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6. Oil Product Supply

This chapter analyzes the conditions of service to the domestic market of oil products in the next decade, with a view to guaranteeing the supply throughout Brazilian territory.

Initially, section 6.1 assesses the outlook for international oil and oil prices, discussing the current situation of the oil & gas industry in light of the impacts of the health crisis resulting from the COVID 19 pandemic and the pace of global economic recovery, as well as the effects of the energy transition and climate change policies in the medium and long term.

Then, section 6.2 discusses the development of the supply of oil products in Brazil over the ten-year timeframe, including analyzes of oil processing in the national refining park and domestic production. The development of fuel quality, planned investments in national refining, prospects for imports and exports of oil and products, and the level of external dependence in meeting domestic demand for fuels are also evaluated. All these aspects are analyzed considering increasing numbers of players and higher competitive on downstream, according to Abastece Brasil Federal Program.

Finally, section 6.3 assesses the prospects for the oil product transport domestic infrastructure, analyzing interregional movements, imports and exports of the main fuels, in addition to the impacts of these logistic flows on existing pipelines.

6.1 International prices of oil and its products

2021 was marked by the global economic recovery and the resumption of activity in the oil and natural gas (O&G) industry. The gradual return of urban mobility and industrial activities increased the demand for energy and raised expectations of a growth in global oil consumption. There were also signs of the increased relevance of the energy transition, intensifying commitments of countries and companies to reduce emissions and carbon neutrality by 2050. Despite this, global demand for oil is expected to return to pre-pandemic levels in 2022. However, uncertainties regarding the recovery in demand, the slow reaction of producers not participating in the Organization of Petroleum Exporting Countries (OPEC), the maintenance of high idle capacity by OPEC+ (a group formed by OPEC members, Russia and other producing countries) and Liquefied natural gas (LNG) supply problems led to a spike in energy commodities prices in the second half of 2021 (IEA, 2021a).

With the progress of vaccination and the relaxation of restrictions, world economic activity has gradually rehabilitated from the effects of the pandemic, with emphasis on the US, European and Chinese economies. Industrial recovery and the return of mobility have spurred growth in world demand for oil. The consumption of diesel and gasoline is returning to pre-crisis levels in major global markets, such as the United States. In China, oil demand surpassed pre-COVID levels in the second quarter of 2020, and since then, consumption has increased steadily (EIA, 2021a). As a consequence, the level of processing in refineries has recovered, especially in Asia and the United States (EIA, 2021b; OPEC, 2021).

Global oil supplies slowly recovered throughout 2021, with non-OPEC countries returning to 2019 production levels. OPEC+ has maintained its strategy of limiting the supply of oil from its member countries, in order to make the market more scarce, restricting excess inventories and contributing to raising oil prices. Outside of OPEC+, oil activity is starting to recover, but companies are investing moderately, which stifled the increase in supply still in 2021. The plans of global oil companies continue to indicate some resistance

in approving long-term maturation projects. Publicly held companies have increasingly demonstrated greater financial discipline, limiting short-term spending, which explains the slow recovery in production. There are also societal pressures for oil companies to reduce their greenhouse gas emissions, which impacts investments in the fossil fuel chain. The continuation of cuts by OPEC+ and the lack of reaction from non-OPEC production favored a shortage of supply, which reduced world inventories and raised prices. In turn, this price increase promoted the resumption of approval of O&G projects to meet future demand, although still incipient.

The international oil market framework, described above, supported forecasts of international price trajectories prepared by EPE, to support national energy planning. The reference trajectory of this PDE cycle considers the resumption of global demand for oil in the short term, mainly due to the recovery of world economic activity. In terms of supply, OPEC+ continues to regulate the international crude oil market. The countries that make up the group have different interests, but all are affected by the consequences of excessively low or high oil prices, which creates a predisposition to maintain compliance with the cut policy agreed by the group. In addition, the reference trajectory considers that involuntary production cuts, caused by logistical, market and/or inventory restrictions (especially in the United States and Canada), in addition to an excess of idle OPEC+ capacity, must be gradually reversed throughout 2022.

Restrictions on mobility and the adoption of social distancing measures may persist throughout 2022, depending on the development of the pandemic situation in the world. However, these actions are not expected to have the same impacts on demand as those that occurred at the beginning of the pandemic in 2020.

Thus, the reference trajectory of this PDE predicts a reduction in oil prices for 2022, especially due to the expectation of increased supply by OPEC+ and the United States. However, the faster recovery of global demand should limit more significant drops in international oil prices. It is estimated that, in 2022, volatilities may still occur, with periods of imbalance between supply and demand.

For the medium and long term, the resumption of growth in economic activity, *per capita* income, demand for mobility, and access to energy are forecast. Thus, increase in global demand for oil over the next decade it is considered, resulting, above all, from the economic development and urbanization of nations located in Asia, Africa and Latin America.

Despite progress in renewable energies, investments and innovation are still required for the main countries to effectively adapt to the desired trajectory of zero net emissions in 2050 (*Net Zero* 2050). According to the International Energy Agency (IEA) (2021b), about 75% of the progress required for the decarbonization of the world economy involves technologies and processes that are not yet economically viable. Technologies such as batteries and hydrogen fuel cells are not expected to displace significant shares of demand before 2030. As a result, these technologies face challenges in terms of obtaining inputs, investments and infrastructure, so that they can be made available at the required scale, presenting high costs, to replace the consumption of fossil fuels. Even the electrification of vehicles, which is advancing rapidly in Europe and China, still requires significant investments, both by governments and by the automotive industry and energy distribution and mobility services sectors, with a view to enabling that the licensing of new vehicles with zero exhaust emission replaces that of internal combustion vehicles.

IEA (2021c) indicates that there is a possibility that oil demand will still decline in the medium term. However, such a scenario would result from a combination of factors, such as greater gains in energy efficiency, faster penetration of zero-emission vehicles, acceleration of population behavioral changes (such as the greater spread of remote work and the replacement of business air travel via teleconferences), in addition to the adoption of additional public policies, such as reducing the consumption of plastics, reducing

subsidies for fossil fuels, and replacing oil products in electricity generation and heating. Given the unlikely possibility of a synchronous conjunction of these factors in the main energy-consuming countries, a continuous and gradual increase in world oil demand is forecast over the next decade.

Even if one considers the circumstance in which global consumption of oil begins to decline in the present time, extending until reaching a volume of 70 million barrels/day (b/d) in 2050, 940 billion barrels would still be needed to meet that demand. Currently, the reserves in production have around 850 billion barrels of recoverable oil (Rystad Energy, 2021). Thus, this volume would not be enough to supply the demand until 2050 in the proposed year, requiring additional investments, not only for the development of oil reserves currently in production, but also in new projects.

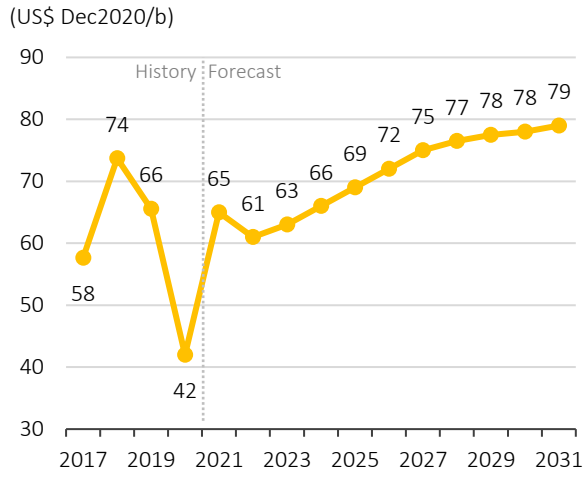
Furthermore, upstream investments have been reduced by around 50% since 2014, not reaching a sufficient level to reverse the pace of decline rates in producing fields (IEA, 2021d). Thus, new investments in E&P will be necessary in the ten-year timeframe, especially when the idle capacity of OPEC+ has returned to pre-pandemic levels, despite the possibility of a recovery in production in Iran and increases in supply in non-OPEC countries such as Brazil, United States, Canada and Norway.

In the long term, international oil prices should remain relatively high to ensure the development of production in sufficient volumes to meet demand, stimulate more exploratory activity and cover the government budget of large producers dependent on oil revenues.

In light of these considerations, the reference path of the present PDE cycle was based on a balance between the global supply and demand for oil over the next decade. In order to make economically feasible, the development of oil projects in new exploratory frontiers, regions currently considered marginal, prices will need to remain at a higher level, reaching a value close to US$ 80/b, a price that is currently feasible. Much of the exploration in less prolific shallow waters, in tar sands, extra-heavy oils, and in the arctic region.

Based on the above assumptions, **Chart 6 - 1** shows forecasts for Brent oil spot price pathway in the ten-year period.

Chart 6 - 1: Brent oil spot price



Source: Prepared by EPE, from EIA (2021a).

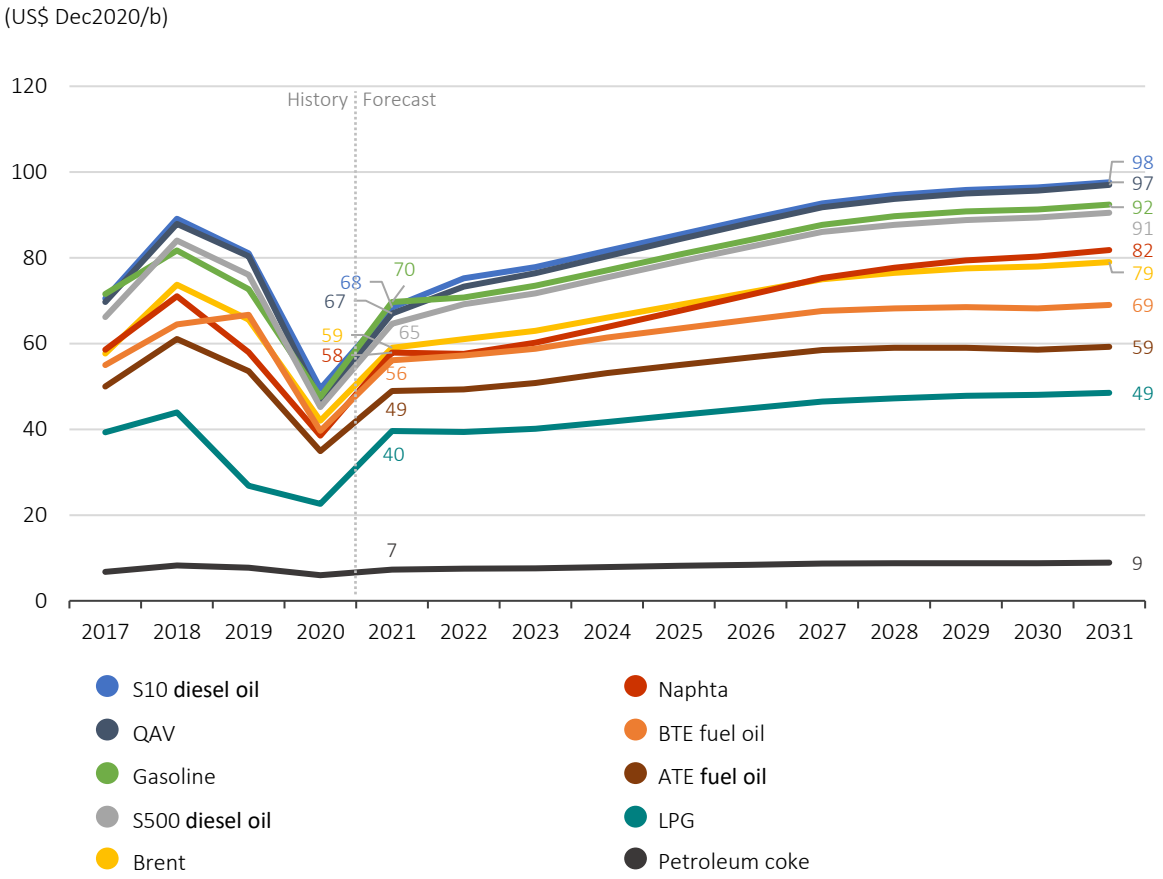
International prices of oil products, to a large extent, follow the changes in the prices of marker oils, such as Brent oil. The methodology for forecasting oil product prices is based on econometric procedures, followed by temporal adjustments on the partial result of the econometrics, in order to reflect the situational impacts and market perspectives of each product. Due to the expectation that the effects of the pandemic will last more significantly for some fuels, an analysis of these impacts was integrated into short-term pricing.

For the preparation of oil product price forecasts in the international market, quotations in the Gulf of Mexico (United States Gulf Coast - USGC), one of the main refining centers in the world, are used as a parameter. USGC quotations are a world benchmark, especially for Brazil, given that a

significant portion of its oil products imports comes from the US[1].

Chart 6 - 2 presents forecasts for international prices of the main oil products for the ten-year period.

Chart 6 - 2: International prices of major oil products



Source: Prepared by EPE, from EIA (2021a).
Note: The following international quotes are considered , as references: *Ultra-low sulphur diesel spot FOB U.S. Gulf Coast*; *Jet fuel spot FOB U.S. Gulf Coast*; *Gasoline regular spot FOB U.S. Gulf Coast*; *Naphtha spot FOB Rotterdam*; *Propane spot FOB Mont Belvieu*; *Fuel oil 1% and Fuel oil 2.5% spot FOB U.S Gulf Coast*.

For diesel oil price forecasts, the greater resilience of energy demand in the freight transport sector in the short term was considered, in addition to the adoption of more restrictive environmental policies in maritime transport[2]. Thus, the increase in global demand for diesel oil should keep the premium for this fuel at high levels in the coming years. In the medium term, demand for diesel oil should continue on an upward trajectory, due to the expectation of growth in global economic activity and the greater difficulty in decarbonizing cargo transport. Post-COVID recovery policies focused on

[1] 50% of Brazilian diesel oil imports between January and August 2021 came from the US, 21% from India, and 8% from the United Arab Emirates (COMEX STAT, 2021).

[2] Since January 1, 2020, more restrictive regulations for marine fuels (established by IMO 2020) are in force, which determined the reduction of the maximum limit of sulphur content in these products of 3.5% mass by mass (m/m) to 0.5% w/w.

investments in infrastructure and renewable energy will require more diesel oil over the next decade, increasing its demand and keeping its premium high. In terms of quality, the demand for low sulphur diesel oil is expected to increase in the coming years, as command and control policies are implemented by countries in the use of fossil fuels[3].

Aviation kerosene (QAV) was undoubtedly the fuel most affected by the pandemic. Although limitations for domestic flights have been eased throughout 2021, many countries still maintain restrictions for international visitors. However, with the gradual reopening of borders, the year 2022 should see an important recovery in demand for domestic and international flights. In the medium term, it is conjectured that global demand for air transport will once again exceed its pre-pandemic highs. Reflections are expected from the growing adoption of teleconferences on business air travel, depressing demand. However, this situation should be offset by continued economic growth, especially in developing countries, whose income increase should stimulate greater adoption of the air transport mode, both for cargo and passengers. This outlook allows us to assume that QAV premium against Brent oil will rise to pre-pandemic levels in the coming years. In the long run, the increase in aircraft efficiency and the introduction of alternative drop-in fuels should limit the growth in demand for this fuel, with the beginning of the reduction of its premium against Brent in 2030.

Regarding the global gasoline market, low consumer prices from 2014 onwards stimulated the sale of sport utility vehicles (SUVs), with higher energy consumption, increasing the demand for this fuel and its premium in relation to Brent. Global demand for gasoline is forecast to remain high in the decade, due to rising incomes in developing countries, the preference for SUVs, and reduced use of public transport for health reasons. On the other hand, engine technologies to replace internal combustion should spread, but gradually, due to the strong barriers to entry that still exist. Consequently, the inventory of gasoline-powered vehicles will remain high for several years, implying a maintenance of high levels of demand and the premium of gasoline against Brent.

The naphtha premium in relation to Brent has been reduced in recent years due to the strong growth in the production of natural gas liquids (NGL) in the United States, as a result of the shale revolution. Prices for this product rose largely as a result of the shortage of natural gas supplies at the end of 2021. After this crisis, it appears that their prices should fall again. However, it is estimated that this premium will partially recover in the coming years with the increase in export capacity in the Gulf of Mexico region and with the increasing consumption of the petrochemical industry, especially in Asia. The premium for gasoline in relation to naphtha is expected to decrease at the end of the decade. Furthermore, it is expected that gasoline demand will peak in the 10-year period under review. The same should not happen with petrochemical demand, which should increase the value of naphtha.

Natural gas production in the United States and exports of LNG and LNG are considered to pressure propane prices (the main component of liquefied petroleum gas - LPG) in the medium term, keeping its premium relative to Brent relatively low.

At the end of 2019 and beginning of 2020, low sulphur fuel oil (OC) (BTE - with up to 1% m/m sulphur) appreciated due to the introduction of regulation (IMO 2020) and its reflexes on demand of marine fuels. On the other hand, the implementation of this standard led to a devaluation of the oil and high sulphur fuel (ATE, with more than 1% m/m sulphur), due to the loss of its most relevant market. This reversed during the pandemic, with the OC BTE premium decreasing throughout 2021, in contrast to an appreciation of the OC ATE, as refiners and ship-owners adapted to the new restrictions, reducing the

[3] Such as, for example, the mandatory introduction of low sulphur diesel oil, with a maximum limit of 10 parts per million (ppm), in China and India.

premium between fuels. This differential is expected to remain constant throughout 2022, expanding only in the medium term, as more restrictive requirements from the International Maritime Organization (IMO) come into force throughout the 2020s.

6.2 Domestic supply of oil products

This section aims to assess the development of the supply of oil products in Brazil for the next decade, with a view to supporting national energy planning. The balances of production, processing, import and export of oil are also analyzed, as well as the level of external dependence in meeting domestic demand for fuel.

The dynamics of oil supply in Brazil is undergoing significant changes. This transformation stems mainly from initiatives promoted by the Federal Government over the last few years - such as the Abastece Brasil Federal Program and the establishment of strategic guidelines for the development of the fuel market by CNPE Resolution nº 15, of June 8, 2017. The aim is developing a new framework for the domestic fuel market is expected, with an emphasis on encouraging the entry of new economic players, free competition and attracting investments in the sector, in an objective and transparent regulatory environment (CNPE, 2017; MME, 2020a).

Within the scope of these transformations, the Cessation Commitment Term (TCC) entered into in June 2019 between Petrobras and the Administrative Council for Economic Defense (CADE in the Portuguese acronym) stands out. Through this document, the state-owned company committed to sell eight of its refineries, including associated logistics assets (CADE, 2019). This measure has the potential to significantly change the dynamics of the national supply of oil products, as Petrobras will reduce its share in the refining segment from 99% to around 50%. To date, three refinery sales contracts have been signed by the company: RLAM and Reman refineries and the Schist Industrialization Facity (SIX) (Petrobras, 2021a, 2021b, 2021c). In late November 2021, the sale of RLAM and its associated logistics assets was completed, with the company Acelen taking over the management of the asset as of 12/01/2021 (Petrobras, 2021d).

Preparation of the analysis in this section uses the Oil Product Supply Planning Model (Plandepe), a mathematical model of linear programming whose equation represents the main activities of the oil products supply system in Brazil. This model covers the integration between domestic production of oil and natural gas liquids; the possibilities of importing and exporting oil and its products; oil processing and the production of oil products in domestic refineries and other production facilities (petrochemical plants, schist industrialization unit, and other producers); the infrastructure for transporting oil and its products; domestic demand for oil products segmented into distribution bases; and the complementarity between oil-derived fuels and biofuels. Thus, Plandepe makes it possible to carry out analyzes on the national refining park in different scenarios, as well as to evaluate the main flows of oil and products between the different regions of production and consumption (EPE, 2020a).

Plandepe's mathematical modeling seeks to minimize the costs of the national supply system for oil products as a whole (EPE, 2020a). The results represent the fulfillment of the country's supply from a national approach to the supply structure, not distinguishing the ownership of the assets of this chain. It is important to note that the entry of new players may change the dynamics and strategy choices of each refinery.

The assumptions adopted in this study include forecasts of Brazilian oil production, shown in Chapter 5; domestic production of natural gas liquids, derived from the natural gas forecasts presented in Chapters 5 and 7; international prices

for oil and oil products discussed in this Chapter (section 6.1); and the Brazilian demand for oil products, presented in Chapter 2, including the supply of QAV and marine fuels, respectively, for foreign aircraft and ships fueled in Brazil.

Additionally, assumptions related to the characteristics of the national refining complex and the infrastructure for transporting oil and oil products, fuel quality specifications, biofuel mandates, and planned investments in refining in Brazil are considered. These issues are addressed in more detail below, with the exception of transport infrastructure, which is discussed in section 6.3.

DOMESTIC REFINING COMPLEX

Brazil currently has 19 oil refineries authorized by the ANP for operation, totaling a nominal processing capacity of 2.4 million b/d, as shown in **Table 6 - 1**. As a result, the domestic refining complex is the 9th largest in the world (BP, 2021).

Table 6 - 1: Brazilian refineries authorized to operate

Refineries	Location	Nominal capacity (THOUSAND B/D)
Paulínia Refinery (Replan)	Paulínia (SP)	434
Mataripe Refinery	São Francisco do Conde (BA)	337
Duque de Caxias Refinery (Reduc)	Duque de Caxias (RJ)	252
Henrique Lage Refinery (Revap)	São José dos Campos (SP)	252
Presidente Getúlio Vargas Refinery (Repar)	Araucária (PR)	214
Alberto Pasqualini Refinery (Refap)	Canoas (RS)	208
Presidente Bernardes Refinery (RPBC)	Cubatão (RJ)	179
Gabriel Passos Refinery (Regap)	Betim (MG)	164
Abreu e Lima Refinery (RNEST)	Ipojuca (PE)	115
Refinery of Capuava (Recap)	Mauá (SP)	63
Isaac Sabbá Refinery (Reman)	Manaus (AM)	46
Potiguar Clara Camarão Refinery (RPCC)	Guamaré (RN)	38
Riograndense Oil Refinery (RPR)	Rio Grande (RS)	17
SSOil Energy Refinery	Coroados (SP)	12
Manguinhos Refinery (Refit)	Rio de Janeiro (RJ)	10
Lubrificantes do Nordeste Refinery (Lubnor)	Fortaleza (CE)	10
Unidade de Industrialização do Xisto (SIX)	São Mateus do Sul (PR)	6
Univen Refinaria de Petróleo (Univen)	Itupeva (SP)	5
Dax Oil	Camaçari (BA)	2

Source: Prepared by EPE from ANP (2021a) and Petrobras (2021e).

Notes: (1) RNEST has nominal capacity of 115 thousand b/d, but is authorized to process at most 100 thousand b/d, as per Operation License Renewal issued by the Pernambuco Environment State Agency; (2) Operations of Univen Petróleo refinery have been since March 2014, so they were not considered in this study; (3) SIX is a pirobetuminous schist industrialization facility , and does not process oil; (4) SSOil Energy refinery has an authorized capacity of 12 thousand b/d, but is limited to producing, at most, 1,290 b/d of gasoline A, 434 b/d of diesel oil S500 and 642 b/d of fuel oil, due to storage limitations.

PLANNED INVESTMENTS IN DOMESTIC REFINING

In spite of possible changes in the coming years in the structure of domestic fuel supply, significant investments in the expansion of refining capacity were not considered in the study timeframe. It is noteworthy, however, that there are small expansions currently underway in the states of Bahia and Rio de Janeiro (ANP, 2019a, 2020a, 2020b).

Additionally, investments in the expansion of treatment capacity in existing refineries were considered. These investments include the construction of a new 10,000 m³/d hydrotreating facility[4] (HDT) with an expected start-up in 2025, and the revamp of two hydrodesulphurization units (HDS), one in 2023 and the other in 2025, totaling 12,000 m³/d treatment capacity (Petrobras, 2021f). It is noted that these projects aim to adapt the national refining park to meet the growing demand for low sulphur fuels.

It is noteworthy that, given the lack of physical progress in the works since 2015, the ongoing process of the refinery sale by Petrobras and the uncertainty about the business strategies of the buying agent, it was decided not to consider the completion of the construction of the 2nd RNEST train on the ten-year timeframe of PDE 2031. In turn, in relation to the Petrobras project in Itaboraí (RJ), renamed as Polo GasLub Itaboraí (former Petrochemical Complex of Rio de Janeiro - Comperj)[5], this study only considers the completion of construction and the start of operation of the processing unit of natural gas (UPGN) in 2022, as indicated in Chapter 7.

In addition to the small refinery projects in the states of Bahia and São Paulo, projects of this type, relevant for the integration between local onshore and offshore oil production and regional development, were announced in the states of Sergipe, Espírito Santo and Rio de Janeiro. (EPE, 2020b). As these refineries have not yet obtained authorization for construction, it was decided not to consider them in this study, but they are still being monitored.

Finally, it should be noted that with the advance of Petrobras' divestment, new players are expected in the refining segment in the country, with strategies different from those observed until then. With this, it can be observed, over the next few years, a change in the pattern of investments and the announcement of projects that have not yet been considered.

Thus, with the assumptions adopted, it is forecast that the nominal refining capacity in the country will remain below 2.5 million b/d over the next ten years.

FUEL SPECIFICATION

Diesel oil is sold in Brazil with different specifications, thus establishing maximum limits for sulphur content. Diesel oil for trucking, plus biodiesel, is consumed in Brazil with a maximum sulphur content of 10 ppm (S10) and 500 ppm (S500). It was assumed that this regulation will remain valid over the ten-year timeframe.

It is noted that, since the implementation of Phase P 7 of the Air Pollution Control Program by

[4] Investments in HDT may imply the need to build or expand hydrogen generation units (UGH). Aspects related to the production and consumption of hydrogen in oil refineries will be dealt with in a specific chapter.

[5] In the disclosure of its Strategic Plan 2022-2026, in November 2021, Petrobras announced investments in the resumption of the 2nd train of RNEST and in the operational integration of Reduc-Gaslub, for the production of base oil for group II lubricants and S10 diesel oil and QAV (Petrobras, 2021g). Despite this announcement, the assumption of non-completion of these projects during the ten-year period was adopted, according to previous disclosures by the company, such as the Strategic Plan 2021-2025 (Petrobras, 2020b), since this was the valid information in the period of elaboration of this study.

Motor Vehicles (Proconve) in 2012, new heavy vehicle engines produced and licensed in Brazil are suitable for the consumption of low-content sulphur diesel. Therefore, the scrapping of the fleet and the harmfulness of the S500 to the new engine drive Brazilian demand to a gradual transition to S10 diesel oil in the coming years[6].

In this sense, it is worth mentioning that a sensitivity analysis was also carried out considering the entry into force of more restrictive specifications for diesel oil B, limiting the sulphur content to 10 ppm, as highlighted in Box 6.1.

In the case of off-road B diesel oil, for use in railway trains, open pit mineral extraction or in electric generation, the current sulphur content limit is 1800 ppm (S1800). Due to its demand in insignificant volumes, as well as the reduction of its consumption over the last few years, it was adopted the hypothesis of replacing the S1800 in Brazil with S500 diesel oil from 2028 on. Similarly, for marine diesel oil for waterway use, the change in the current maximum sulphur content limit from 5000 ppm to 500 ppm was considered, with the new specification coming into force in 2024.

Marine fuel oil, internationally known as bunker, is a fuel used mainly for long-distance water transport by large vessels. The maximum limit of sulphur content in the bunker of 0.5% (5000 ppm) was adopted as a premise (ANP, 2019b) and in line with IMO 2020 standard, implemented by IMO in January 2020 (IMO, 2019).

For gasoline C, its new specification in Brazil was considered, which came into force in 2020, establishing specific mass limits at 20°C, distillation temperature at the 50% evaporated point (T50) and the RON octane parameter, according to ANP Resolution No. 807/2020 (ANP, 2020c). It was also assumed that the maximum sulphur content limit of 50 ppm for C gasoline would be maintained throughout the study timeframe.

Also noteworthy are the assumptions of mandatory percentages of biofuels in the mixtures of gasoline C and diesel oil B in the next ten years. For C gasoline, the current percentage of anhydrous ethanol in the mixture was adopted, 27% for regular C gasoline and 25% for premium C gasoline, according to MAPA Ordinance No. 2015, throughout the study timeframe. For diesel, the figure of 10% of biodiesel in 2022 was considered, according to a decision by CNPE (MME, 2021). From 2023, 15% of biofuel addition was considered, until the end of the analyzed ten-year series, as established by CNPE Resolution No. 16/2018 and ANP Order No. 621/2019 (ANP, 2019c; CNPE, 2018). Additionally, the insertion of biojet fuel in Brazil was taken as an assumption. Issues related to biofuels are discussed in detail in Chapter 8.

DOMESTIC OIL BALANCE

Throughout this decade, Brazil should expand its status as a net exporter of oil. Brazilian exports are projected to reach 3.4 million b/d in 2031, which corresponds to 66% of national production in the year. This expressive volume could elevate Brazil to one of the five largest exporters in the world, which would increase the country's importance and relevance in the geopolitical context of the world oil industry.

This export condition is largely explained by the increase in domestic oil production (described in Chapter 5), mainly in the pre-salt areas of the Santos Basin. It is estimated that this growth in national production will greatly outweigh the oil processing in the domestic refining complex.

[6] The average share of S10 in the Brazilian diesel oil market, considering accumulated sales from January to September 2021, was 58% (ANP, 2021b).

This PDE cycle forecasts indicate a small increase in the volume of oil processed in Brazilian refineries, from 1.75 million b/d (average of the last four years) to 1.93 million b/d in 2031. In terms of the refineries' utilization factor, this represents an increase of 75% to a level of 82% at the end of the decade.

Table 6 - 2 presents forecasts for the domestic oil balance in the ten-year timeframe, as well as for refinery utilization factor, share of domestic oil in processing, and the relationship between oil exports and domestic production.

Table 6 - 2: Domestic oil balance and indicators for oil and refine

Domestic oil balance (million b/d)						
	2019	**2022**	**2025**	**2028**	**2031**	**% p.y. (2019-2031)**
Domestic production	2.79	3.36	3.96	5.04	5.17	5.3%
Processing in refineries	1.75	1.81	1.93	1.93	1.93	0.8%
Imports	0.19	0.16	0.17	0.17	0.17	-0.9%
Exports	1.17	1.71	2.21	3.28	3.41	9.3%
Indicators for oil and refine (%)						
	2019	**2022**	**2025**	**2028**	**2031**	
Domestic refineries' utilization factor	75%	77%	82%	82%	82%	
Share of domestic oil in processed load	89%	91%	91%	91%	91%	
Ratio between oil exports and domestic production	42%	51%	56%	65%	66%	

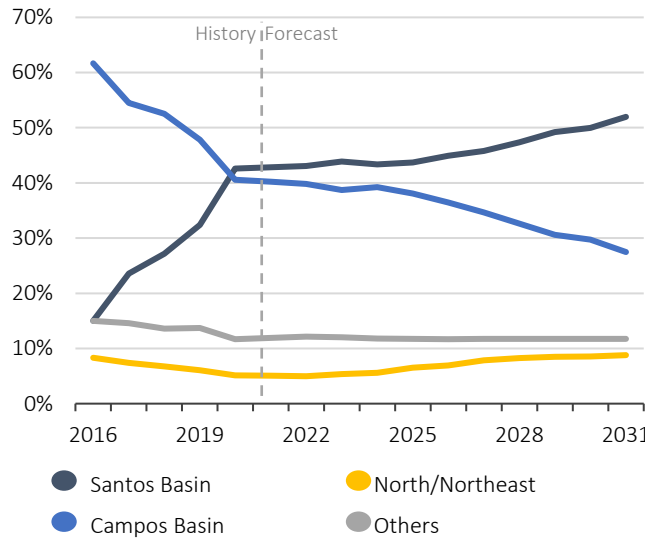
Source: Prepared by EPE, from ANP (2021c).

Note: Oil balance (domestic production + Imports - Processing in refineries - Exports) may not sum zero due to variance in stocks or rounding-ups.

With regard to oil imports, it is forecast to remain at volumes similar to recent history. This import is mainly due to the processing of paraffinic oil for the production of lubricating base oils at Reduc. As domestic production of this type is limited, it is necessary to supply the refinery with imported oils (mostly Arab Light and Basrah Light types). The importation of other types of oil occurs, above all, due to commercial opportunities and the need to adjust the quality of the oil basket in some refineries.

Over the period, a high share of domestic oil is forecast to be part of the refineries' processed load. Particularly noteworthy is the growth in the share of Santos Basin oils, mostly from the pre-salt layer, such as Búzios and Tupi oils, according to **Chart 6 - 3**. In turn, oils from the Campos Basin, mostly from the post-salt, such as Marlim, Roncador and Parque das Baleias, show a decreasing share in the processing basket. Oils from sedimentary basins in the North and Northeast, such as Baiano, RGN Mistura and Urucu, account for 5% to 10% of the basket processed in national refineries.

Chart 6 - 3: Processed oils basket in refineries by type (%)



Source: Prepared by EPE, from ANP (2021d).
Note: Others include imported oils and reprocessing load

DOMESTIC BALANCE OF OIL PRODUCTS

The COVID-19 pandemic has affected the national demand for oil products in different ways. As a result, the refineries adapted their production mix to meet the variations in domestic fuel market demand and export opportunities, increasing, for example, the production of maritime bunker, S10 diesel oil, and LPG.

In the coming years, with the prospect of a recovery in demand, a gradual recovery of the utilization factor is expected and, consequently, of the production of products in national refineries.

Table 6 - 3 shows the forecasts for the domestic production of oil products, while **Chart 6 - 4** presents the production profile of Brazilian refineries.

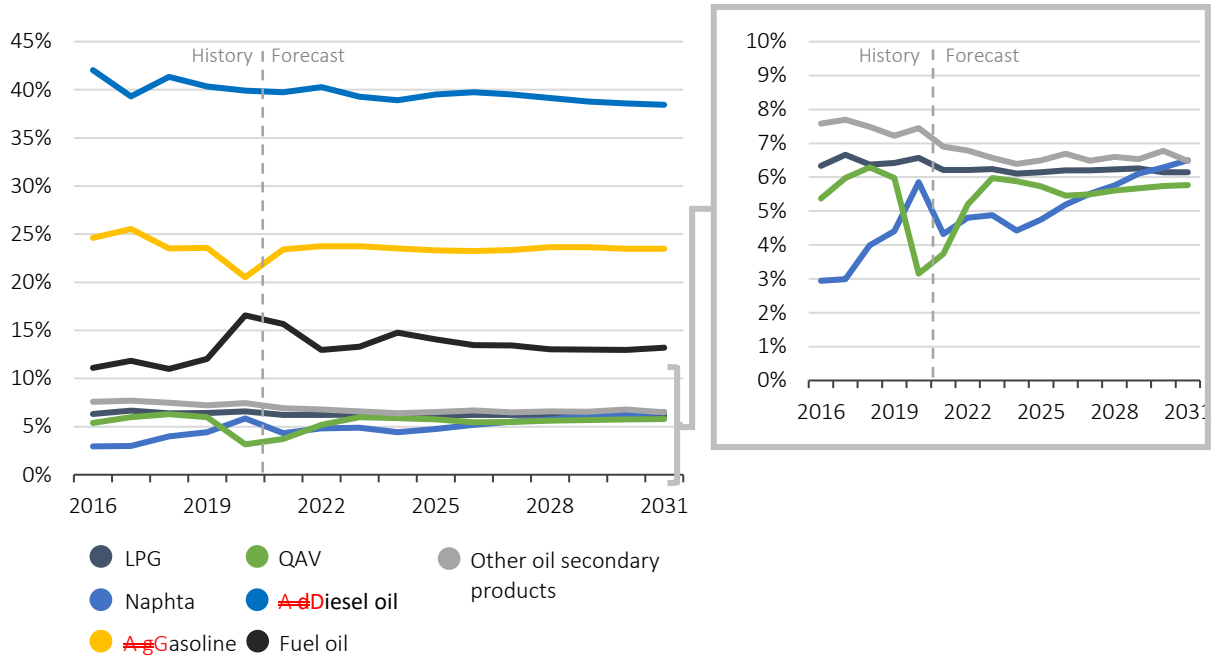
Table 6 - 3: Domestic production of oil products

(Thousand m³/d)	2019	2022	2025	2028	2031	% p.y. (2019-2031)
LPG	27.2	33.5	34.8	43.0	46.5	4.6%
Naphtha	12.3	14.0	14.7	18.0	20.3	4.3%
Gasoline A	69.2	72.8	75.7	77.2	76.9	0.9%
Jet Kerosene (QAV)	16.6	15.1	17.8	17.5	18.1	0.7%
Diesel Oil A	112.3	117.5	122.6	122.1	120.3	0.6%
Fuel Oil	33.5	37.9	43.6	40.7	41.3	1.8%
Petroleum coke	12.1	11.6	12.1	12.2	12.1	0.0%
Asphalts	4.7	5.9	5.7	5.9	5.6	1.5%
Lubricants	2.4	1.8	1.8	1.9	1.9	-2.1%
Other energetics and non-energetics	6.3	6.1	6.1	6.1	6.1	-0.3%

Source: Prepared by EPE, from ANP (2021c) and EPE(2021).

Notes: (1) Table values include production from refineries, petrochemical plants, natural gas processing facilities, schist industrialization facilities, and other producers; (2) Other energetics and non-energetics include: benzene, special butane, MTBE, n-paraffin, paraffins, propylene, aromatic residue, asphalt residue, solvents, toluene and xylenes.

Chart 6 - 4: Domestic refineries' production profile (%)

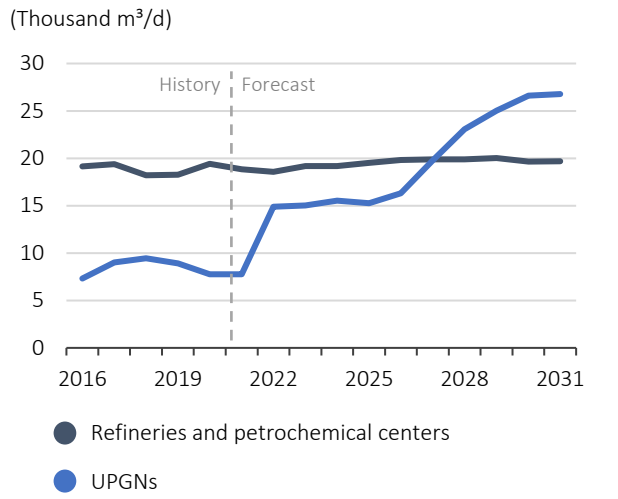


Source: Prepared by EPE, from ANP (2021c) and EPE(2021).
Note: Other oil secondary products include asphalts, green petroleum coke, lubricant and solvents.

Liquefied Petroleum Gas (LPG) – The growth of more than 70% in national production of LPG between 2019 and 2031 stands out. This increase will largely result from the share of production from natural gas processing, in particular, with the entry into operation in 2022 of the UPGN of the GasLub Polo, in Itaboraí (RJ), and with the development of natural gas production in the Sergipe-Alagoas Basin in the second half of this decade. Thus, it is estimated that the production of LPG from UPGNs will reach 26.8 thousand cubic meters per day (m³/d) in 2031, a volume much higher than the 8.9 thousand m³/d produced in 2019 at these units. Issues related to the domestic supply of natural gas and planned investments in UPGNs are discussed in more detail in Chapter 7.

In turn, LPG production in refineries and petrochemical plants should remain between 18 and 20 thousand m³/d over the ten-year period. Only a gradual increase is forecast in the first years of the decade due to the recovery of the utilization factor of refineries. **Chart 6 - 5** shows forecast for domestic LPG production per producing unit type.

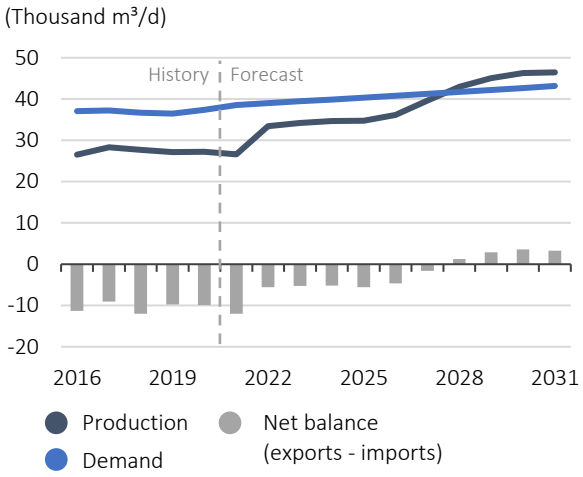
Chart 6 - 5: Domestic LPG production per producing unit type



Source: Prepared by EPE, from ANP (2021c), ANP (2021e) and EPE (2021).
Notes: (1) Does not include propane and butane for petrochemical, commercial propane, commercial butane and special propane. (2) UPGN LPG production includes volumes produced by natural gas processing facilities associated to refineries, such as UPGNs Lubnor, Reduc I and II, Catu and Candeias.

With the significant growth in production from UPGNs, Brazil could become self-sufficient in LPG by the end of the 2020s. Between 2019 and 2031, LPG production is expected to grow at a faster pace (+4.6% pa) than national demand (+1.4% pa), gradually reducing imports of the product, until it becomes a surplus in the second half of the decade, as presented in **Chart 6 - 6**. More details on LPG demand can be found in Chapter 2. It is forecast that, in 2031, LPG exports will represent 7% of national production.

Chart 6 - 6: LPG balance



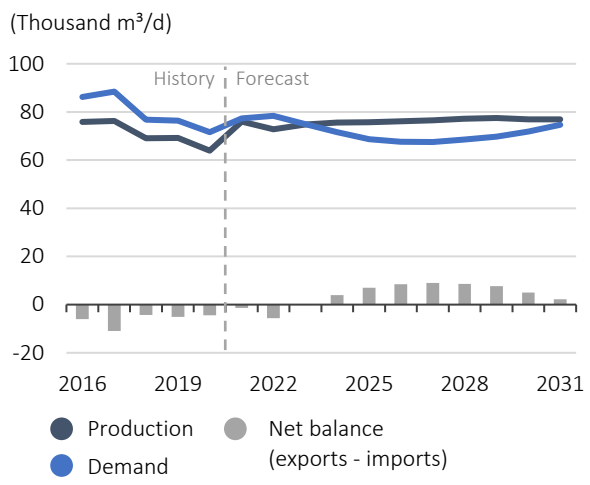
Source: Prepared by EPE, from ANP (2021c), ANP (2021e) and EPE (2021).
Note: Does not include propane and butane for petrochemical, commercial propane, commercial butane and special propane.

Significant changes are expected in the LPG sector in the coming years, both as a result of the end of price differentiation with the repeal of CNPE Resolution nº 04/2005, and as a result of the increase in the number of players in the sector from the sale of refining and processing natural gas. During this process, attention will be required to the primary supply infrastructure of this fuel, which currently has limitations (MME, 2020b).

Gasoline – Despite the higher utilization factor of the refineries in the period, the national production of gasoline should remain around 75 thousand m³/d, in line with the average registered in recent years. To a large extent, this is justified, as the forecasts of this PDE cycle indicate that domestic gasoline demand is not expected to return to 2019 levels before 2031, due to the behavior of demand for Otto cycle fuels and the expectation of greater supply of hydrated ethanol, described in Chapter 8.

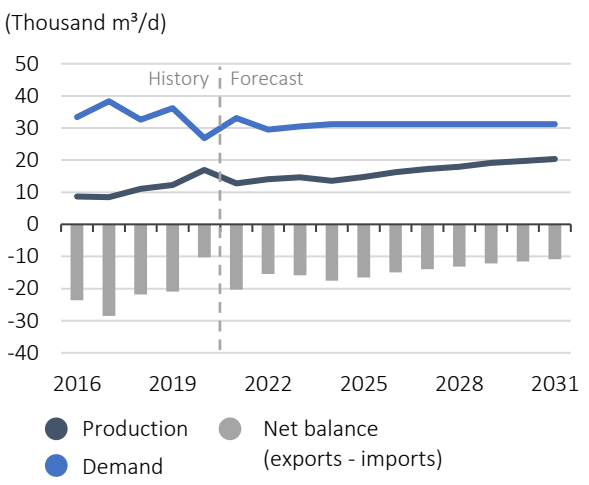
In this situation, Brazil may have a surplus in gasoline throughout this decade, as indicated in **Chart 6 - 7**. Net export volumes are projected to reach a maximum of 9.0 thousand m³/d in 2027, which would represent 12% of national production in the year.

Chart 6 - 7: Gasoline balance



Source: Prepared by EPE, from ANP (2021c) and EPE (2021).
Note: Includes common gasoline, premium gasoline, and aviation gasoline.

Chart 6 - 8: Naphtha balance



Source: Prepared by EPE, from ANP (2021c) and EPE (2021).
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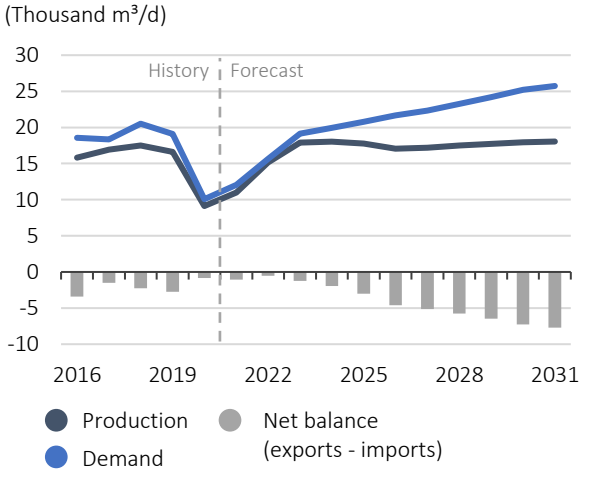
Naphtha – A substantial increase in national production of naphtha is forecast, from 12.3 thousand m³/d in 2019 to 20.3 thousand m³/d in 2031. This production growth should be guided by the increase in the volumes of oil processed in the refineries over the period, in such a way that the incremental production of fractions of naphtha in the distillation should be mainly directed towards obtaining petrochemical naphtha instead of composing the pool of gasoline. In 2031, the imported volume of naphtha (10.9 thousand m³/d) will represent around 35% of national demand, a level below the recent average[7].

Chart 6 - 8, which illustrates the national balance of naphtha, indicates that Brazil will remain an importer of this product, albeit in decreasing volumes.

Jet fuel– Domestic production of QAV is projected to increase gradually, following the recovery of domestic consumption. However, due to operational limitations of the refining complex, production will be limited to volumes around 18 thousand m³/d, while domestic demand will continue to increase, as indicated in **Chart 6 - 9**.

Chart 6 - 9: Jet fuel balance



Source: Prepared by EPE, from ANP (2021c) and EPE (2021).
Notes: (1) Includes jet fuel and lighting kerosene. (2) jet fuel supply for foreign aircrafts is accounted for as domestic demand.

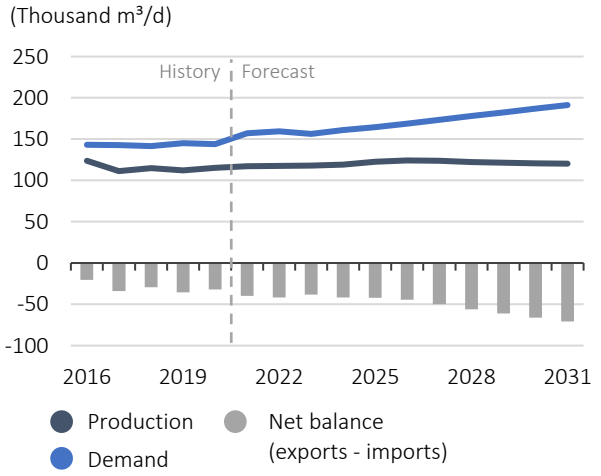
[7] Between 2015 and 2019, Brazil imported, on average, 22,800 m³/d of petrochemical naphtha, which represented about 65% of national demand in the period (ANP, 2021c, EPE, 2021).

Thus, increasing import volumes are projected over the ten-year timeframe, reaching 7,700 m³/d in 2031 (about 30% of demand in the year). This amount is higher than the historical maximum import of jet fuel in the country (5.4 thousand m³/d in 2013), which may require investments in the expansion of the primary infrastructure to supply this fuel.

Diesel – Despite the greater use of national refineries and the planned investments in hydrotreatment units, the production of fossil diesel is expected to grow slightly over the decade, reaching 120,000 m³/d in 2031. This is largely explained by the gradual exchange of S500 diesel production for S10, which represents a challenge for the operation of national refineries with a view to meeting the specifications.

Thus, as the demand for diesel oil is expected to grow at a faster pace (+2.3% pa) than national production (+0.6% pa) between 2019 and 2031, Brazil will further expand its status as an importer diesel during the ten-year period, as indicated in **Chart 6 - 10**.

Chart 6 - 10: Diesel balance



Source: Prepared by EPE, from ANP (2021c) and EPE (2021).
Notes: (1) Includes road diesel (S10 e S500), non-road diesel (S1800) and maritime diesel (S5000). (2) Maritime diesel supply for foreign ships is accounted for as domestic demand.

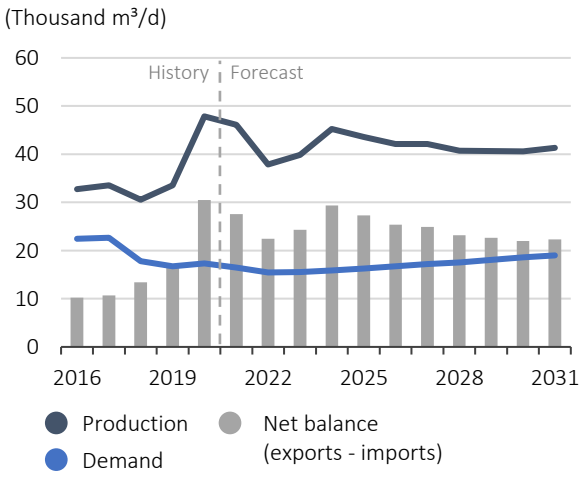
Import volumes of diesel should progressively increase, surpassing the level of 70 thousand m³/d in 2031 (which is equivalent to 37% of demand in the year). This figure is almost double the 35,500 m³/d imported by Brazil in 2019, the historic maximum recorded until then, signaling an investment opportunity in expanding the primary diesel fuel supply infrastructure.

Fuel oil – As Brazilian oils generally have a low sulphur content, the production and sale of marine fuel oil (bunker) that meets the new IMO specifications has become a commercial opportunity for national refineries.

In 2020, production and exports of fuel oil recorded significant increases compared to previous years. However, low sulphur fuel oil margins are expected to be gradually reduced in the coming years as refiners around the world adapt their conversion and treatment process units to meet bunker specifications 0.5 %, as discussed earlier in section 6.1.

Brazil will remain a net exporter of fuel oil throughout the ten-year period, but with a downward trend in exported volumes over the study timeframe. **Chart 6 - 11** shows domestic fuel oil balance forecasts.

Chart 6 - 11: Fuel oil domestic balance

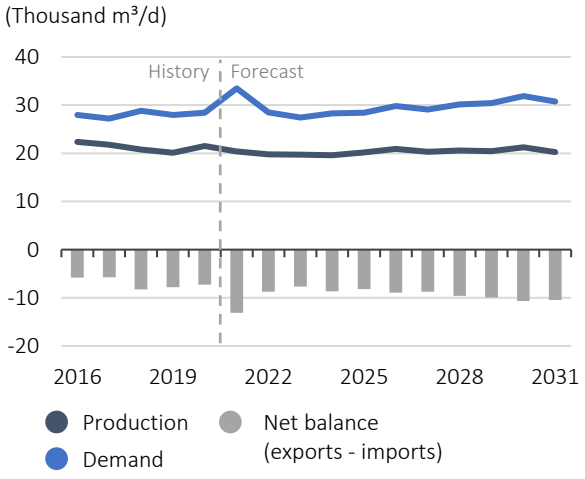


Source: Prepared by EPE, from ANP (2021c) and EPE (2021).
Notes: (1) Includes maritime fuel oil (bunker 0.5%), industrial and low Sulphur (1%) and high Sulphur (2%) thermoelectric

generation fuel oil and schist fuel oil. (2) Maritime fuel oil supply for foreign ships is accounted for as domestic demand.

Other oil secondary products – Brazil will remain a net importer of other oil secondary products, such as lubricants, petroleum coke and solvents throughout the ten-year period. On the other hand, the national balance of asphalts should maintain a slight surplus for practically the entire period, despite the fact that demand for this product is highly seasonal. **Chart 6 - 12** displays national balance forecasts for other oil secondary products.

Chart 6 - 12: Balance of other oil secondary products

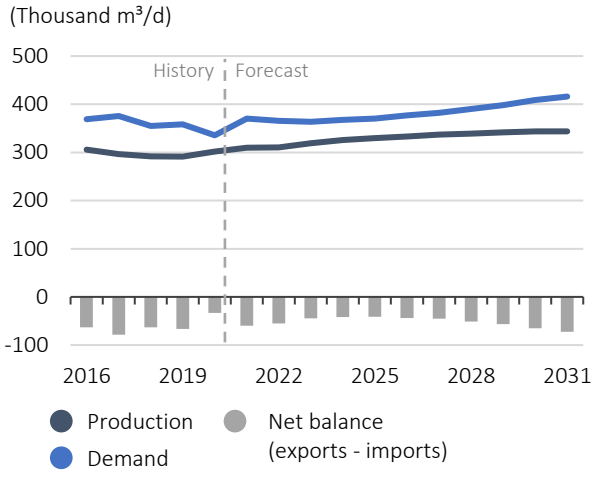


Source: Prepared by EPE, from ANP (2021c) and EPE (2021).
Notes: Other oil secondary products are asphalts (includes diluted asphalt and asphaltic cement), oil green coke (includes anode grade, metallurgical grade and energy grade coke and does not include calcinated coke), lubricants and solvents (does not include benzene, toluene, xylenes and mixed aromatics).

Total oil products – Due to the impacts of the COVID-19 pandemic on fuel consumption, imports of oil products declined in 2020. However, with the forecast of economic recovery and growth in domestic demand, net imports will reach 72 thousand m³/d in 2031, slightly below the volume recorded in 2017 (79 thousand m³/d).

Chart 6 - 13 presents the sum of PDE 2031 forecasts for the national balance of the main oil products analyzed – LPG, naphtha, gasoline A, QAV, diesel oil A, fuel oil, petroleum coke, asphalts, solvents and lubricants.

Chart 6 - 13: Domestic balance of major oil products



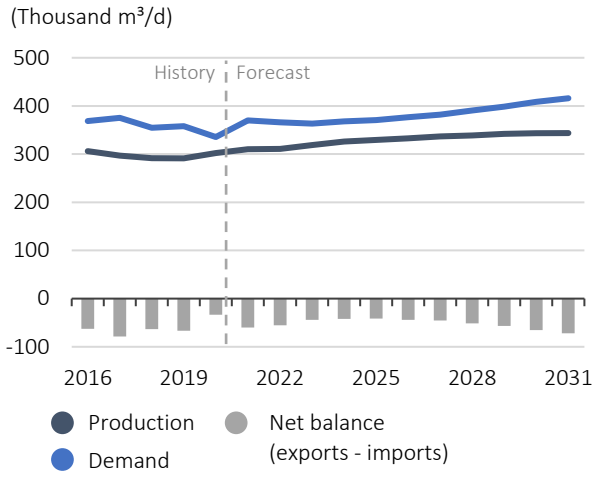
Source: Prepared by EPE, from ANP (2021c) and EPE (2021).
Note: Includes LPG, naphtha, gasoline A, QAV, diesel oil, fuel oil, oil coke, asphalts, solvents and lubricants.

Oil products that most contribute to the deficit in 2031 are diesel oil (-71 thousand m³/d), naphtha (-11 thousand m³/d) and jet fuel (-8 thousand m³/d). On the other hand, product with the largest surplus in 2031 is fuel oil (+22 thousand m³/d).

These volumes of imports of oil products present themselves as opportunities to make investments in expanding the national refining capacity, as well as the infrastructure for the haulage of products. In this sense, conditions to favor the realization of investments and the entry of new actors must be analyzed.

Chart 6 - 14 shows the projected net balance for the main oil products in the study timeframe.

Chart 6 - 14: Net balance of major oil products in Brazil



Source: Prepared by EPE, from ANP (2021c) and EPE (2021).

With regard to the energy transition, although there is an increase in consumption and expansion of the supply of oil products over the ten-year period, advances can be seen in actions for decarbonization in the national refining park, either in the form of optimization and reduction of carbon intensity in refineries, or in initiatives for the co-processing of biomass (Petrobras, 2021g, 2021h). Other advances and specification were not considered in the baseline scenario, one of which is indicated in the sensitivity analysis presented in Box 6 - 1.

Box 6 - 1: What if the specification of sulphur content in trucking diesel becomes more restrictive?

Diesel fuel for trucking is consumed in Brazil with a maximum sulphur content of 10 ppm (S10) and 500 ppm (S500), according to ANP Resolution No. 50/2013 (ANP, 2013). As discussed earlier, this ten years plan assumes the maintenance of these limits over the ten-year timeframe, despite the gradual transition of Brazilian demand for S10 diesel oil.

However, as the burning of fossil fuels, notably in the transport sector, accounts for a significant portion of the emissions of atmospheric pollutants in the world, several countries have adopted stricter energy and environmental policies, aiming at mitigating these emissions. The main global fuel markets – Europe, the United States, China, India, Russia, Japan, Australia and Canada – adopt more restrictive specifications for diesel for road use, allowing only the sale of the low sulphur product – with maximum limit of 10 or 15 ppm (ICCT, 2019).

Thus, it is possible for Brazil to eventually follow the main global fuel markets and adopt more restrictive specifications for diesel oil sold in the national territory, promoting the migration of the entire Brazilian market to the S10. The eventual adoption of such a measure would represent a huge challenge for the national refining park, since the production of low sulphur diesel oil necessarily requires hydrorefining units, such as hydrotreatment (HDT) and catalytic hydrocracking (HCC), and, consequently, requiring significant volumes of hydrogen. Thus, production of A S10 diesel oil becomes restricted to the capacities of HDT, HCC and hydrogen generation units (UGH) available at the refineries.

Currently, the national refining park has 15 diesel hydrotreatment units, adding up to 110,000 m³/d of low sulphur diesel production capacity (ANP, 2021a). With the planned investments in Reduc, Replan and Revap, the production capacity of S10 will be increased to 132 thousand m³/d. On the other hand, domestic refineries do not currently have HCC units. It is also worth noting that not all Brazilian refineries are able to produce low sulphur diesel. Of the 18 oil refineries in operation in the country, among the 19 authorized, eight do not have hydrorefining units capable of producing A S10 diesel oil – Dax Oil, Lubnor, Refit, Reman, Riograndense, RPCC, SSOil and SIX (ANP, 2021a).

The eventual adoption of a more restrictive specification for diesel for road use in Brazilian territory, in terms of sulphur content, could have relevant impacts on national refining in the next decade:

- Reduction of oil processing in some refineries, especially in those that do not have S10 production capacity;
- Increase in the production of A S10 diesel oil, from the greater use of HDT units;
- Substantial reduction in the production of A S500 diesel oil, due to the replacement of its demand, being restricted to non-road consumption;
- Increase in fuel oil production, from intermediate streams formerly intended for the S500 blend; and
- Increased consumption of hydrogen (and, consequently, of natural gas) due to the greater use of HDT units.

To reduce diesel imports, Brazil will need additional investments in refining, in addition to those announced by sector agents, whether in expanding oil processing capacity or in HDT and/or HCC units, in addition to auxiliary systems. Projects to expand the production capacity of S10 diesel oil are capital intensive, requiring significant investments, in the order of billions of reais.

6.3 Domestic infrastructure for transporting oil products

Based on the development of oil product supply, this section assesses the national transport infrastructure. This approach is carried out through the identification of interregional movements and imports and exports. In addition, the impacts of the flows of oil products on the main existing pipelines are analyzed.

It is noteworthy that the production of oil products in each region and the development of oil product movements until 2031 are obtained from the results of the Plandepe model.

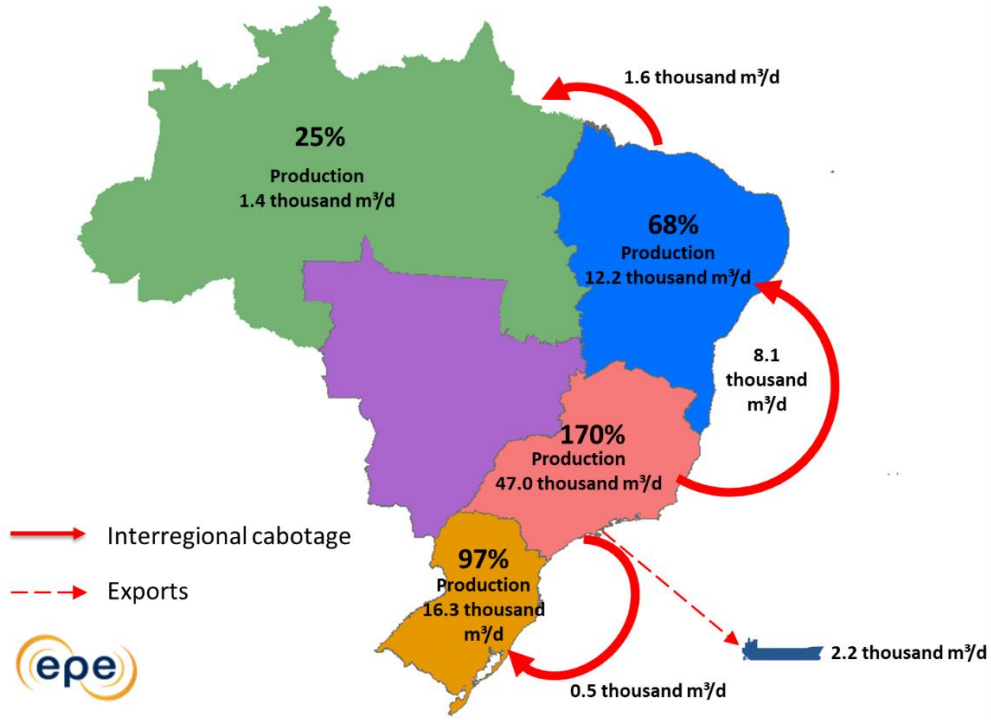
MAIN INTERREGIONAL MOVEMENTS AND IMPORTS AND EXPORTS OF OIL PRODUCTS

Interregional movements, as well as imports, are necessary to complement the production of deficit regions.

The percentage of fuel demand met by local production in each region of the country, in 2031, is shown in **Figure 6 - 1** for gasoline, in **Figure 6 - 2** for diesel, in **Figure 6 - 3** for LPG and in **Figure 6 - 4** for jet fuel. Interregional maritime flows and imports and exports of these products are also presented.

It is worth noting that the Midwest Region remains without production of oil products until 2031, which keeps it totally dependent on the interregional movement of products.

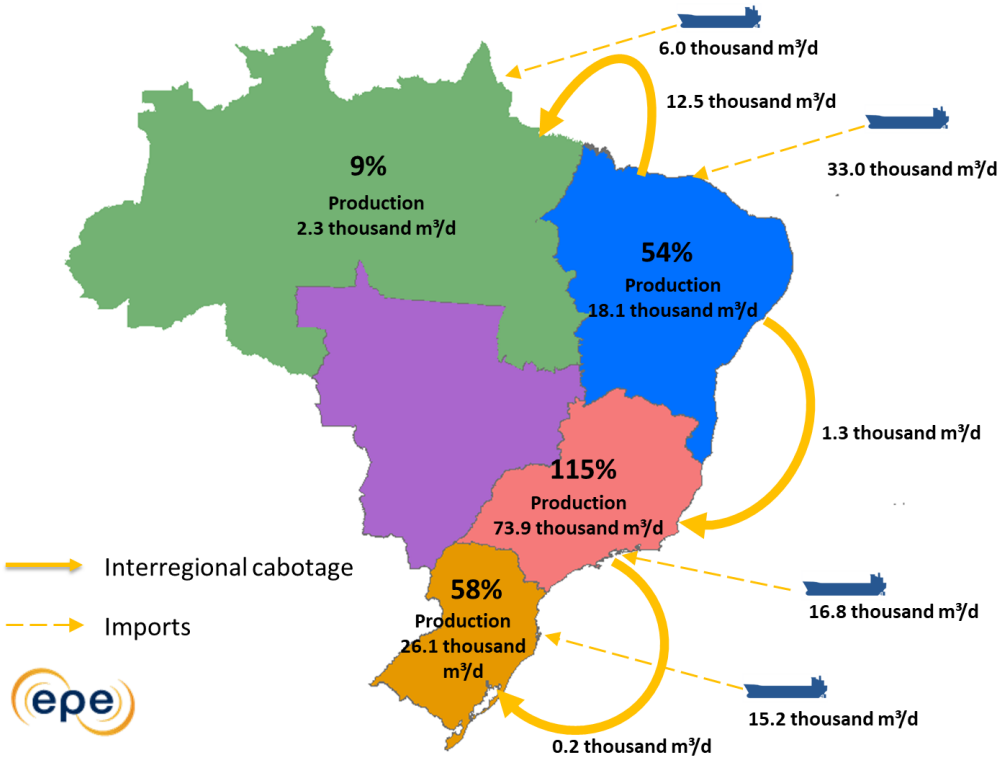
Figure 6 - 1: Meeting of demand by region and interregional cabotage of gasoline in 2031



Source: Prepared by EPE.
Note: The percentages refer to the portions of regional demand met by local production.

The surplus supply of gasoline forecast for the Southeast Region not only supplies the Midwest, but also complements the demand of the North, Northeast and South regions of Brazil. The Northeast contributes with a large part of the supply of the North Region. In 2031, the surplus volume of gasoline production in the country can be exported by the Southeast Region and represents about 3% of the domestic demand in the year.

Figure 6 - 2: Meeting of demand by region and interregional diesel cabotage in 2031

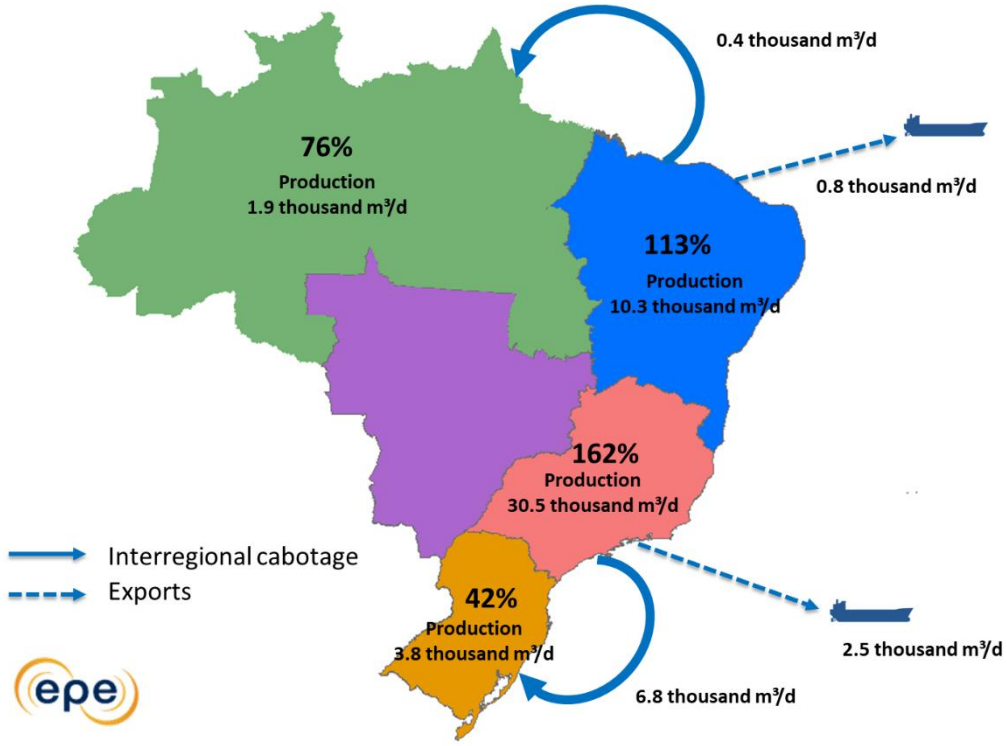


Source: Prepared by EPE.
Note: The percentages refer to the portions of regional demand met by local production.

Regarding diesel, in 2031, with Brazil having a deficit in this product, it is forecast that the largest import volumes will be introduced into the country by the Northeast, Southeast and South regions. The other imports, in smaller volumes, are received in the North Region.

With regard to its interregional movements, demand for diesel in the North Region is met mostly via cabotage, through the Northeast. The Southeast Region, in turn, receives volumes of this fuel from the Northeast and transfers it, mainly through pipelines, to the Midwest Region, and via cabotage to the South of Brazil.

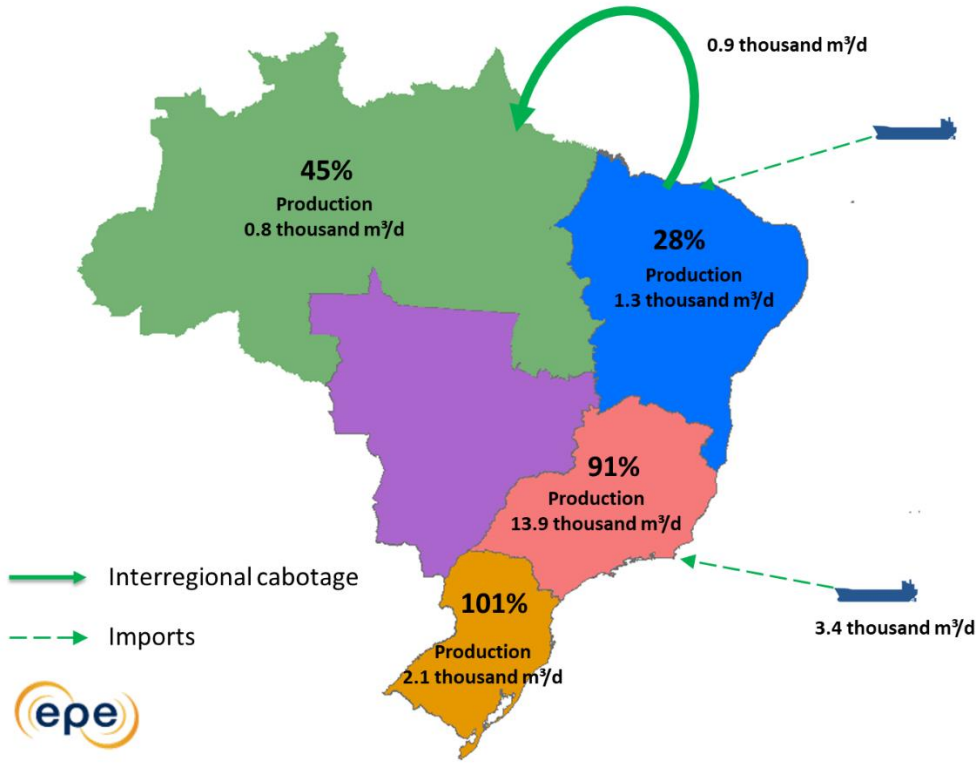
Figure 6 - 3: Meeting of demand by region and interregional LPG cabotage in 2031



Source: Prepared by EPE.
Note: The percentages refer to the portions of regional demand met by local production.

Regarding LPG, considering that Brazil will have a surplus in this product at the end of the decade, there is no forecast of imports in 2031. The North Region is deficient in LPG, being served, via cabotage, by volumes from the Northeast Region. The surplus from the Southeast is sent to the Midwest and South regions, mostly by road. In 2031, LPG exports will be carried out by the Southeast Region and, to a lesser extent, by the Northeast.

Figure 6 - 4: Meeting of demand by region and interregional jet fuel cabotage in 2031



Source: Prepared by EPE.
Note: The percentages refer to the portions of regional demand met by local production.

For jet fuel, in 2031, the country remains in deficit. Approximately half of the demand in the North Region is met by its local production, the other part being supplied, via cabotage, by volumes from the Northeast. In turn, the supply of the Northeast Region is complemented by imports. There is also a forecast of imports in the Southeast Region, which supplies the Midwest by road. The South Region is self-sufficient in jet fuel and its surplus is sent to the Southeast by road.

The need to import considerable volumes of oil products (especially diesel and jet fuel) and the significant cabotage of LPG, gasoline and diesel require attention in relation to the country's logistics infrastructure.

Investments in ports, terminals and cabotage incentive programs are important in order to guarantee the supply of fuel throughout national territory.

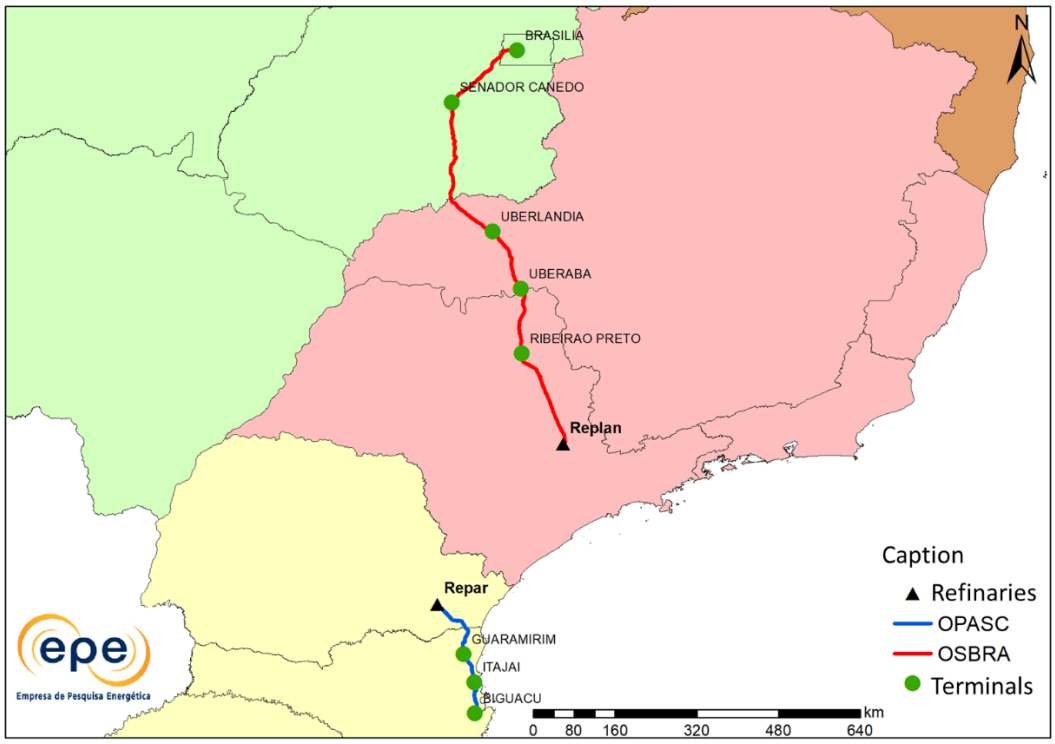
Some Federal Government Programs, such as the auctions of port areas and the promotion of cabotage (BR do Mar program), seek to identify and develop port areas for the movement of fuels (BRASIL, 2016; BRASIL, 2020a) and promote cabotage in the country (BRAZIL, 2020b).

IMPACTS OF OIL PRODUCT MOVEMENTS ALONG THE PIPELINE INFRASTRUCTURE

In this item, the impacts of the movement of oil products along the domestic pipeline infrastructure are analyzed.

The results indicate that some oil pipelines for the transport of products may reach saturation or be close to their maximum capacities in the considered timeframe of PDE 2031. Regarding this, **Figure 6 - 5** highlights the Araucária/PR – Biguaçu/SC Oil Pipeline (OPASC) and the São Paulo/SP – Brasília/DF Oil Pipeline (OSBRA).

Figure 6 - 5: Transport oil pipelines that reach their capacity threshold over the ten-year timeframe



Source: Prepared by EPE.

With the maximum utilization of the capacities of some pipelines, it will be necessary to improve the logistics operational efficiency processes to avoid possible regional shortages.

Pipeline expansions were not considered in the ten-year timeframe due to the existing challenges in that market. However, preliminary studies by EPE within the scope of the Indicative Plan for Oil Pipelines (Plano Indicativo de Oleodutos) indicate that the increase in demand for oil products and the need for supply in regions further away from the coast may represent a potential market for movement through pipelines. These are significant investments (over 2 billion dollars) that must be analyzed within the scope of the aforementioned plan.

INVESTMENTS IN LOGISTICS PLANNED FOR THE TEN-YEAR PERIOD

As detailed in section 6.2, an increase in demand for liquid fuels in the Brazilian market is forecast over the timeframe of this Plan, met mainly by the increase in imports. Since most of this movement of products will take place by waterway, it is important to monitor the expansion of the movement and storage capacity of the main Brazilian ports, so that they can meet the national demand. An investment in ports and terminals within the study timeframe is estimated at around 800 million dollars. **Table 6 - 4** details how such investments will increase the dynamic capacity for the national logistics of moving liquid fuels.

Considering the conclusion of these investments, the simulations using Plandepe indicate a port handling capacity sufficient to meet the future demand for oil products, especially diesel, the largest in terms of import volume.

Table 6 - 4: Domestic production of oil products

Region	Dynamic capacity expansion per region (kt/year)	Major ports to receive investments
Southeast	2.6	Santos, Vitória
South	0.7	Paranaguá
Northeast	2.2	Suape, Mucuripe, Itaqui
North	0.8	Vila do Conde
TOTAL	6.3	

Source: Prepared by EPE.

MAJOR POINTS OF THE CHAPTER
OIL PRODUCT SUPPLY

- *Despite their volatility in the short term, due to the existence of factors that pressure them in different directions, international oil prices should follow an upward trajectory in the medium term until they stabilize at values close to the breakeven prices of more expensive projects in fields currently considered marginal.*
- *The development of world oil demand is affected by public policies, technologies and consumer preferences. This presupposes a relative valuation of cleaner fuels and, for example, with lower sulphur content. In the international price scenario defined in this study, S10 diesel oil will be more valued than jet fuel, which will economically favor its domestic production.*
- *Brazil will consolidate its status as an oil exporter, remaining a net importer of the main oil products throughout the study's timeframe, with emphasis on imports of naphtha, jet fuel and diesel.*
- *Brazil should reach levels of imports of diesel and jet fuel above the historical maximums, signaling a possible need for investments in the expansion of the primary supply infrastructure.*
- *The supply of S10 diesel could be significantly expanded through the construction of new hydrotreatment units in the refining complex. Additional hydrotreating capacity would allow greater availability of processing in the distillation units of some refineries and, consequently, an increase in the production of oil products.*
- *Gasoline and LPG imports show decreasing trends over the decade. At the end of the ten-year period, Brazil will be able to reach self-sufficiency for these oil products. The influence of the lower growth in domestic demand and the increase in supply from UPGNs with processing of domestic natural gas, stand out.*
- *The production of fuel oil will remain in surplus during the ten-year period, sufficiently meeting domestic demand, as well as the entire bunker market for foreign ships, but with a downward trend in exported volumes over the ten-year timeframe.*
- *The projected import of considerable volumes of oil products may require investments in expanding refining capacity and/or in expanding and improving the operational efficiency of the country's logistics infrastructure.*
- *In this situation, government actions and programs - like the Abastece Brazil Federal Program - seek the development of a new framework for the domestic fuel market is expected, with an emphasis on encouraging the entry of new economic players, free competition and attracting investments in the sector, in an objective and transparent regulatory environment.*
- *Besides, within the logistic infrastructure scope, other Federal Government Programs seek to identify and encourage the expansion of port areas for the conveyance of fuel and to promote cabotage in the country. Investments in logistics infrastructure for oil products will be vital in order to guarantee the supply of fuel throughout national territory.*