prices in Selected States (average price, R\$/liter)									
		Gasoline				Ethanol			
		2017	2018	2019	2020	2017	2018	2019	2020
Sao Paulo State	Jan	3.628	3.998	4.058	4.390	2.777	2.858	2.625	3.045
	Feb	3.615	4.004	3.974	4.374	2.740	2.884	2.607	3.055
	Jun	3.327	4.340	4.193	3.798	2.266	2.768	2.607	2.467
	Aug	3.560	4.214	4.083		2.415	2.434	2.625	
Sao Paulo City	Jan	3.588	3.944	3.944	4.412	2.757	2.834	2.611	3.076
	Feb	3.584	3.954	3.933	4.384	2.748	2.865	2.579	3.062
	Jun	3.237	4.294	4.174	3.823	2.220	2.760	2.590	2.474
	Aug	3.507	4.170	4.045		2.391	2.421	2.610	
Minas Gerais	Jan	3.850	4.393	4.555	4.809	2.947	3.123	2.960	3.291
	Feb	3.827	4.438	4.509	4.776	2.944	3.186	2.929	3.339
	Jun	3.618	4.860	4.744	4.104	2.577	3.087	2.953	2.699
	Aug	3.871	4.735	4.579		2.684	2.841	2.856	
Belo Horizonte (MG Capital)	Jan	3.731	4.263	4.459	4.680	2.888	3.095	2.920	3.229
	Feb	3.723	4.327	4.398	4.667	2.902	3.187	2.900	3.281
	Jun	3.521	4.839	4.658	4.009	2.534	3.057	2.889	2.594
	Aug	3.733	4.663	4.505		2.613	2.792	2.834	
Rio Janeiro State	Jan	4.042	4.647	4.780	5.041	3.546	3.624	3.595	4.214
	Feb	4.024	4.671	4.707	5.012	3.535	3.688	3.620	4.247
	Jun	3.921	4.974	4.946	4.492	3.163	3.592	3.810	3.598
	Aug	4.151	4.888	4.814		3.199	3.279	3.775	
Rio Janeiro Capital	Jan	4.033	4.648	4.853	5.030	3.566	3.631	3.644	4.267
	Feb	3.999	4.651	4.679	4.978	3.526	3.693	3.637	4.261
	Jun	3.896	4.942	4.916	4.477	3.137	3.582	3.804	3.625
	Aug	4.130	4.857	4.799		3.181	3.267	3.810	
Porto Alegre (RS Capital)	Jan	3.813	4.351	4.401	4.754	3.697	3.932	3.971	4.314
	Feb	3.797	4.357	4.155	4.597	3.714	3.996	3.872	4.388
	Jun	3.731	4.698	4.916	3.971	3.439	4.039	4.072	3.887
	Aug	3.946	4.576	4.380		3.438	3.736	3.966	
Goiania (GO Capital)	Jan	3.902	4.464	4.387	4.780	3.023	2.890	2.974	3.423
	Feb	3.742	4.427	4.435	4.681	2.810	2.880	2.939	3.381
	Jun	3.771	4.840	4.668	4.033	2.689	2.935	2.943	2.851
	Aug	3.970	4.755	4.393		2.779	2.847	2.768	

Gasoline and Ethanol Prices in Selected States (average price, R\$/liter)									
		Gasoline				Ethanol			
		2017	2018	2019	2020	2017	2018	2019	2020
Fortaleza (CE Capital)	Jan	3.980	4.302	4.206	4.679	3.288	3.453	3.462	3.701
	Feb	3.974	4.066	4.184	4.657	3.276	3.420	3.477	3.716
	Jun	3.845	4.726	4.726	3.984	3.255	3.770	3.798	3.457
	Aug	3.883	4.370	4.576		3.200	3.637	3.782	

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

Ratio Ethanol/Gasoline Prices					
		2017	2018	2019	2020
Sao Paulo State	Jan	77%	71%	65%	69%
	Feb	76%	72%	66%	70%
	Jun	68%	64%	62%	65%
	Aug	68%	58%	64%	
Sao Paulo City	Jan	77%	72%	66%	70%
	Feb	77%	72%	66%	70%
	Jun	69%	64%	62%	65%
	Aug	68%	58%	65%	
Minas Gerais	Jan	77%	71%	65%	68%
	Feb	77%	72%	65%	70%
	Jun	71%	64%	62%	66%
	Aug	69%	60%	62%	
Belo Horizonte (MG Capital)	Jan	77%	73%	65%	69%
	Feb	78%	74%	66%	70%
	Jun	72%	63%	62%	65%
	Aug	70%	60%	63%	
Rio Janeiro State	Jan	88%	78%	75%	84%
	Feb	88%	79%	77%	85%
	Jun	81%	72%	77%	80%
	Aug	77%	67%	78%	
Rio Janeiro Capital	Jan	88%	78%	75%	85%
	Feb	88%	79%	78%	86%
	Jun	81%	72%	77%	81%
	Aug	77%	67%	79%	
Porto Alegre (RS Capital)	Jan	97%	90%	90%	91%
	Feb	98%	92%	93%	95%
	Jun	92%	86%	83%	98%
	Aug	87%	82%	91%	

Ratio Ethanol/Gasoline Prices

		2017	2018	2019	2020
Goiania (GO Capital)	Jan	77%	65%	68%	72%
	Feb	75%	65%	66%	72%
	Jun	71%	61%	63%	71%
	Aug	70%	60%	63%	
Fortaleza (CE Capital)	Jan	83%	80%	82%	79%
	Feb	82%	84%	83%	80%
	Jun	85%	80%	80%	87%
	Aug	82%	83%	83%	
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. The fleet was estimated at 37.8 million units in June 2020 and pure hydrous ethanol and flex fuel powered vehicles together represent roughly 80 percent (30.47 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 represent over 90 percent of total monthly vehicle sales. Purchases of new flex-cars have continuously recovered from a record low in 2015, when the Brazilian economic recession began.

Licensing of Ethanol Powered Vehicles (pure ethanol & flex fuel units)								
2012	2013	2014	2015	2016	2017	2018	2019	2020 /1
3,162,824	3,169,111	2,940,508	2,194,020	1,750,754	1,927,221	2,168,173	2,328,649	649,275
Source: National Association of Vehicle Manufacturers (ANFAVEA) 1/ January-June								

Trade

Exports

ATO/Sao Paulo estimates total Brazilian ethanol exports for 2020 at 1.9 billion liters, similar to 2019 (1.94 billion liters). Major export destinations are the United States and South Korea.

In the United States, the California Air Quality Board has considered Brazilian ethanol as a low carbon fuel that qualifies for carbon credits in the state. Industry contacts report that at the current exchange rate of R\$5.00 = US\$1.00, California's carbon credit is worth approximately R\$ 1 per liter compared to R\$ 0.15-0.20 per liter for CBios in Brazil.

The tables below show ethanol exports (NCM 2207.10 through 2207.20.19) for 2018, 2019 and 2020 (January through June), as reported by Trade Data Monitor based on figures provided by the Brazilian Secretariat of Foreign Trade (SECEX).

Brazilian Ethanol Exports (NCM 2207.10, 2207.20.11, 2207.20.19, M3, US\$ 000 FOB)						
	CY 2018		CY 2019		CY 2020 1/	
Country	Volume	Value	Volume	Value	Volume	Value
United States	933,179	511,703	1,211,725	626,761	331,009	146,502
South Korea	534,855	262,071	517,591	250,892	287,634	139,181
Netherlands	43,288	24,198	67,404	36,175	69,437	40,250
Japan	102,368	57,120	56,982	30,687	27,520	13,357
Nigeria	1,175	763	15,950	10,292	1,735	1,140
Colombia	23,051	12,790	13,708	7,556	17,977	7,112
Philippines	5,945	3,106	11,937	6,521	5,058	2,310
Ghana	2,381	1,551	9,405	5,474	1,910	1,259
Cameroon	644	428	9,306	6,244	2,642	1,802
Liberia	159	112	4,271	2,717	2,346	1,510
Others	37,460	20,399	22,598	14,759	79,548	42,736
Total	1,684,505	894,241	1,940,877	998,078	826,814	397,158

Data Source: Trade Data Monitor (TDM) based on the Brazilian Secretariat of Foreign Trade (SECEX).
Note: Numbers may not add due to rounding 1/Jan-June

Imports

Brazil's total ethanol imports for 2020 are projected at 1.5 billion liters, similar to the revised figure for 2019 (1.46 billion liters). Virtually all ethanol imports are used for fuel and originated from the United States for the past several years. Starting in 2019, Paraguay has increased its market share in the Brazilian market. The tables below show ethanol imports (NCM 2207.10 through 2207.20.19) for 2018, 2019 and 2020 (January through June), as reported by Trade Data Monitor based on figures provided by SECEX.

Brazilian Ethanol Imports (NCM 2207.10, 2207.20.11, 2207.20.19, M3, US\$ 000 FOB)						
	CY 2018		CY 2019		CY 2020 1/	
Country	Volume	Value	Volume	Value	Volume	Value
United States	1,772,588	741,071	1,321,216	543,044	739,509	301,784
Paraguay	2,336	973	136,012	58,551	73,495	33,563
Poland	116	148	135	188	44	60
Germany	142	636	104	460	51	168
France	26	50	67	90	1	2
Argentina	-	-	63	60	8,157	3,899
Spain	3	15	2	14	1	6
Mexico	2	22	2	12	0	2
UK	0	1	0	3	2	17
Japan	0	3	0	0	0	0
Others	119	360	0	1	88	119
Total	1,775,333	743,281	1,457,602	602,424	821,348	339,619

Data Source: Trade Data Monitor (TDM) based on the Brazilian Secretariat of Foreign Trade (SECEX).
Note: Numbers may not add due to rounding 1/Jan-June

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 2011 through 2020.

Biodiesel (Million Liters)										
Calendar Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020 ^f
Beginning Stocks	60	132	137	105	85	89	90	99	111	115
Production	2,673	2,800	2,935	3,430	4,020	3,801	4,310	5,410	5,925	6,270
Imports	18	0	0	0	0	0	0	0	0	0
Exports	6	0	39	40	12	0	0	0	0	4
Consumption	2,613	2,795	2,928	3,410	4,004	3,800	4,301	5,398	5,921	6,258
Ending Stocks	132	137	105	85	89	90	99	111	115	123
Production Capacity (Million Liters)										
Number of Biorefineries	65	65	64	58	57	51	51	51	51	51
Nameplate Capacity	6,742	7,400	7,900	7,722	7,860	7,191	8,140	8,500	8,500	9,792
Capacity Use (%)	39.6%	37.8%	37.2%	44.4%	51.1%	52.9%	52.9%	63.6%	69.7%	64.0%
Feedstock Use for Fuel (1,000 MT)										
Soy oil, crude	1,951	1,947	2,015	2,369	2,807	2,703	2,774	3,363	3,638	4,000
Animal Fat (tallow)	344	452	557	651	723	594	695	834	799	781
Market Penetration (Million Liters)										
Biodiesel, on-road use	1,897	2,029	2,125	2,458	2,927	2,759	3,122	3,919	4,298	4,543
Diesel Pool, on-road use 1/	37,938	40,578	42,518	43,283	41,813	39,402	39,761	40,383	41,593	38,400
Blend Rate (%)	5.0%	5.0%	5.0%	5.7%	7.0%	7.0%	7.9%	9.7%	10.3%	11.8%
Diesel Pool, total 1/	52,264	55,900	58,572	60,032	57,211	54,279	54,772	55,629	57,298	52,900

Source: ATO/Sao Paulo based on ANP and SECEX. Note 1/ Fuel pools are defined as fossil fuels plus all "bio-components" (biofuels) blended with fossil diesel. f/ forecast

Production

Biodiesel is a trans esterified vegetable oil, also known as Fatty Acid Methyl Ester (FAME). It is produced from plant and animal oils and fats. According to updated information reported by the Petroleum, Natural Gas and Biofuels National Agency (ANP), there are no significant changes in the raw material used to produce biodiesel. About 71 percent of biodiesel produced is made from soybean oil and 13 percent is made from animal fat (tallow). The remaining feedstock are cooking oil (two percent), cottonseed oil (one percent) and other raw materials (13 percent). Other raw materials include palm oil, peanut oil, turnip ("*nabo-forrageiro*") oil, sunflower oil, castor oil, sesame oil, canola oil, and corn oil.

Biodiesel production remains tightly regulated by the government. Total Brazilian biodiesel production in 2020 is estimated at 6.27 billion liters, an increase of six percent compared to the previous year. The increase is due to the higher biodiesel blend-mandate (B12) and the projected estimate for diesel consumption (52.9 billion liters). According to ANP, cumulative January through June 2020 production is approximately 2.95 billion liters. Biodiesel production by month as reported by ANP is shown below.

Brazilian Biodiesel Monthly Production/Deliveries (000 liters)					
Month	2016	2017	2018	2019	2020
January	271,388	255,361	337,824	446,508	467,596
February	300,065	259,812	338,420	415,249	483,199
March	323,158	335,069	452,310	462,134	548,848
April	348,485	347,603	446,137	464,902	438,077
May	328,814	369,316	383,291	448,352	479,109
June	292,772	359,236	467,077	461,613	533,311
July	337,435	387,236	489,776	495,344	
August	327,183	399,997	486,156	503,146	
September	313,309	398,707	482,327	558,226	
October	341,024	409,344	500,209	583,718	
November	321,560	386,941	479,066	539,820	
December	296,145	382,671	487,444	522,093	
Total	3,801,339	4,291,294	5,352,054	5,901,104	2,950,140

Source: ANP

Brazil has currently 51 plants authorized to produce biodiesel. The map below shows the location of the biodiesel plants in the country. Note that roughly 45 percent of the plants are located in the Center-West region, with abundant soybean supply. According to ANP, the authorized industrial capacity for 2020 is estimated at 9.79 billion liters of biodiesel per year, based on a 360-day operational cycle, an increase of 15 percent compared to the estimated industrial capacity for 2019. This represents approximately 1.56 times the mandatory biodiesel production to be blended in mineral diesel in 2020.

Distribution of Biodiesel Plants in Brazil



Source: ANP

Market Prices

The biodiesel market remains regulated by the government through a public auction system. It sets the volume of biodiesel that should be produced and delivered to fuel distributors in a particular period of the year as well as the average sales price. The auction system gives preference to producers with the Social Fuel Stamp (SFS). The SFS provides incentives for poorer farmers (family farmers) in disadvantaged areas (see Section II – Policy and Programs). The tables below update the results of the 68th through the 74th auctions from Aug 2019 to July 2020, as published by ANP.

Biodiesel Auctions				
Auction	68th Auction	69th Auction	70th Auction	71st Auction
Date	Aug-2019	Oct-2019	Dec-2019	Feb-2019
Number of Suppliers	46	39	40	41
Offered Quantity (m3)	1,159,700	1,173,800	1,190,980	1,271,280
Purchased Quantity (m3)	1,156,477	1,061,211	1,039,889	1,123,233
Opening/Reference Price (R\$/m3) 1/	2,760-3,060	3,220-3,500	3,370-3,680	4,000-4,320
Average Price (R\$/m3) 2/	2,857	3,076	3,012	3,002
Delivery Date	Sep-Oct/2019	Nov-Dec/2019	Jan-Feb/2020	Mar-Apr/2020

Source: ANP. 1/ Reference prices vary according to the producing region.
2/ Price FOB, including PIS/PASEP and COFINS, excluding ICMS, including Petrobras margin.

Biodiesel Auctions				
Auction	72nd Auction	73rd Auction	74th Auction	73th Auction*
Date	Apr-2020	Jun-2020	Jun-2020	Jul-2020
Number of Suppliers	37	42	24	25
Offered Quantity (m3)	1,276,340	1,206,180	74,240	75,450
Purchased Quantity (m3)	1,020,251	1,189,270	72,940	72,750
Opening/Reference Price (R\$/m3) 1/	3,900-4,300	4,320-4,620	3,660-3,940	3,900-4,300
Average Price (R\$/m3) 2 /	2,713	3,512	3,803	4,578
Delivery Date	May-Jun/2020	Jul-Aug/2020	Jun/2020	Oct/2020

Source: ANP. 1/ Reference prices varies according to the producing region.
2/ Price FOB, including PIS/PASEP and COFINS, excluding ICMS, including Petrobras margin.
* Additional auction held in July, 2020

Biodiesel prices received by producers are determined by the public auction system (see Average Price in the tables above). The government sets the 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 75 to 80 percent of the biodiesel production cost, whereas other inputs such as methanol and additives represent 10 percent of the total cost. Given that roughly 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 2019 and 2020 (January through June). The average crude price in the state of Sao Paulo is US\$646 per ton for January through May 2020, similar to the same period in 2019 (US\$650 per ton).

Soybean Oil, Crude - Prices (2019)						
Location	Jan	Feb	Mar	Apr	May	Jun
Chicago (US\$/ton)	637	665	648	629	602	612
Premium (US\$/ton)	11	14	3	-1	28	17
Port of Paranaguá - Fob (US\$/ton)	648	679	651	629	630	629
São Paulo - (US\$/ton com ICMS 12%)	660	676	652	626	635	633

Source: Elaborated by ABIOVE based on several sources.

Soybean Oil, Crude - Prices (2019)						
Location	Jul	Aug	Sep	Oct	Nov	Dec
Chicago (US\$/ton)	616	628	642	664	683	698
Premium (US\$/ton)	17	43	40	14	26	43
Port of Paranaguá - Fob (US\$/ton)	633	671	681	678	709	740
São Paulo - (US\$/ton com ICMS 12%)	642	657	675	695	689	766

Source: Elaborated by ABIOVE based on several sources.

Soybean Oil, Crude - Prices (2020)						
Location	Jan	Feb	Mar	Apr	May	Jun
Chicago (US\$/ton)	732	669	602	580	588	
Premium (US\$/ton)	44	52	11	11	3	
Port of Paranaguá - Fob (US\$/ton)	776	722	613	591	591	
São Paulo - (US\$/ton com ICMS 12%)	757	700	578	580	615	

Source: Elaborated by ABIOVE based on several sources.

Consumption

Biodiesel domestic consumption in Brazil remains regulated by the government and is a function of two variables: 1) the mandatory biodiesel blend rate, and 2) overall diesel consumption. The biodiesel mandate was set at B10 (ten percent of biodiesel blended on mineral diesel) during January-February 2020 and B12 (12 percent of biodiesel blended on mineral diesel) as of March 1, 2020. In June 2020, BACEN revised the GDP projection to a contraction of 6.4 percent. Therefore, ATO/Sao Paulo estimates diesel consumption for 2020 at 52.9 billion liters, a sharp decrease of 4.4 billion liters relative to 2019 (57.3 billion liters). As a result, ATO/Sao Paulo estimates total biodiesel consumption for 2020 at 6.26 billion liters, an increase of six percent relative to 2019 (5.92 billion liters).

Trade

Brazil does not export any significant amounts of biodiesel because it is not cost competitive. Biodiesel imports are nearly zero. The National Biodiesel Production Program (PNPB) created in 2004 requires that only domestically produced biodiesel be eligible to participate in the auction system. The tables below show biodiesel exports and imports as reported by Trade Data Monitor (TDM) based on the Brazilian Secretariat of Foreign Trade (SECEX).

Brazilian Biodiesel Exports by Country of Destination (MT, US\$ 000 FOB)								
	CY 2018		CY 2019		YTD 2019 / 1		YTD 2020 / 1	
Country	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
United States	97.27	167.88	293.50	517.28	293.48	517.27	-	-
Israel	-	-	34.20	48.37	-	-	67.50	89.78
India	-	-	0.00	0.01	0.00	0.01	-	-
Belgium	-	-	-	-	-	-	3,150.00	567.66
Japan	0.04	4.00	-	-	-	-	-	-
Malaysia	-	-	-	-	-	-	-	-
Netherlands	-	-	-	-	-	-	-	-
Peru	-	-	-	-	-	-	-	-
Turkey	-	-	-	-	-	-	-	-
Total	97.31	171.88	327.70	565.66	293.48	517.27	3,217.50	657.44

Source: Trade Data Monitor (TDM) based on the Brazilian Secretariat of Foreign Trade (SECEX) Note NCM: 3826.00.00 / 1/ Year to Date - Jan-June

Brazilian Biodiesel Imports by Country of Origin (MT, US\$ 000 FOB)								
	CY 2018		CY 2019		YTD 2019 / 1		YTD 2020 / 1	
Country	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Belgium	-	-	5.950	14.819	-	-	-	-
Germany	0.025	0.293	0.248	0.932	0.048	0.180	0.475	1.766
France	-	-	-	-	-	-	1.520	3.979
Total	0.025	0.293	6.198	15.751	0.048	0.180	1.995	5.745

Source: Trade Data Monitor (TDM) based on the Brazilian Secretariat of Foreign Trade (SECEX) Note NCM: 3826.00.00 / 1/ Year to Date - Jan-June

Trade under NCM 2710.20 remains insignificant. In 2019, Brazil exported only 7.3 metric tons of biodiesel, up 2.8 mt from 2018 (4.5 mt). Imports for 2019 were 14.1 metric tons (mt), up 5.3 mt compared to 2018 (8.76 mt). Given that petroleum oils may contain biodiesel up to and including 30 percent by volume, ATO/Sao Paulo considers an average of 15 percent of biodiesel included under NCM 2710.20.

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, large-scale production has not proven economically feasible due to the high cost of the technology to produce cellulosic ethanol, and the cost of the enzymes used in the process. In addition, plant operational/mechanical challenges remain significant preventing plants from reaching full capacity use as designed.

There are currently three cellulosic ethanol plants in Brazil: (1) Bioflex 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. Granbio is currently diverting the biomass to the thermoelectric plant and should resume the ethanol cellulosic production in August.

Advanced ethanol production capacity remains unchanged as it has since 2015, estimated at 127 million liters. Production for 2020 is projected at 32 million liters, similar to 2019 (30 million liters). 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) are based on information from the Ministry of Agriculture, Livestock and Supply (MAPA) and reflect all stocks at the ethanol plants as of January 1, 2020. Beginning Stocks for ethanol used as “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 the total ethanol disappearance (use).

ATO/Sao Paulo historically reported all figures related to the sugar-ethanol industry in marketing years 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 GOB is April through March for the center-south producing states. The official marketing year for the north-northeast region is September through August.

Ethanol production estimates for Fuel and Other Industrial Chemicals are provided by MAPA. 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 are 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 to or over 80 percent with water content equal to or below 1 percent volume. Undenatured alcohol is defined as pure ethanol with no additives and is suitable for consumption.
- NCM 2207.10.90 - Undenatured ethylic alcohol with ethanol content equal to 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 and water content equal to or below 1 percent volume. Denatured alcohol is defined as ethanol with additives that make it poisonous and/or unpalatable, thus not 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 that make it poisonous and/or unpalatable, thus not 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 used for fuel and/or any other uses. Post estimates traded ethanol used for fuel based on industry sources.

Domestic consumption figures were taken from information provided by Datagro, the National Agency for Petroleum, Natural Gas and Biofuels (ANP), the Sugarcane Industry Union (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 it 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 it by 185 through 240 days, depending on the estimate for the sugarcane crushing period in a given year, for the annual estimate.

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 = 417 liters of ethanol
- 1 metric ton of corn yields 313 kg of Dried Distilled Grains (DDGs)
- 1 metric ton of corn yields 18 liters of corn oil
- 1 metric ton of ethanol = 1,237 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 given 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 fall under NCM 2710.20 is equivalent to 0.15 metric tons of pure biodiesel (B100).

The number of bio refineries and their combined 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
- 1 metric ton of biodiesel = 1,143 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 (RS/US\$1.00 - official rate, last day of period)							
Month	2014	2015	2016	2017	2018	2019	2020
January	2.43	2.66	4.04	3.13	3.16	3.65	4.25
February	2.33	2.88	3.98	3.10	3.24	3.74	4.50
March	2.26	3.21	3.56	3.17	3.32	3.90	5.20
April	2.24	2.98	3.45	3.20	3.48	3.94	5.43
May	2.24	3.18	3.60	3.26	3.74	3.94	5.43
June	2.20	3.10	3.21	3.30	3.86	3.83	5.48
July	2.27	3.39	3.24	3.13	3.75	3.76	5.20
August 1/	2.24	3.65	3.24	3.15	4.14	4.14	5.31
September	2.45	3.98	3.25	3.17	4.00	4.16	
October	2.44	3.86	3.18	3.27	3.72	4.00	
November	2.56	3.85	3.40	3.26	3.86	4.22	
December	2.66	3.90	3.47	3.31	3.87	4.03	

Source: Brazilian Central Bank (BACEN) - Last day of month. 1/ August 2020 refers to August 3.

Attachments:

No Attachments