INSTITUTO
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Outlook IBP

2025-2029

Editorial

The oil and gas industry, given its strategic centrality to Brazil's economic development and energy security, finds itself at the very point where structure and circumstances intersect to define the present and shape the future. In this first edition of the IBP Outlook, we offer a forward-looking exercise that combines memory and anticipation: we outline estimates for the sector over the next five years (2025-2029) based on a careful analysis of 2024 and the economic environment that has developed in recent years.

In many ways, 2024 marked a turning point. On the one hand, the post-pandemic economic recovery was consolidated, albeit marked by sectoral and regional asymmetries. On the other hand, international geopolitical tensions deepened, continuing to influence global energy flows, the behavior of oil, gas, and fuel prices, and the redesign of production chains. Domestically, Brazil continued to navigate between fiscal and inflationary challenges and a labor market that, despite signs of dynamism, still faces structural obstacles. This is the context in which the national oil and gas industry operates, simultaneously confronting the urgency of the energy transition, the need for sustainable investments, and the demand for regulatory predictability.

The analyses presented here are the result of a technical and methodological effort based on consolidated data, market projections, and active listening to the main players in the production chain. Estimates of oil, natural gas, and fuel production, domestic and foreign demand scenarios, expected investment levels, and the increased role of decarbonization initiatives are a set of vectors that, when combined, help us understand the likely direction of the industry until the end of the decade.

The IBP Outlook seeks to be a tool for informed debate on the role that the sector can and should play in building a more resilient and efficient economy, aligned with climate commitments. It is based on the recognition that Brazil has significant comparative advantages—not only in terms of reserves and technical capacity, but also in terms of the opportunity to responsibly lead a fair, equitable, and orderly energy transition.

A mix of retrospective and forecast, the first edition of the IBP Outlook inaugurates an annual tradition, offering the market, society, and public authorities a reliable, transparent, and strategic reference on the prospects for the oil and gas industry.

Oil and Gas Sector Technical Analysis Management / IBP
Rio de Janeiro, 2025

President's Letter

I am pleased to present the first edition of Outlook IBP, an institutional milestone for the Brazilian Institute of Oil and Gas and the national oil and gas industry itself. This document is, at the same time, a testimony to our history, an accurate portrait of the present, and a structured vision of the future. We wanted to give our members and society a study with technically accurate and credible analysis, which is what the Institute is all about.

The IBP Outlook 2025–2029 clearly reaffirms the role of the O&G sector in national development, economic competitiveness, and supply security, while paving the way for the energy transition. The Brazilian oil and gas industry is the driving force behind the country's growth, technological innovation, and strategic integration. From the pre-salt to new exploration frontiers, from biofuels to carbon capture and use, from refining to distribution, the sector demonstrates its continued ability to invest, reinvent itself, and generate value.

Today, we account for 17% of the industrial GDP, 45% of the domestic energy supply, and more than 1.6 million direct and indirect jobs. In 2024, with an average production of 3.4 million barrels/day, Brazil consolidated its position as the eighth-largest oil producer and consumer in the world, the second-largest global producer of biofuels, with oil being the country's most exported product.

Our energy vocation is unique. Pre-salt oil exploration activities emit half the carbon of the world average; Brazilian biofuels are a global benchmark; and Carbon Capture, Utilization, and Storage (CCUS) technologies are advancing vigorously. The energy transition in Brazil does not need to be imported: it stems from our resources, our inventiveness, and the strength of our institutions. We are moving toward a fair, gradual, and orderly energy transition that harnesses existing potential while ensuring growth, social inclusion, and energy security.

The IBP Outlook 2025–2029 projects the evolution of production, consumption, and investments through the end of the decade, highlighting the jobs, tax revenue, and innovation that will expand our contribution to national development. In launching this publication, we reaffirm our mission to promote the progress of the energy sector and the values that guide us — integrity, leadership, competitiveness, sustainability, and commitment to our Associates and society. We hope this document will inspire confidence, encourage reflection, and inform the debate on the future of energy in Brazil, in which the oil and gas industry will continue to play a leading role.

Roberto Furian Ardenghy
President of the IBP

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Summary

Chapter 1

Oil and Gas Industry Balance

Economic Impact of the Industry

8th largest oil-producing country in the world

9th largest Refinement Park

17% of the Brazilian Industrial GDP

8th largest consumer market in the world

45% of the domestic power supply (OIE)

2nd largest fuel producer in the world

> 1.6 million direct and indirect jobs

18 refineries
359 ethanol plants
50 biodiesel producers

+42 thousand fuel stations
161 distributors
557 importers of oil and derivatives

1.1. Economic Landscape

The year 2024 brought accelerated economic activity to Brazil, with a 3.4% increase in Gross Domestic Product (GDP) for the year. This result was driven by multiple factors: the resilience of productive sectors, sustained domestic consumption, and a gradual recovery in investments.

At the same time, the advance in aggregate activity led to an increase in inflation, which ended the year at 4.8%, exceeding the center of the target set by the inflation targeting regime. In response, monetary policy was conducted more conservatively, and the Selic rate was raised progressively, reaching 12.25% at the end of 2024.

The exchange rate kept on a volatile path, reflecting both domestic factors and movements in the international scenario. The average annual rate was BRL 5.39 per dollar, consolidating the trend of the real's devaluation. This development imposed additional pressures on import costs, investments indexed to foreign currency, and, above all, on chains exposed to global price dynamics, such as the oil and gas sector.

In this context, the macroeconomic effects had a direct impact on the sector's dynamics. The growth in activity favored an increase in domestic demand for fuels. On the other hand, rising inflation and interest rates increased operating costs and reduced the predictability necessary for medium- and long-term decisions. Finally, currency devaluation had ambiguous effects: it increased the competitiveness of crude oil exports, but also made imports of derivatives more expensive, with a direct impact on domestic market prices, which are still dependent on products refined in other countries.

The outlook reveals an environment in which productive advances and economic constraints coexist. It should be noted that 2024 was a year in which the oil and gas industry faced the challenge of operating efficiently and flexibly in the face of a changing economy—sometimes driven, sometimes strained by global and domestic variables.

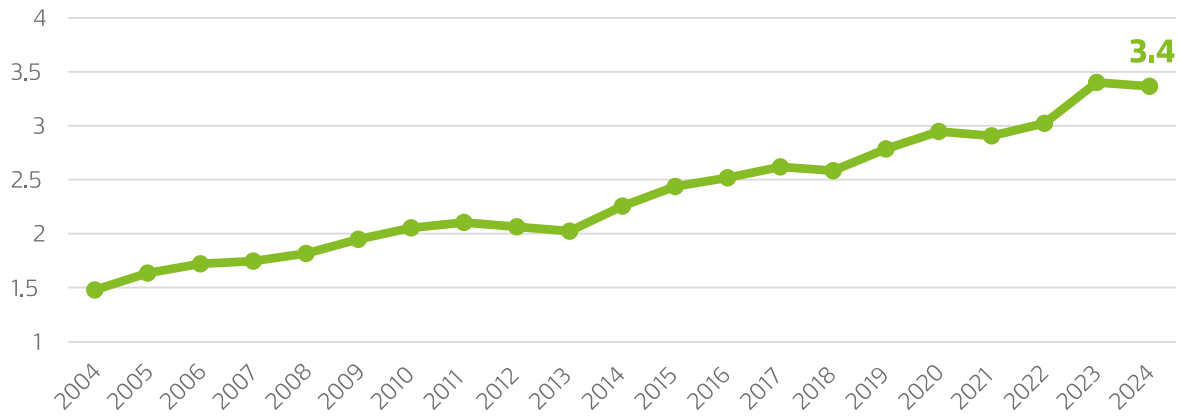
1.2 *Upstream*

1.2.1 Oil Production

In 2024, national oil production remained stable at around 3.4 million barrels per day, with the pre-salt polygon accounting for 78.5% of this total. The main producing areas remain concentrated in the Santos, Campos, Potiguar, and Recôncavo basins. It is worth noting the growth in production in the Santos Basin, which recorded a 3% expansion in the year.

Chart 01 – Growth in the national production of oil

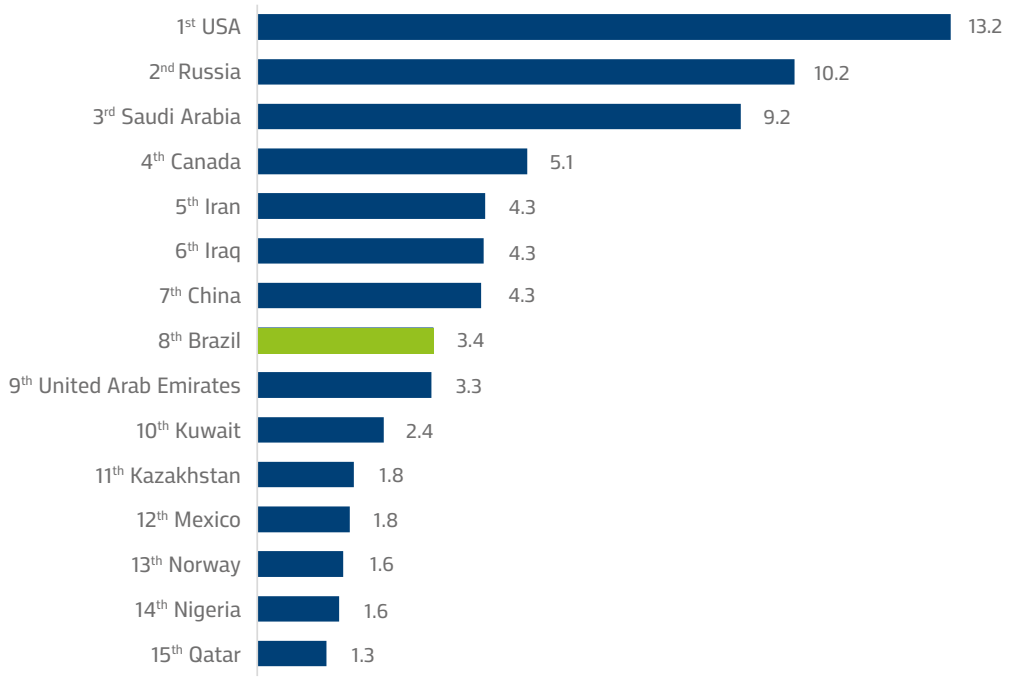
2004-2024, millions of barrels per day



Source: Designed by the IBP based on ANP data (2025).

Chart 02 – The world's leading oil-producing countries

2024, millions of barrels per day



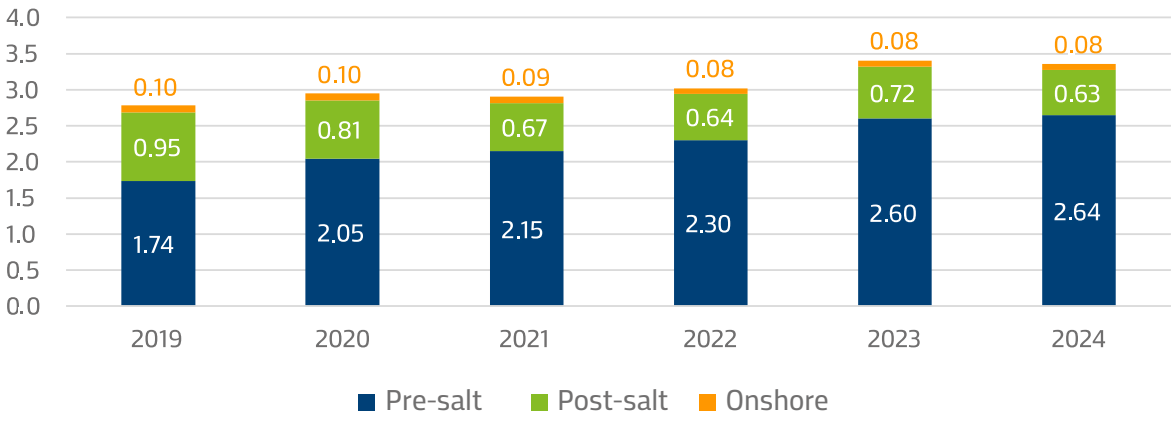
Source: Designed by the IBP based on data from the Energy Institute (2025).

Globally, Brazil maintained its position as the eighth-largest oil producer in the world, reaffirming its strategic importance in the international energy supply scenario.

In the exploration and production (upstream) segment, there was progress in the diversification of operators, coupled with the continued expansion of offshore infrastructure, elements that point to potential sustained growth over the next decade.

Chart 03 – Oil production per environment

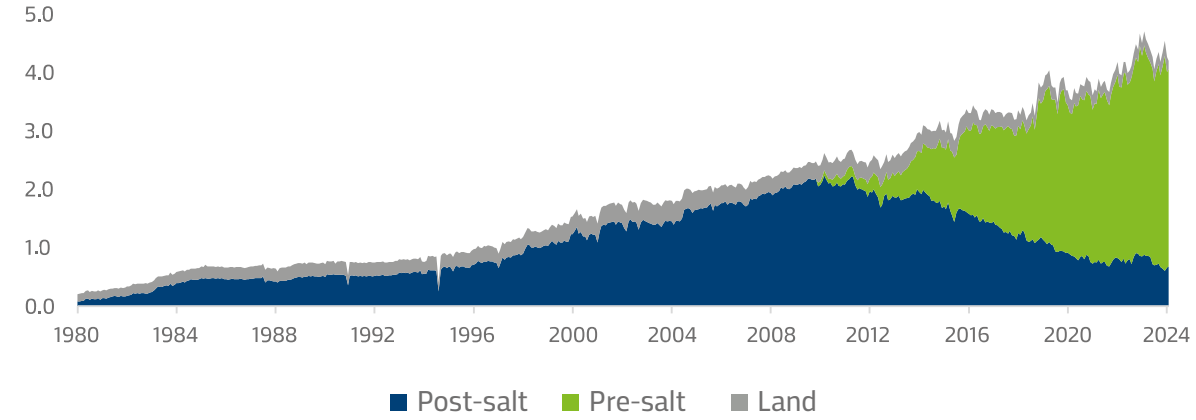
2019-2024, millions of barrels per day



Source: Designed by the IBP based on ANP data (2025).

Chart 04 – Brazilian production of oil and natural gas

1980-2024, millions of barrels of oil equivalent per day



Source: Designed by the IBP based on ANP data (2025).

The ten largest exploration fields accounted for 76% of national production, an increase in total share compared to 74% in the previous year. Despite a 6% reduction in production in the Tupi field, it held on to its lead in terms of production per field. In contrast, the Itapu and Mero fields grew by 62% and 47%, respectively, standing out as the new hubs for increased oil production in the country. In the Mero field, the Sepetiba platform was put into operation in the Libra block area, in the pre-salt layer of the Santos Basin. Production then began from the Alexandre de Gusmão FPSO, forming part of the Mero production system, with a capacity to produce up to 180,000 barrels of oil and compress up to 100,000 barrels of gas. Subsequently, production began from the Alexandre de Gusmão FPSO, which is part of the Mero production system, with a capacity to produce up to 180,000 barrels of oil and compress up to 12 million cubic meters of gas daily. The Sepetiba FPSO is part of a production system that includes the drilling and preparation of the well for the production (completion) of eight producing wells and eight water and gas injection wells that are being connected to the unit.

Table 01 – Brazil's largest oil-producing fields

2019-2024, thousands of barrels per day

Field	2019	2020	2021	2022	2023	2024	% 2023/2024	% 2019/2024
Tupi	945.1	953.8	901.0	839.7	832.3	779.2	-6%	-18%
Búzios	250.9	513.0	549.9	563.9	622.6	639.4	3%	155%
Mero	36.0	127.3	21.9	91.8	201.1	296.3	47%	724%
Itapu	0.0	51.3	0.0	1.9	92.4	149.8	62%	-
Sépia	0.0	85.3	14.2	135.0	144.8	132.5	-8%	-
Sapinhoá	5.3	577.8	195.1	180.0	168.4	130.9	-22%	2359%
Atapu	0.0	93.5	96.6	118.8	116.3	121.5	4%	-
Jubarte	204.8	137.2	158.3	100.9	126.8	114.5	-10%	-44%
Roncador	161.2	124.0	130.2	121.2	120.1	99.1	-18%	-39%
Peregrino	61.1	15.5	0.0	29.0	85.1	79.6	-6%	30%
Top 10 Production	1,664	2,679	2,067	2,182	2,510	2,543	1%	53%
Brazil Production	2,785	2,940	2,905	3,021	3,401	3,357	-1%	21%
Top 10 Participation	60%	91%	71%	72%	74%	76%	-	-

Source: Designed by the IBP based on ANP data (2025).

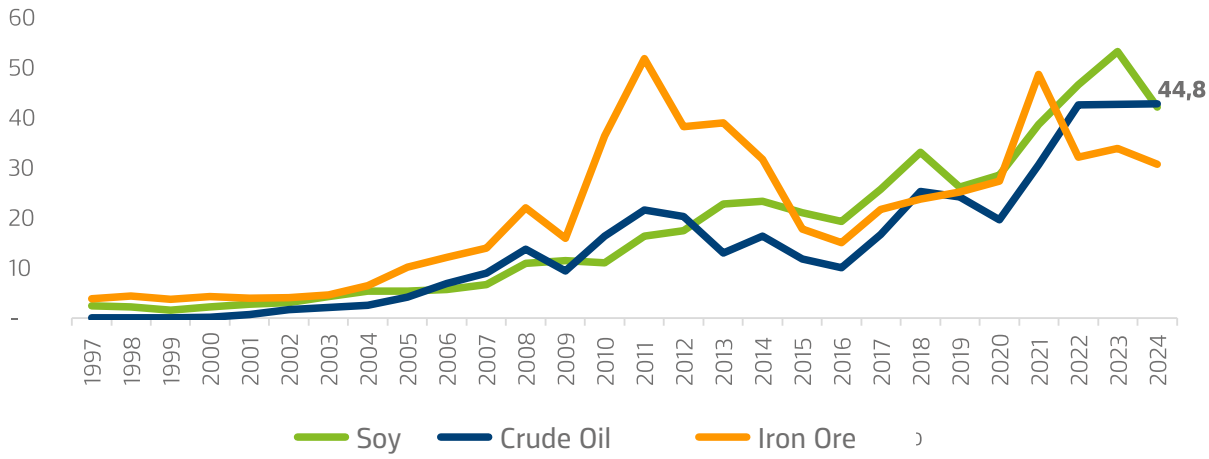
1.2.2 Oil foreign trade

In 2024, oil became Brazil's leading export product for the first time. A total of 637 million barrels were shipped to the international market, equivalent to a daily average of 1.75 million barrels—a volume representing more than half of the country's production throughout the year.

In monetary terms, crude oil exports totaled approximately US$45 billion in revenue, with a net surplus of US$36.3 billion after deducting imports of the same product. Thus, Brazil's oil trade balance consolidated its surplus and reinforced the country's relevance in global energy supply.

Chart 05 – Growth in the main exported products

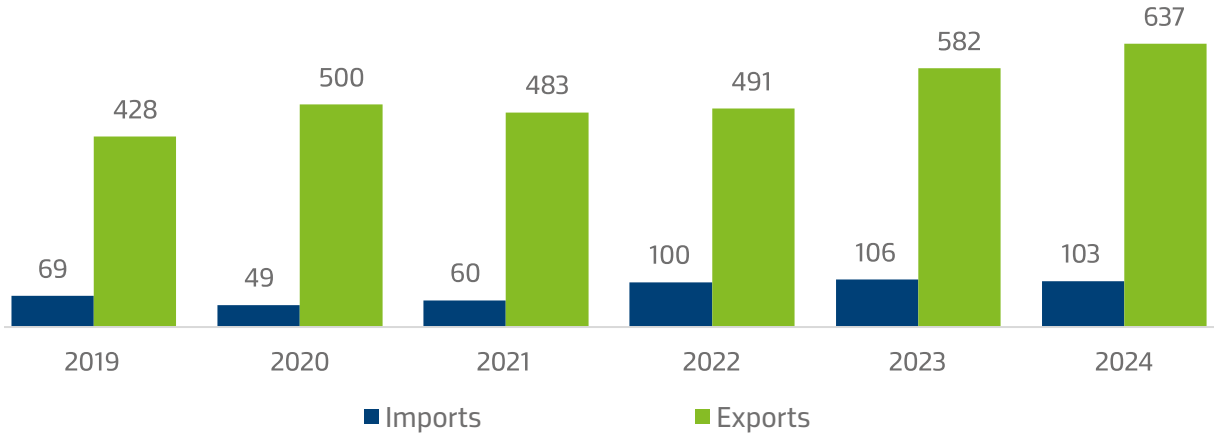
97-2024, Billions of US$



Source: Designed by the IBP based on MDIC data, 2025.

Chart 06 – Oil exports and imports

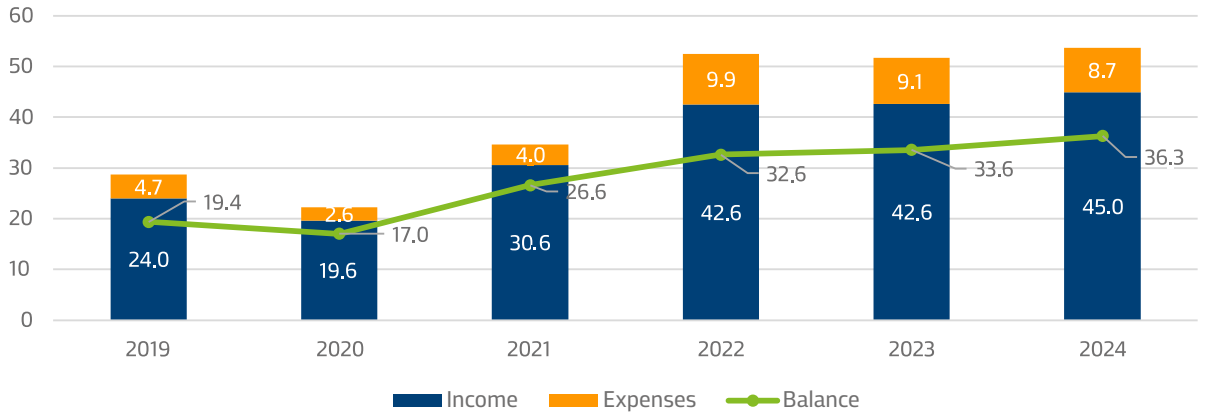
2019-2024, millions of barrels



Source: Designed by the IBP based on ANP data, 2025.

Chart 07 – Oil trade balance

019-2024, Billions of US$



Source: Designed by the IBP based on ANP data, 2025.

1.3 Natural Gas

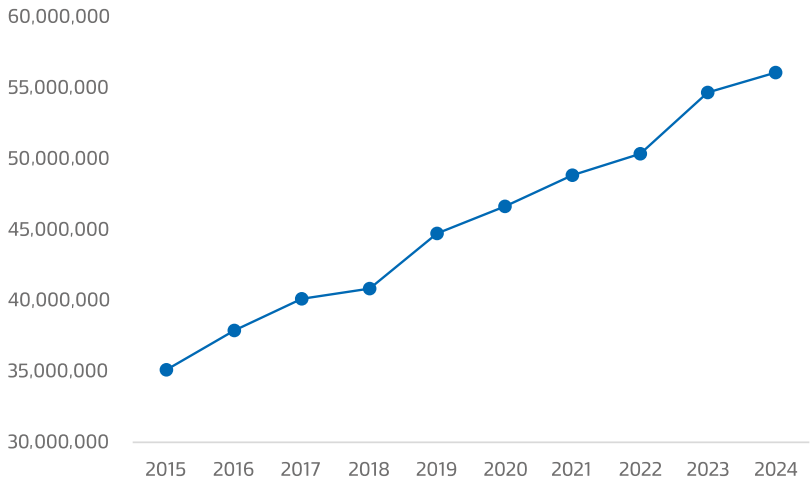
1.3.1 Natural gas production

Brazil has 517 billion cubic meters of proven natural gas reserves, which indicates significant production potential. In 2024, the country produced 153 million cubic meters per day (MMm³/day), with almost 80% of this volume coming from the pre-salt area.

In 2024, natural gas production in Brazil grew 2.3%, totaling 56 billion cubic meters (bcm) throughout the year, with a daily average of 153.1 million cubic meters. The main producing basins were Santos, Solimões, Campos, and Parnaíba. As with oil, the pre-salt layer was primarily responsible for this performance.

Chart 08 – Growth in natural gas production

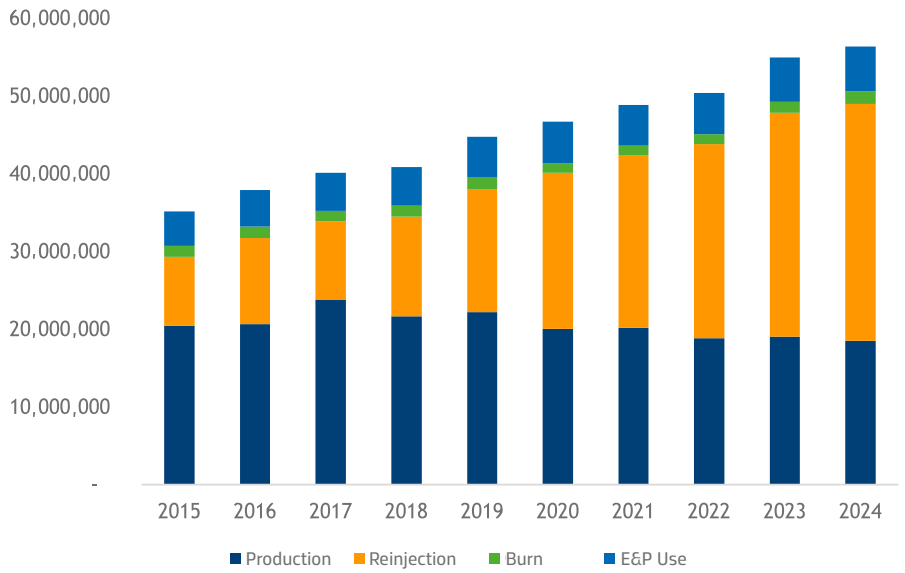
2015 – 2024, thousands of m³



Source: Designed by the IBP based on ANP data, 2025.

Chart 09 – Growth in segmented natural gas production

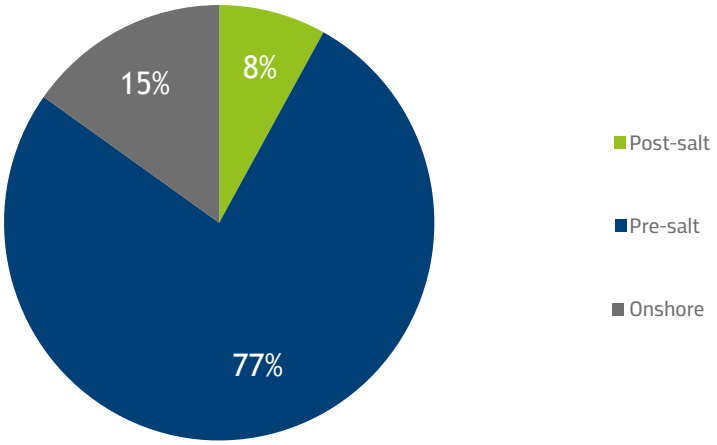
2015 – 2024, thousands of m³



Source: Designed by the IBP based on ANP data (2025).

Chart 10 – Natural gas production

2024, % per environment



Source: Designed by the IBP based on ANP data (2025).

In terms of production settings, when it comes to natural gas, the onshore environment has a significantly higher share, representing about 15% of the total – a percentage that, in the case of oil, is less than 3%.

As with oil production, the 10 largest natural gas fields also accounted for around ¾ of domestic production. While Sapinhoá, Mexilhão, and Jubarte saw a drop in production of between 14% and 21%, the Mero field stood out with a 51% increase in 2024.

Table 02 – Brazil's largest oil-producing fields

2019-2024, millions of cubic meters per day

Field	2019	2020	2021	2022	2023	2024	% 2023/2024	% 2019/2024
Tupi	39.9	41.7	41.7	39.9	40.2	39.1	-3%	1%
Búzios	9.5	20.0	21.9	23.1	26.4	27.0	2%	178%
Mero	2.5	1.7	1.4	5.9	13.0	19.6	51%	432%
Sapinhoá	9.9	9.3	9.5	8.8	8.0	6.3	-21%	-20%
Rio Urucu	7.5	6.2	6,5	6,1	5.8	6.2	6%	-22%
Leste de Urucu	6.6	6.5	6.5	6.3	6.4	6.1	-6%	-3%
Sépia	0.0	0.0	0.4	4.0	4.9	4.9	1%	-
Atapu	0.0	0.5	3.3	4.3	4.3	4.5	5%	-
Mexilhão	6.5	5.7	4.5	4.9	3.9	3.3	-17%	-39%
Jubarte	5.4	5.0	4.2	2.5	3.2	2.7	-14%	-41%
Top 10 Production	88	97	100	106	116	120	3%	32%
Total Production	122	127	134	138	150	153	2%	22%
Top 10 Participation	72%	76%	75%	77%	77%	78%	-	-

Source: Designed by the IBP based on ANP data (2025).

1.3.2 Natural gas imports

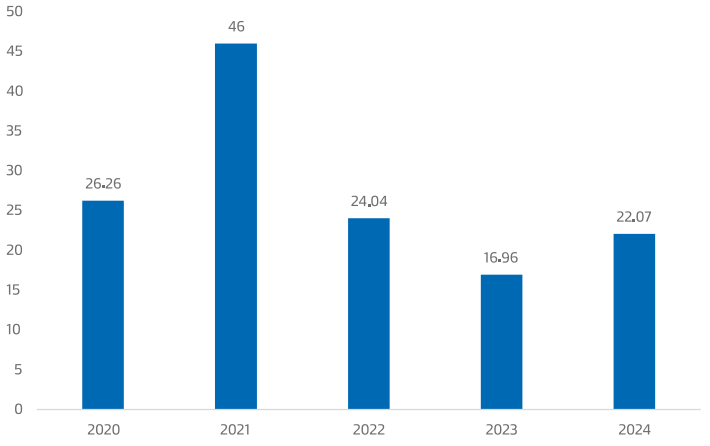
In the international natural gas trade, Brazil does not work as a commodity exporter, but rather exclusively as an importer of both piped gas and LNG. Bolivia is one of Brazil's main suppliers of natural gas. In 2024, Bolivian imports averaged 14.0 million cubic meters per day (MMm³/day). Despite the decline in Bolivian production, there are prospects for an increase in imports from Argentina, which would initially be transported through existing infrastructure.

Argentina began exporting gas to Brazil in early 2025, although volumes are still limited, focusing on seasonal demand and opportunities in the spot market.

The year 2024 was marked by an increase in Brazilian imports of natural gas. According to data from the National Agency of Petroleum, Natural Gas, and Biofuels (ANP), the volume imported grew 30% compared to 2023, reaching 22 million m3/day. This amount represented an expenditure of approximately US$2.4 billion.

Chart 11 – Growth in Brazil's natural gas exports

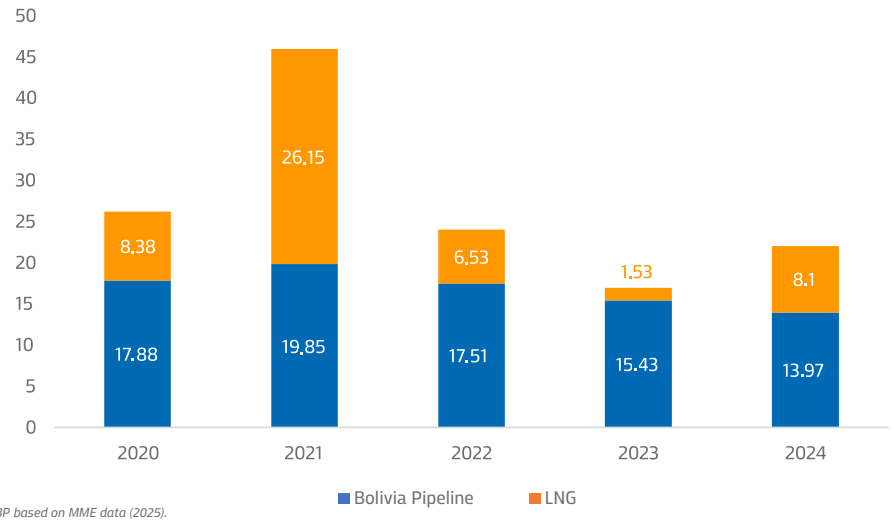
2019-2024, millions of cubic meters per day



Source: Designed by the IBP based on ANP data (2025).

Chart 12 – Growth in Brazil's natural gas imports (LNG and Bolivia Pipeline)

2019-2024, millions of cubic meters per day



Source: Designed by the IBP based on MME data (2025).

This increase in imports is mainly associated with higher dispatch from thermoelectric plants in 2024, to compensate for the reduction in hydroelectric power generation due to drought in important river basins in the country. Given the growth in imports, natural gas continues to be an important energy source for Brazil, serving as a supplementary source for the national system.

1.4 Downstream

A country with a robust installed infrastructure

Optimization and efficiency must be considered

+60,000,000 cars

+25,000,000 motorcycles

+1,000,000 buses and microbuses

+3,000,000 trucks

+100 airports

+42 thousand fuel stations

+1.6 million km of highways

213 thousand km of paved highways (13.6%)

30.5 thousand km of railways

45 thousand km of pipelines

18 authorized refineries

140 lubricant producers

+500 lubricant and biofuel importers

+400 biofuel producers

212 power-isolated communities

Source: Designed by the IBP based on ANP data| CBJE | Ministry of Transportation | BNDES.

The world's second-largest biofuel producer

2024 conjuncture highlights

INTERNACIONAL SCENARIO

- Volatility in international oil prices
- Geopolitical conflicts
- OPEC+ production adjustments

DOMESTIC SCENARIO

- Brazilian GDP growth above expectations
- Industrial development policies
- Impact of El Niño on crops
- Enactment of the Fuel of the Future Law
- Enactment of Tax Reform regulations

The Brazilian fuel market is impacted by a series of geopolitical, economic, and regulatory factors, both internal and external. In addition, it is undergoing significant structural changes, driven by the need to decarbonize the economy and transition to low-carbon energy sources.

Since the 1950s, Brazil has established a logistics model heavily based on road transportation, in line with its industrialization strategy and the strengthening of the automotive industry. As a result, the expansion of the highway network throughout the country has ensured that road transport is the main means of freight transportation in Brazil.

This predominance has a direct impact on the fuel consumption grid, with an emphasis on diesel oil, widely used by trucks and buses. Road transportation is essential both for the shipment of cargo over long distances and for urban public transportation, being particularly relevant for agribusiness, the main driver of Brazilian exports.

Agricultural logistics depend on the connection between the productive centers in the countryside and the ports used for foreign trade.

In agribusiness, even in the face of adverse climate conditions, such as the effects of El Niño, which affected soybean and grain crops, the consumption of derivatives remained high in the sector. According to the National Transport and Logistics Observatory, the volume of soybeans, corn, and soybean feed transport fell by 10.3% during the year, negatively impacting road freight activity.

On the other hand, other sectors compensated for this slowdown. The civil construction sector, according to the CBIC (Brazilian Chamber of Construction Industry), grew by 4.1% in 2024, boosting material transportation and diesel consumption. Furthermore, the extractive and manufacturing industries experienced an increase in export volumes, thereby strengthening demand for transportation and energy within the country.

The year was also marked by floods in Rio Grande do Sul, causing supply difficulties in the region, particularly regarding access to biodiesel and anhydrous ethanol. As a result, the ANP temporarily relaxed mandatory fuel blending requirements to ensure a stable supply in the region. In the northern region, a severe drought raised concerns about supply, as the region is dependent on waterway transportation.

This situation is even more challenging given the continuous growth in demand for mobility in the country, which increases the need for strategic planning by different stakeholders in both the public and private sectors.

Given this scenario, the purpose of this subchapter is to analyze the evolution of the fuel market in Brazil throughout 2024, identifying the main events that impacted the sector and offering initial impressions for 2025.

It is vital to constantly monitor these dynamics to understand the trends and challenges that will shape the future of the fuel market and their implications for the national economy.

1.4.1 Fuel sales

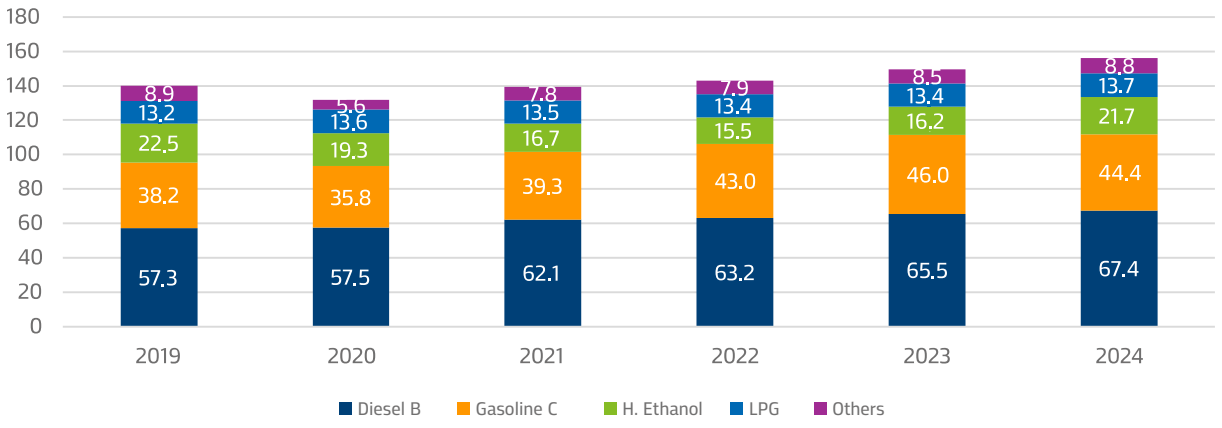
Fuel sales in Brazil grew by approximately 4% in 2024 compared to the previous year, totaling 155.6 million cubic meters, thus surpassing the 150 million cubic meter mark. The main fuels consumed during the period were diesel B, gasoline C, hydrated ethanol, and liquefied petroleum gas (LPG).

Diesel oil is still the most widely used fuel, accounting for 43% of the total volume sold, with an annual increase of 2.6%. Hydrated ethanol, in turn, accounted for 14% of total sales and showed the most significant variation of the year, with 33% growth, reaching 21.6 million cubic meters. Gasoline C and LPG were also among the products with the highest sales volume, although with less pronounced variations.

From a regional perspective, the states with the highest consumption volumes were São Paulo, Minas Gerais, Paraná, Rio Grande do Sul, and Rio de Janeiro, stressing the central role of the Southeast Region in the dynamics of the national fuel market. Also noteworthy is the performance of Amazonas, which saw an increase of almost 10% in domestic fuel sales compared to 2023.

Chart 13 – Brazil fuel consumption profile (sales)

2019-2024, millions of cubic meters



Source: Designed by the IBP based on ANP data (2025).

Table 03– Fuel sales per state in Brazil

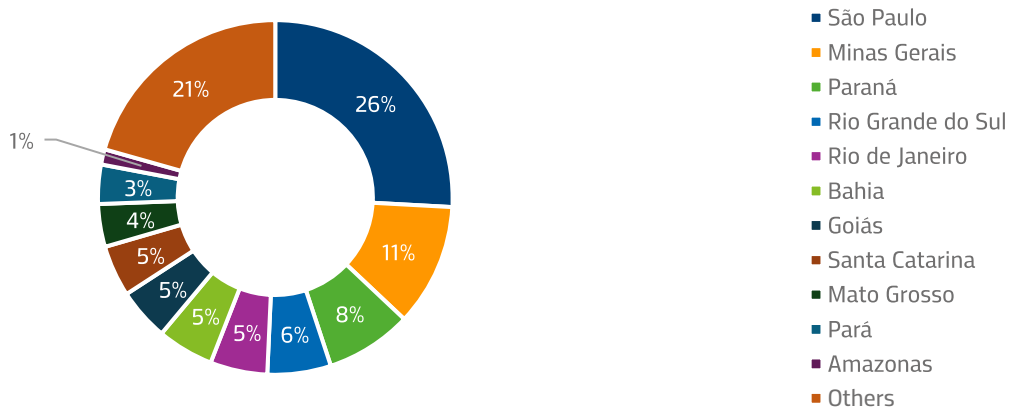
2019-2024, millions of cubic meters

State	2019	2020	2021	2022	2023	2024
São Paulo	39.4	34.8	35.6	37.5	39.3	40.4
Minas Gerais	15.1	14.5	15.1	15.6	16.5	17.4
Paraná	11.1	10.9	11.3	11.4	11.9	12.3
Rio Grande do Sul	8.3	7.7	8.2	8.5	8.8	9.0
Rio de Janeiro	7.1	5.9	6.1	6.8	7.5	8.1
Bahia	7,0	6.8	7.2	7.0	7.6	8.0
Goiás	6.4	6.3	6.7	6.9	7.2	7.4
Santa Catarina	6.2	5.9	6.5	6.7	6.9	7.3
Mato Grosso	4.7	4.9	5.2	5.5	5.8	6.1
Pará	4.7	5.0	5.4	5.5	5.6	5.6
Amazonas	2.0	1.8	2.0	2.1	2.0	2.2
Outros	28.2	27.2	30.2	29.5	30.6	32.2
Total	140	132	139	143	150	156

Source: Designed by the IBP based on ANP data (2025).

Chart 14 – Consumption profile (sales) per state in Brazil

2024, % share



Source: Designed by the IBP based on ANP data (2025).

The strong growth in ethanol sales in 2024 is directly related to a combination of factors, notably the good harvest in 2023/24. This increase in production ensured high carry-over stocks during the off-season (December 2023 to March 2024), favoring above-average sales volume during the period. Part of this performance can also be attributed to the 2024/25 harvest, which recorded an increase compared to the previous one. With greater availability in the market and more attractive prices, there was an increase in the share of hydrated ethanol compared to gasoline C in the Otto cycle mix.

Given that approximately 76.2% of the national fleet is composed of flex-fuel vehicles (SindiPeças, 2024), the increase in demand for ethanol can be interpreted as a response to the relative price variation between fuels.

In terms of average annual price, among the four main fuels, only LPG did not show a positive variation. Gasoline C recorded the largest increase, rising approximately 7.3% from BRL 5.50 in 2023 to BRL 5.90. Diesel and ethanol, in turn, showed more modest increases, both around 3%.

1.4.2 Fuel production

Since the early 2000s, the national refining park has undergone a new wave of investments, focusing on the modernization of existing units and the expansion of installed capacity. These investments were motivated mostly by the need to comply with international fuel quality standards and the requirement for lower pollutant emissions. Brazil currently has the ninth largest refining capacity in the world (Energy Institute, 2024), consisting of 18 refineries with a total installed capacity of approximately 2.4 million barrels per day (mb/d), according to the ANP. It is worth noting that Brazil is the second-largest producer of biofuels in the world (Energy Institute, 2024).

In 2024, the volume processed in Brazilian refineries was approximately 2 million barrels per day (mb/d), resulting in an annual total of 726.8 million barrels. Of the total refined oil, about 86% is of domestic origin, while 12% comes from imports, and the remaining 2% corresponds to other processed cargoes.

In the regional context, the state of São Paulo stands out as the country's main refining hub, accounting for 43% of national production. Next come Bahia, Rio de Janeiro, Paraná, and Rio Grande do Sul. Despite their individual relevance, the sum of the volume refined by these four states remains lower than the total processed by São Paulo refineries.

Table 4 – Refined volume per state

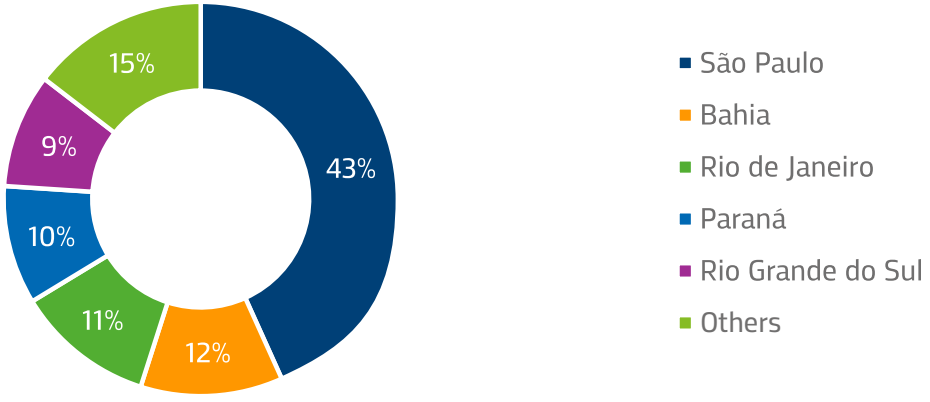
2019-2024, millions of cubic meters

State	2019	2020	2021	2022	2023	2024
São Paulo	40.6	41.3	46.0	48.9	49.3	50.1
Bahia	13.2	14.6	12.1	14.6	15.1	13.5
Rio de Janeiro	11.6	11.1	11.5	12.6	13.6	13.2
Paraná	9.8	10.4	10.6	9.4	11.8	11.3
Rio Grande do Sul	9.2	8.6	9.5	10.3	9.5	10.9
Outros	17.0	16.9	15.9	16.6	17.0	16.9
Total	101.4	102.9	105.5	112.3	116.3	115.7

Source: Designed by the IBP based on ANP data(2025).

Chart 15 – Refine volume per state

2024, % share



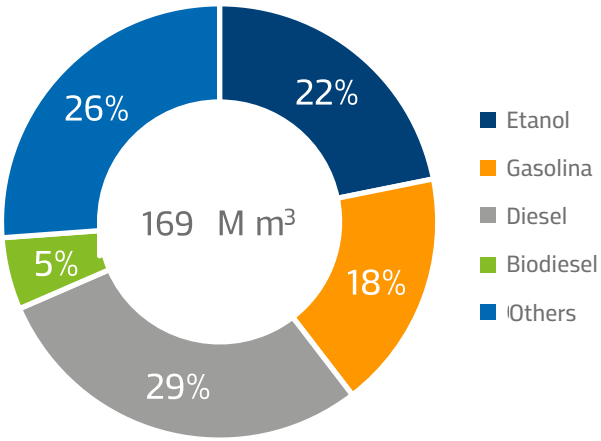
Designed by the IBP based on ANP data (2025).

In 2024, domestic production of fuels and biofuels totaled approximately 169 million cubic meters, equivalent to a daily average of 463,600 cubic meters, or about 3 million b/d. As with sales, diesel oil remained the main derivative produced in the country, with a volume of approximately 49 million cubic meters, an increase of 3.2% over the previous year. However, the highest growth rates were observed in biodiesel production, with an increase of 20%, followed by gasoline A (5%) and hydrated ethanol (4%).

Biodiesel stood out in the production mix in 2024, with a 20% growth in volume produced compared to 2023, totaling 9 million cubic meters. This advance was mainly driven by the increase in the mandatory blend content in diesel oil, which rose from 12% to 14%, as established by the Fuel of the Future Act (Law No. 14,993/2024). The purpose of the measure was to stimulate the use of biofuels in Brazil, promoting a gradual advance in the decarbonization of the transportation sector.

Chart 16 – Fuel and biofuel production

2024, % per product



Fonte: Elaboração IBP com base na ANP (2025).

1.4.3 Fuel demand

• Diesel

In 2024, diesel consumption in Brazil grew by 2.66% compared to the previous year, totaling 67.2 million cubic meters. This increase occurred even in the face of significant climatic adversities, especially associated with the El Niño phenomenon, which negatively affected the soybean and grain harvest for the 2023/2024 cycle. As a result, there was a 10.3% decline in soybean, corn, and bran transportation, according to data from the National Transport and Logistics Observatory, which would initially indicate a possible reduction in demand for road freight transport and, by extension, a drop in diesel consumption.

However, other sectors of the Brazilian economy offset this decline in agribusiness. Civil construction, for example, played an important role in sustaining demand for transportation and fuel, registering a 4.1% growth in the year, according to data from CBIC. This performance contributed to maintaining strong demand for freight in various regions of the country, thereby boosting diesel consumption.

Another factor that contributed to the increase in consumption was the positive performance of Brazilian exports, which, despite a US$9 billion (-11%) drop in agricultural exports compared to 2023, grew in other segments. The extractive industry saw an increase of US$1.93 billion (2.4%), and the manufacturing industry expanded its exports by US$4.81 billion (2.7%). The total volume exported in kilograms also increased by 1.1%, signaling an intensification of logistics activity associated with the movement of goods to foreign markets.

Therefore, although the agricultural sector faced significant challenges in 2024, the expansion of

civil construction and the positive performance of industrial exports contributed decisively to sustaining and even expanding domestic diesel consumption, reflecting the resilience and diversification of sources of demand in freight transport in the country.

- Otto Cycle

In 2024, there was a significant increase in the consumption of Otto Cycle fuels in Brazil, totaling 59.3 million cubic meters in gasoline equivalent, representing a 3.4% growth over the previous year. This positive performance reflects changes in both the demand structure and economic factors, which influenced the light fuel market throughout the year.

The breakdown of this volume shows distinct dynamics among the main fuels that make up the Otto Cycle. Hydrated ethanol grew significantly, reaching 21.6 million cubic meters, which represents an increase of 33.3% compared to 2023. This growth contrasts with the decline observed in gasoline C, whose consumption fell 4.1%, totaling 44.1 million cubic meters.

The expansion in Otto Cycle fuel consumption can also be associated with two specific economic factors. First, the light vehicle market performed well in 2024, with an 8.7% increase in flex-fuel vehicle registrations, according to data from the National Association of Motor Vehicle Manufacturers (Anfavea). Second, the electoral calendar, with municipal elections held in the second half of the year, contributed to increased movement of people and vehicles, temporarily raising fuel demand, especially in urban areas.

- Aviation Kerosene (QAV)

In 2024, domestic civil aviation recorded its best performance since the beginning of the pandemic, consolidating its position as one of the main drivers of mobility recovery in the country. According to data from the National Civil Aviation Agency (ANAC), 118.3 million passengers were transported throughout the year, the second-highest volume in the historical series, representing a 5% increase compared to 2023. Despite this significant progress, the sector has not yet fully returned to 2019 levels, when the volume of passengers carried reached 118.6 million.

The sector's recovery was also reflected in the operational indicators of supply and demand. Total demand, measured in RPK (Revenue Passenger Kilometers), grew by 7% on international flights and 5% on domestic flights, compared to the previous year. In turn, the supply of available seats, measured in ASK (Available Seat Kilometers), also expanded, with cumulative growth of 14.8% on international flights and 3.6% on domestic flights. These figures indicate not only a gradual recovery in pent-up demand in recent years, but also a strategy by airlines to reposition their networks and expand international connectivity.

The more dynamic operating environment in the sector was directly reflected in fuel consumption in the air transportation sector. In 2024, aviation kerosene (AK) consumption grew by 5.8%, totaling 6.97 million cubic meters. This increase is in line with the sustained recovery of the sector, driven both by increased passenger traffic and the expansion of flight offerings, especially in the international market. The performance of Brazilian civil aviation in 2024, therefore, shows a trajectory of robust recovery, although still incomplete, with prospects for consolidation in the coming years.

1.4.4 Foreign trade of derivatives

Brazil remains structurally dependent on the petroleum derivatives market, especially for products such as diesel oil. Despite also exporting derivatives, the trade balance remains negative. In 2024, the country imported 216.1 million barrels and exported 137.3 million, generating a physical deficit of 78.8 million barrels. Exports totaled US$12 billion, but the trade balance was negative at US$4.9 billion (ANP, 2024).

This imbalance reflects the limitations of the national refining park, which, although it has an installed capacity of around 2.4 million barrels per day, still lacks the flexibility to efficiently process light pre-salt oil and fully meet the demand for low-sulfur diesel (EPE, 2024). Diesel accounts for most imports due to the predominance of road freight transport in the country. Thus, Brazil exports surplus crude oil and imports higher-value-added derivatives, such as diesel and gasoline, as a result of a mismatch between production and domestic demand for refined products.

1.5 O&G Industry Earnings

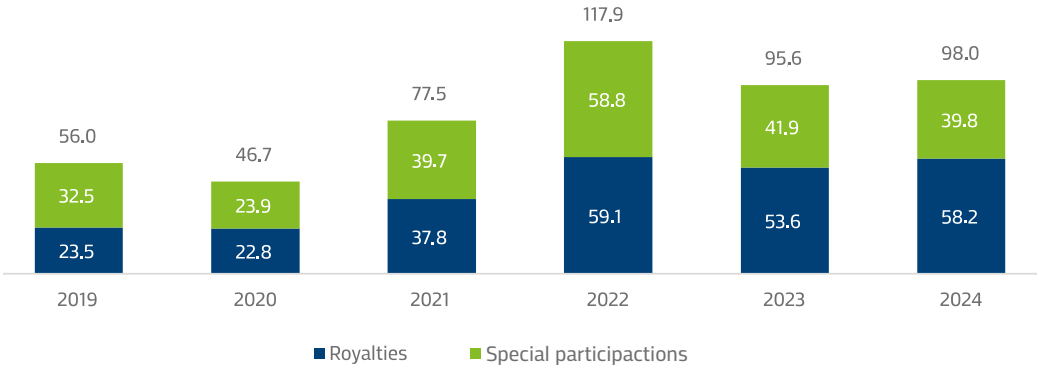
1.5.1 Royalties and special participations

The growth in Brazilian production over the last decade has contributed to an increase in government participation. Price volatility during this period is reflected in variations in revenue from royalties and special participation, although it is worth noting the increasing amounts derived from oil profits, contained in production sharing agreements.

In 2024, revenue from royalties (R$58.2 billion) and special participation (PE) (R$39.8 billion) exceeded BRL98 billion1, an increase of approximately 2.6% over the previous year, the second highest value in the historical series, behind only 2022, when the war between Russia and Ukraine caused the price per barrel to peak at US$122. In 2023, the amount totaled BRL53.6 billion in royalties and BRL41.9 billion in PE, totaling BRL96 billion.

Chart 17 – Royalties and special participations | Federal, state, and municipal governments

2019-2024, billions of BRL



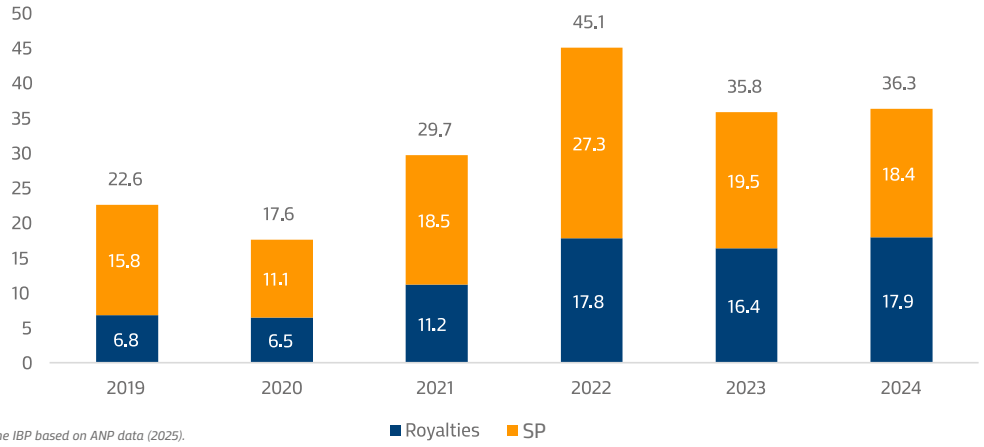
Source: Designed by the IBP based on ANP data (2025).

1 In addition to the royalty payments allocated to the federal government, states, and municipalities, judicial deposits in the amount of BRL182 million and funds from special funds, which totaled BRL4.9 billion, are included for the purpose of calculating the total amount distributed. It should be noted that Special Participations also benefited from amounts from special funds, totaling BRL3.1 billion.

• Federal Government

Chart 18 – Royalties and Special Participations | Federal Government

2019-2024, billions of BRL



rce: Designed by the IBP based on ANP data (2025).

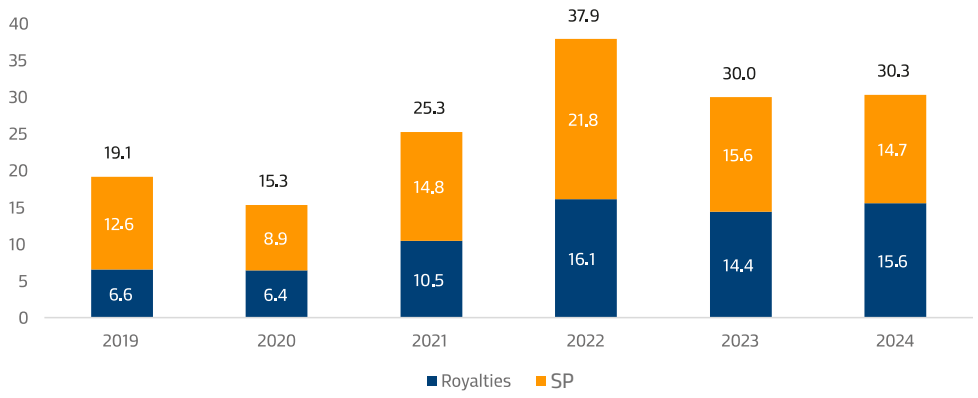
Oil profits, which correspond to the portion of oil allocated to the Union in production sharing agreements, in turn, yielded BRL 10.3 billion for public treasury in 2024, compared to BRL 6 billion in the previous year. Although lower than other government revenues, this source is expected to grow significantly in the coming years. According to estimates by PPSA (Pré-Sal Petróleo S.A.), sales of this oil are expected to peak at around BRL 72 billion in 2030.

• State governments

The collection of royalties and special participations (PE) by Brazilian states continued to rise between 2019 and 2024, reflecting the dynamics of oil and natural gas production, international commodity prices, and the exchange rate. In aggregate terms, the amount allocated to state entities rose from BRL 19.1 billion in 2019 to BRL 30.3 billion in 2024, which represents a nominal growth of approximately 59%.

Chart 19 – Royalties and Special Participations | States

2019-2024, billions of BRL



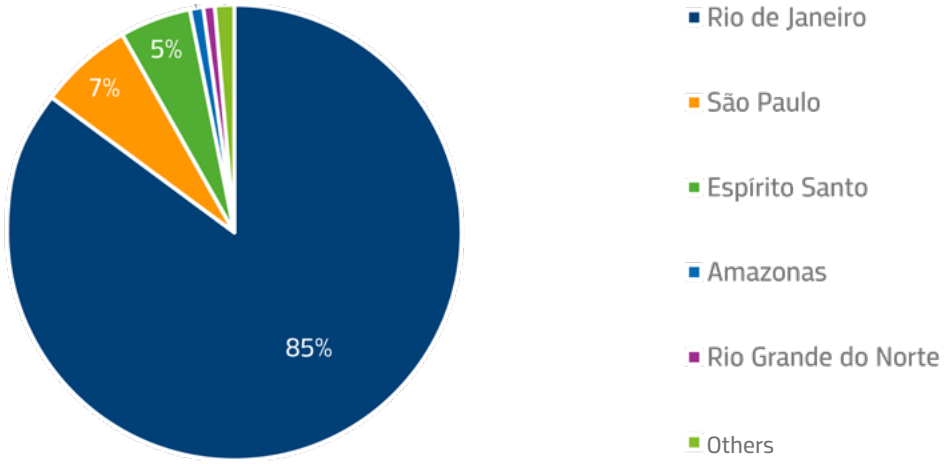
Source: Designed by the IBP based on ANP data (2025).

An analysis of the percentage distribution by state in 2024 reveals a high concentration of transfers: the state of Rio de Janeiro accounted for 85% of the total received by the states, followed by São Paulo (7%) and Espírito Santo (5%). Amazonas, Rio Grande do Norte, and other states shared the remaining 3%. This concentration is explained by the geographical location of the main producing areas, mostly offshore, with an emphasis on the pre-salt fields in Rio de Janeiro.

This distribution reinforces the centrality of Rio de Janeiro in the collection of revenues from oil activities, which, although positive for the state's fiscal capacity, poses challenges in terms of the intertemporal management of these resources and the reduction of structural dependence on these volatile revenues.

Chart 20 – Royalties and Special Participations | States

2024, % share



Source: Designed by the IBP based on ANP data (2025).

• Municipalities

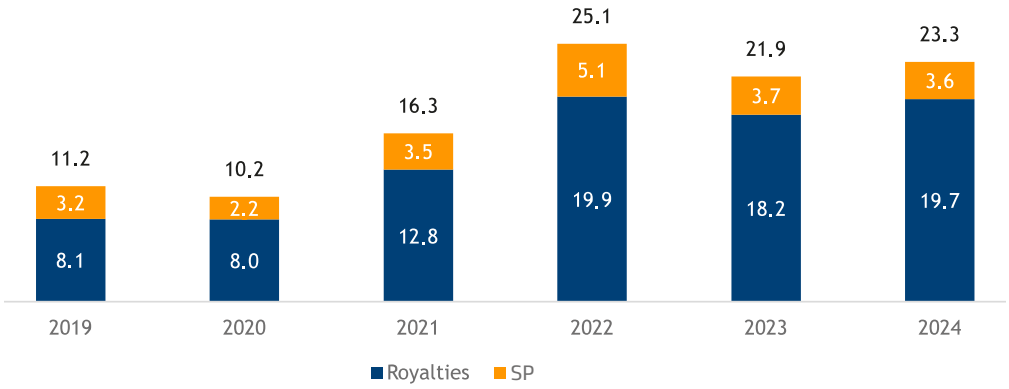
Between 2019 and 2024, transfers of royalties and special participations (PE) to Brazilian municipalities continued to grow, albeit with fluctuations associated with market conditions, production, and the application of distribution rules. The total amount allocated to municipalities jumped from BRL 11.2 billion in 2019 to BRL 23.3 billion in 2024 – a nominal increase of more than 100% over the period.

The highest point in the series occurred in 2022, with a total transfer of BRL 25.1 billion, driven by a favorable context in international oil prices and the performance of production in the pre-salt fields. In 2024, there is a slight recovery compared to 2023, with an increase of BRL 1.4 billion in the total distributed, reflecting stability in production levels and the maintenance of high average barrel prices throughout the year.

The revenue breakdown shows the predominance of royalties over special participations. This asymmetry is related to the calculation methodology and the technical and economic profile of the fields that determine the payment of SP, traditionally concentrated in state entities and a few municipalities with highly profitable production.

Chart 21 – Royalties and Special Participations | Municipalities

2019-2024, billions of BRL



Source: Designed by the IBP based on ANP data (2025).

Table 05 – The 10 municipalities with the highest royalty collection in Brazil

2024, R$

Municipality	State	Amount
Maricá	RJ	2,692,586,105.8
Saquarema	RJ	2,012,494,238.8
Macaé	RJ	1,402,199,874.5
Niterói	RJ	964,769,992.6
Campos dos Goytacazes	RJ	667,436,470.4
Arraial do Cabo	RJ	546,843,509.5
Araruama	RJ	525,549,681.2
Cabo Frio	RJ	374,472,766.7
São Sebastião	SP	341,112,003.6
Rio de Janeiro	RJ	314,481,626.4

Source: Designed by the IBP based on ANP data (2025).

Table 06 – The 10 municipalities with the highest Special Participation collection in Brazil

2024, R$

Municipality	State	Amount
Maricá	RJ	1,548,370,382.4
Niterói	RJ	1,269,184,080.0
Rio de Janeiro	RJ	236,218,478.5
Ilhabela	SP	144,867,134.0
São Sebastião	SP	102,719,153.1
Presidente Kennedy	ES	71,518,138.8
Marataízes	ES	68,063,370.3
Itapemirim	ES	67,572,402.2
Campos dos Goytacazes	RJ	57,977,234.9
São João da Barra	RJ	27,299,626.5

Source: Designed by the IBP based on ANP data (2025).

Municipal distribution follows a highly concentrated pattern, with the state of Rio de Janeiro standing out. Among the ten municipalities that received the most royalties in 2024, nine belong to RJ, with only São Sebastião (SP) appearing outside this axis.

Maricá leads with an impressive BRL 2.7 billion in royalties and ranks first among the municipalities that collected the most special participations, with BRL 1.5 billion. Niterói, Saquarema, and Macaé round out the group with the highest collections, consolidating the Rio de Janeiro coast as the epicenter of municipal redistribution of oil revenues.

As for special shares, there are municipalities in Espírito Santo (Presidente Kennedy, Marataízes, and Itapemirim) and São Paulo (Ilhabela and São Sebastião), reflecting the contribution of these states in high-productivity maritime production areas.

Chapter 2

IBP Production Curve Analysis and Forecast

The constant expansion of oil production is strategic for maintaining the security of the national energy supply by reducing exposure to possible fluctuations in supply and prices on the foreign market, ensuring high levels of access to oil, and providing long-term planning conditions for consumers.

It is important to note that with the year-by-year growth of the Brazilian economy, the energy demand will increase, requiring the expansion of supply flows. In this context, increased oil exploration and production are essential to sustain Brazil's self-sufficiency in oil supply and maintain security of supply levels.

The growth in national oil production is measured to present a possible scenario to industry, consumers, and the government, making it easier to plan the activities that make up the oil chain, as well as the volume of oil available to meet demand and indicate the level of new investments to be made to keep production at adequate levels. For the federal government, states, and municipalities, measuring production volume, investments, and revenue allows for financial and budgetary planning, which is essential for controlling public accounts.

In this sense, the IBP has developed a forecast for oil and natural gas production, as well as projections for tax revenue, investments, and job creation in the sector. These data allow us to observe a possible scenario, showing the evolution of the sector as new exploration blocks become part of Brazil's asset portfolio.

2.1. Upstream

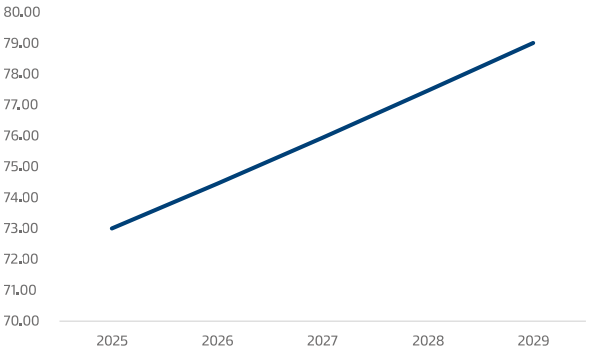
2.1.1 Oil production

Oil production is analyzed considering Brazil's oil production curves, with an estimate of the oil production trajectory for the 2025-2029 period. It is worth mentioning that the oil production projection seeks to use a more restricted and conservative approach regarding the exploration potential of the fields in the database, with a bottom-up analysis and considering approved projects (tendered, with measured potential and defined start of production), without considering production percentages with above-average recovery factors.

Thus, the projection is closer to an average and stable scenario, considering production based on consolidated projects, with oil extraction levels based on average and already observed potential.

In this sense, the methodology adopted is based on the application of an average annual price curve as shown in the Chart below:

Gráfico 22 – Curva de preços para o cenário Base

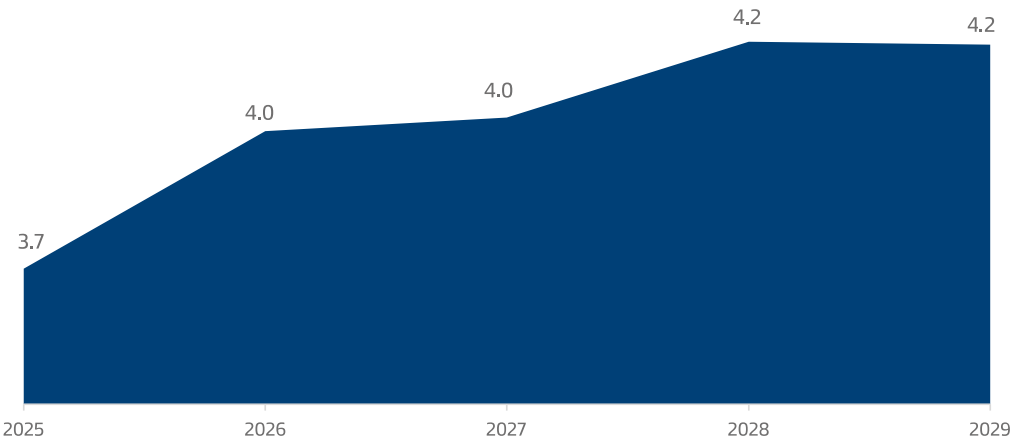


Fonte: IBP elaborado com base no S&P Global, 2025.

The curve indicates continued growth in oil production in the coming years, reaching a peak of 4.2 million barrels per day in 2028 (Chart 23).

Chart 23 – Oil production

2025-2029, millions of barrels per day



Source: Designed by the IBP based on S&P Global data (2025).

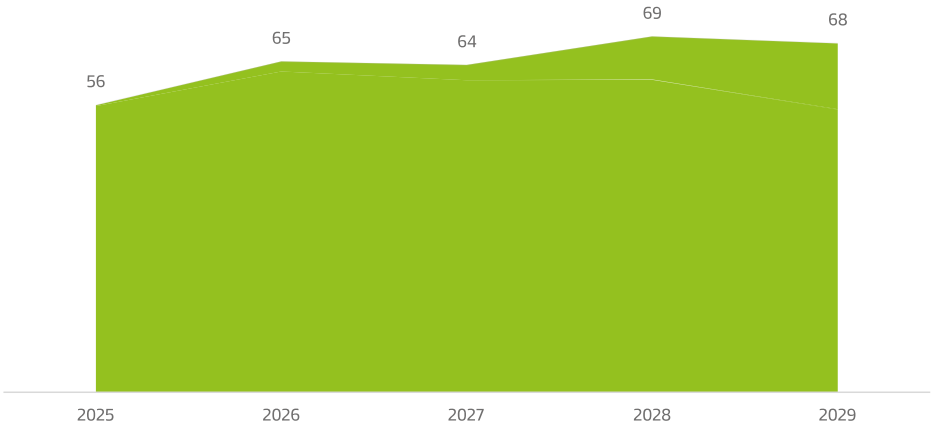
Growth during this period is approximately 16.6%, pointing to a considerable increase in national exploration and production activities, notably in the offshore environment.

2.1.2 Natural gas production

Available natural gas production, i.e., gross production from consolidated projects, net of volumes consumed in exploration and production activities, flaring, and reinjection, is expected to reach 68 million m³ per day in 2029, a 34% increase over the 2024 volume (Chart 24).

Chart 24 – Natural gas available production forecast

2025-2029, millions of cubic meters per day



Source: Designed by the IBP based on S&P Global data (2025).

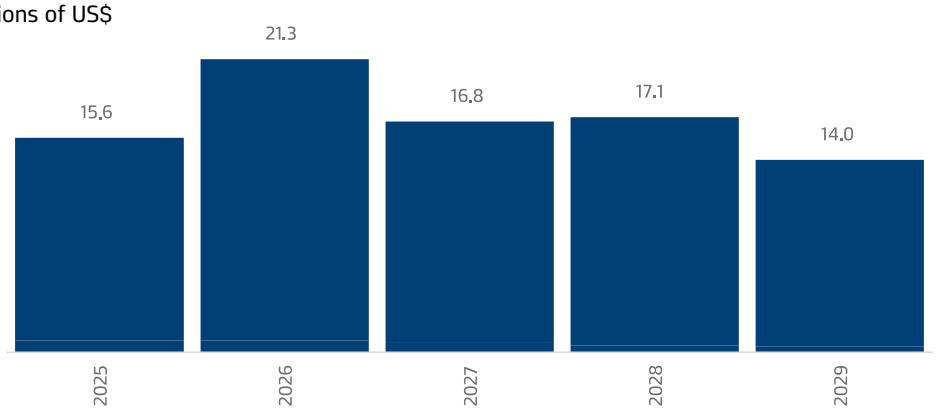
The upward trajectory of natural gas production in Brazil indicates an increase in exploration and production activities, resulting in a greater energy supply in the domestic market. Natural gas fields with significant proven reserves and highly viable production, such as the Raia field in the Campos Basin (with a potential of 16 million m³/day of natural gas), promote this continuous growth in available gas and consolidate its supply in the country.

2.1.3 Investments and earnings

Investments in oil and gas production are expected to grow by 36.5% between 2025 and 2026, reaching approximately US$ 21.3 billion (Chart 25). These investments point to the start of production in new fields, with the aim of expanding the national oil supply and meeting demand.

Chart 25 – Investment in O&G production

2025-2029, Billions of US$



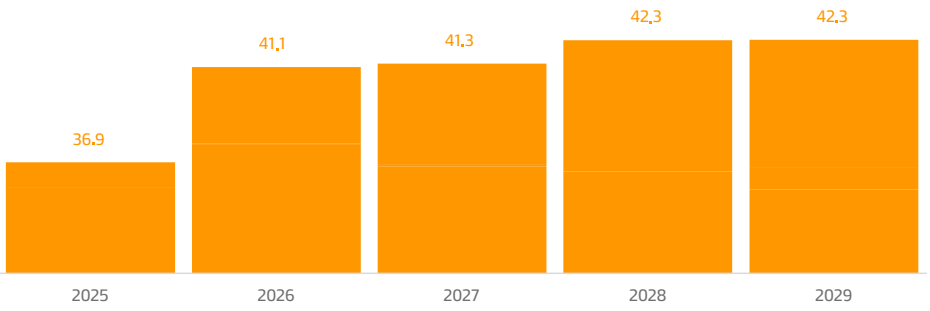
Fonte: Designed by the IBP based on S&P Global data (2025).

Within this scenario of oil and natural gas production for the coming years, there are effects on the collection of royalties, special participations, and taxes from oil activities in Brazil. These revenues are essential to finance public spending, supporting government programs focused on health, education, and science and technology.

According to projections, with production growth between 2025 and 2029, revenues will reach approximately US$42 billion in 2029 (Chart 26). This increase represents a 14.6% increase in the number of financial resources collected based on oil production in Brazil, indicating the importance of this activity for the expansion of resources collected by the State government[2].

Chart 26 – Government earnings

2025-2029, Billions of US$



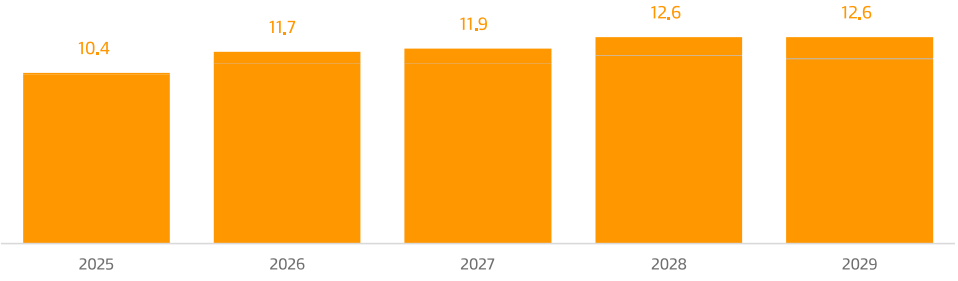
Source: Designed by the IBP based on SSP Global data (2025).*

**Base: projects under development.*
Exploratory: projects that will begin investments by 2029, which are currently under evaluation or temporarily abandoned.
Potential: Other projects in the database with no firm start date and with investments beginning between 2025-2028.

If we look at the specifics of oil production tax collection, we can see that royalty revenue is growing steadily. Royalties are expected to grow by approximately 21.1% between 2025 and 2029 (Chart 27).

Gráfico 27 – Royalties

2025-2029, Billions of US$



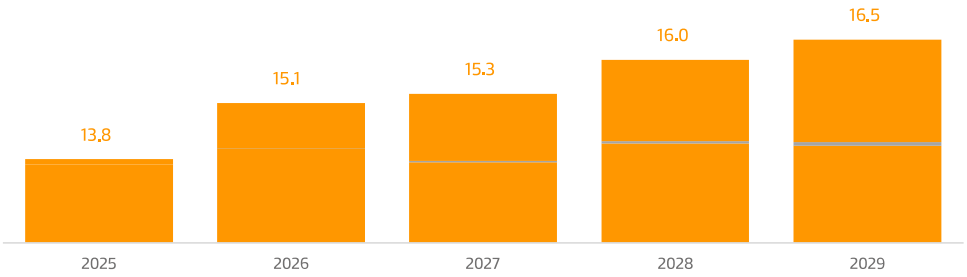
Source: Designed by the IBP based on SSP Global data (2025).

2 For royalty, special participation, and Profit Oil (crude oil received under production sharing agreements) revenue forecasts, as well as for investment decisions, Brent crude oil at US$74/bbl was used as a reference.

Corporate Income Tax (IRPJ) also contributes to the total revenue from oil production in Brazil. In the scenario observed, in 2029, its collection may reach US$16.5 billion, indicating a growth of 19.5% between 2025-2029 (Chart 28). This volume of resources accompanies the growth of investments and the gradual development of E&P activity in the country.

Chart 28 – Corporate Income Tax (IRPJ)

2025-2029, Billions of US$



Source: Designed by the IBP based on SSP Global data (2025).

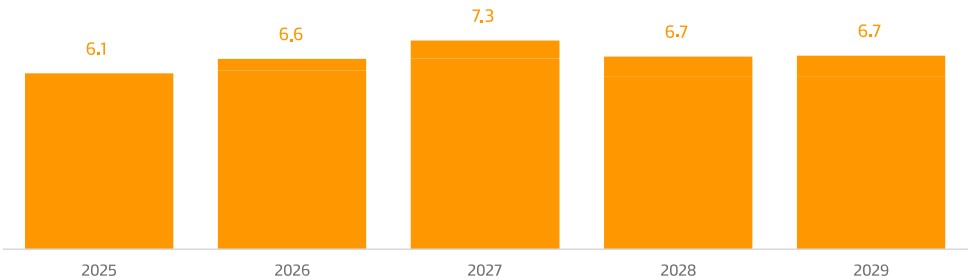
Specifically concerning Special Participation (PE) and Profit Oil – surplus oil collected through production sharing contracts – revenue peaks at US$7.3 billion in 2027, representing a 19.6% increase since 2025 (Chart 29). These resources originate from exploratory blocks located in the pre-salt polygon and other strategic areas that can be defined by the government.

In subsequent years, revenue from Special Participation and Profit Oil remains stable at US$6.7 billion, which is justified by the maturation period of new exploration projects and the definition of investments to be made in new oil and natural gas fields.

**Profit oil: oil resources collected by the Federal Government in production-sharing contracts.*

Chart 29 – Special Participations and Profit Oil (production-sharing regime)

2025-2029, billions of US$



Source: Designed by the IBP based on SSP Global data (2025).

3 The oil surplus is the portion of oil and/or natural gas production to be shared between the Federal Government and the producing company, as provided by the contract, resulting from the difference between the total production volume and the portions concerning the cost of oil and royalties due.

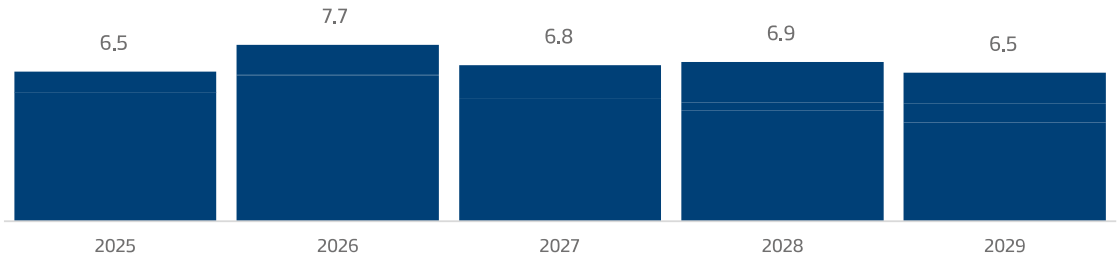
Oil and natural gas production in Brazil also generates indirect tax revenues, which are levied on E&P activities. In addition, oil production contributes to research, innovation, science, and technology in the country by financing projects included in the ANP's RD&I Clause.

This clause stipulates that a percentage of the gross revenue from fields with high production or high profitability be set aside to finance research projects. The funds may be directed to projects developed, individually or jointly, by oil companies, Brazilian companies, or accredited institutions. According to the projection, the highest collection of funds for RD&I and indirect taxes will occur in 2026, reaching approximately US$ 7.7 billion, reflecting the growth of oil production in Brazil (Chart 30).

It is worth noting that, in 2021, the National Energy Policy Council (CNPE) established that the resources from the clause can be applied to energy transition-related RD&I projects. Therefore, the resources generated by oil production are also being used to develop and support sustainable technologies, decarbonization, and energy efficiency.

Chart 30 – Research, Development, and Innovation (PD&I) and Indirect Taxes

2025-2029, billions of US$



Source: Designed by the IBP based on SSP Global data (2025).

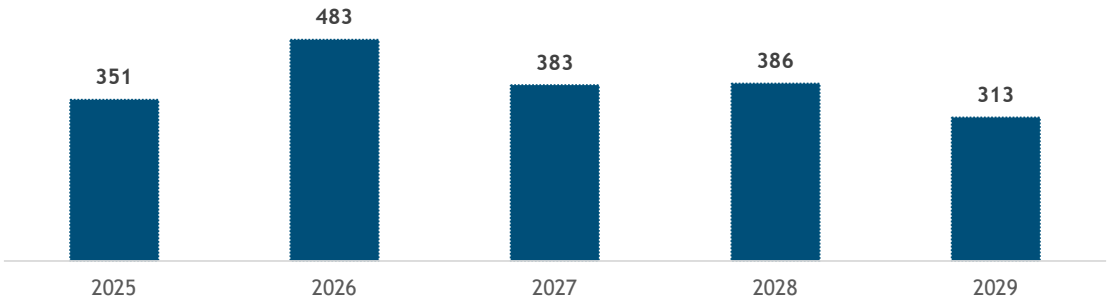
2.1.4 Effects on the national economy

Considering the projections analyzed, it is clear that the development of oil production has an impact on the national economy, generating revenue for state entities, stimulating industrial activity, encouraging innovation, and creating jobs in the oil chain and in economic segments related to exploration and production, the transformation of primary energy into fuels and non-energy products, and the distribution and consumption of these products.

As a result of the oil production forecast in Brazil, a peak in job creation linked to the sector in 2026 has been estimated, reaching 483,000 jobs. Growth is expected between 2025 and 2026 due to the start of production activities in new fields in the country, representing an increase of approximately 37.6% (Chart 31). The following years mark the consolidation of the beginning of production in areas that have been auctioned and have the appropriate infrastructure, as well as indicating a period of maturation for new projects.

Chart 31 – Jobs created

2025-2029, thousands



Source: Designed by the IBP based on S&P Global data (2025).

Given the projections analyzed, it is clear that the national oil industry is constantly developing. The increase in oil production reflects the demand for the product, which is essential for the country's energy security. New investments indicate the expansion of activity in consolidated basins, as well as pointing to the need to explore new frontiers in the country, such as the Equatorial Margin and the Pelotas Basin (BOX 1).

It is worth noting that investments made in oil production, through the acquisition of new blocks, provide an increase in infrastructure for E&P and logistics, generate resources for the State to sustain essential public services for the Brazilian population, create jobs, and provide resources used in innovation, science, and technology, applied through the R&D Clause in energy efficiency projects and diversification of energy sources. - and provide resources used in innovation, science, and technology, applied through the R&D Clause in energy efficiency and energy source diversification projects.

BOX 1 - EQUATORIAL MARGIN

The Equatorial Margin is Brazil's new offshore frontier for oil and natural gas exploration. Stretching over 2,200 kilometers, from the northern tip of the state of Amapá to the coast of Rio Grande do Norte, the region covers five sedimentary basins: Foz do Amazonas, Pará-Maranhão, Barreirinhas, Ceará, and Potiguar. Its reserve potential has attracted growing interest, driven by discoveries of large volumes in geologically similar areas, such as Guyana and Suriname. The ANP estimates that the Equatorial Margin may contain approximately 30 billion barrels of oil equivalent (boe). Studies indicate that production in the region could add about 1.1 million barrels per day to the national supply starting in 2029, playing a strategic role in replenishing Brazilian reserves and ensuring long-term production sustainability.

The first drilling operations in the Equatorial Margin took place in the 1970s but did not result in large-scale commercial discoveries. To date, most exploration activities have been concentrated in shallow waters, although there are growing expectations of significant reserves in deep waters. The most recent wells were drilled between 2010 and 2015, distributed across the Amazon River Mouth, Pará-Maranhão, Barreirinhas, Ceará, and Potiguar basins. The renewed interest in the region is reflected in Petrobras' planned investments. According to its 2025–2029 Strategic Plan, the company intends to allocate US$3 billion to drill 15 new wells over the

next five years. Petrobras has already drilled more than 700 wells in the Equatorial Margin and plans to drill 42 new exploratory wells between 2023 and 2027, 16 of which are specifically focused on the region.

The exploration of the Equatorial Margin could play a central role in Brazil's energy future. With the natural decline in production in traditional basins, such as Santos and Campos, this new frontier could become a vital source for maintaining production levels from the 2030s onwards. In addition, monetizing these resources could contribute to job and income generation, boosting the economy, especially in the North and Northeast regions of the country. Given the strategic location of these sedimentary basins along the northern Brazilian coast, exploration could stimulate investment in infrastructure and strengthen the energy sector in areas historically distant from established production centers, contributing to the reduction of regional inequalities.

Petrobras plans to start drilling new wells in the Equatorial Margin in 2026, with an initial focus on the Foz do Amazonas and Pará-Maranhão basins. The first well will be drilled more than 160 kilometers from the coast and 500 kilometers from the mouth of the Amazon River, at a water depth of 2,880 meters. It should be noted that the development of transportation and refining infrastructure is one of the decisive factors for commercially developing production. The Equatorial Margin could consolidate Brazil as one of the world's leading offshore exploration hubs, ensuring energy security, diversifying supply, and creating economic opportunities for decades to come.

• Sensitivity Analysis for the 2026 Oil Production Landscape

The choice of the median aims to reduce the influence of extreme values among heterogeneous projection methodologies.

The incorporation of the new price for the fiscal year continues the architecture of the previously disclosed model. The other exogenous determinants remain constant, and the central assumption (US$58/barrel) is applied to the estimated functions/technical coefficients used for: (i) production forecasts; (ii) investments; and (iii) revenue collection.

The results are presented in a single Base scenario, allowing direct comparison with the previous fiscal year and enabling the measurement of the sensitivity of the projections to the revision of the Brent price without resorting to additional uncertainty intervals.

The analysis indicates that most projects in the portfolio remain economically viable, even considering the revision of the previously estimated price to US$58/barrel. In this context, the effect on the investment decision tends to be limited, since the projects are resilient to this new price level. Moreover, the disbursement schedule is not significantly concentrated in 2026, which mitigates potential short-term impacts on the volume of investments.

In this sense, there should not be a significant reduction in production throughout the period, since contracted investments remain resilient and existing infrastructure tends to operate continuously and near its installed capacity to optimize economic efficiency.

In terms of government revenue, however, the impact is significant, given the direct correlation between oil prices and the calculation basis of government participation. In this

4 Goldman Sachs; Fitch Ratings; EIA; UBS; JP Morgan; S5P Global; OPEP; HSBC.

sense, the revision of the forecast price of Brent for 2026 may imply a potential reduction of up to 30% in government revenues, with distributive effects between the Union, states, and municipalities.

Looking ahead to 2030, the main international energy agencies and financial institutions agree on an average annual price of US$70/barrel for Brent. This level indicates expectations of relative market recovery in the medium term, after the recent volatility observed in short-term prices. Thus, the exercise originally conducted remains methodologically valid and relevant, since the projected long-term scenario is consistent with the assumptions used in the first round of forecasts.

2.2 Derivatives

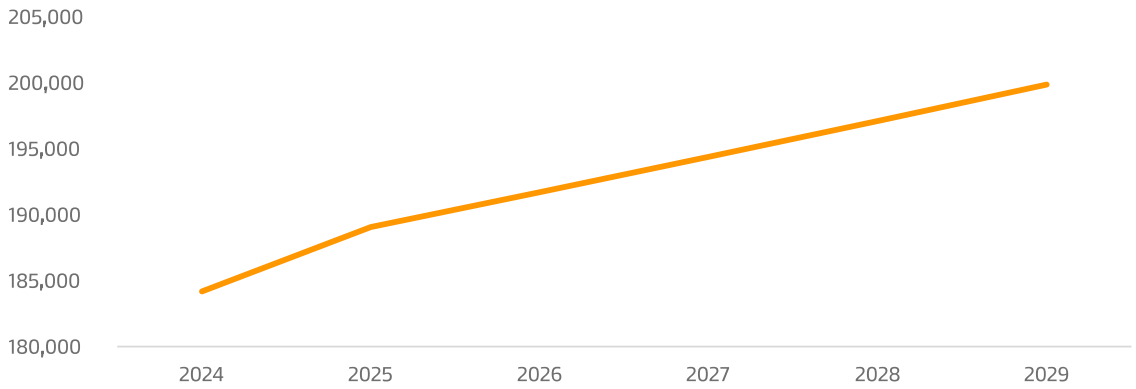
This section presents oil derivative demand forecasts for Brazil for the period from 2025 to 2029. The goal is to systematically estimate the evolution of sector demand and specific consumption for each derivative, contributing to energy planning and the formulation of industrial and regulatory policies.

The demand forecasts for oil derivatives in Brazil indicate consistent growth between 2025 and 2029. This expansion is supported mainly by increased consumption of diesel and gasoline, which together account for more than 72% of total demand for derivatives at the beginning of the period.

Diesel, the main derivative consumed in the country, is expected to increase from 184,000 m³/d in 2024 to 200,000 m³/d in 2029, with a cumulative variation of 8.5%. This performance is directly related to the centrality of road transportation in national logistics and to demand from the agricultural and industrial sectors, which are highly dependent on this type of fuel.

Chart 32 – Demand for diesel B

2024-2029, thousands of m³ per day

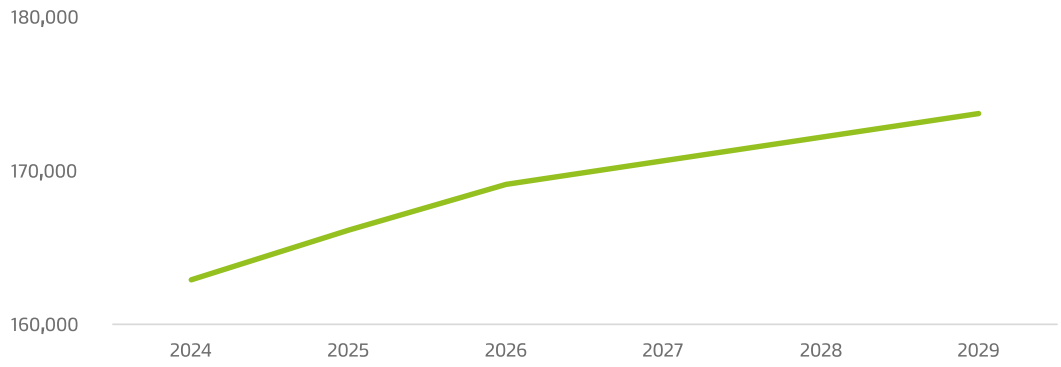


Source: Designed by the IBP based on ANP data (2024).

Otto cycle fuels, gasoline C, and hydrated ethanol are expected to grow moderately, from 163,000 m³/d of gasoline equivalent in 2024 to 174,000 m³/d in 2029, an increase of 6.6%. This expansion reflects the maintenance of the flex-fuel light vehicle fleet, even with the gradual advances in electrification.

Chart 33 – Demand for Otto Cycle fuels

2024-2029, thousands of m³ of gasoline equivalent per day

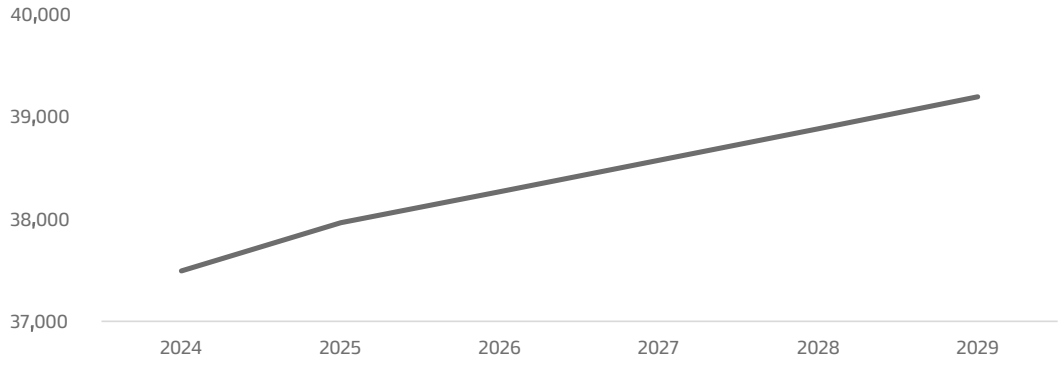


Source: Designed by the IBP based on ANP data (2024).

In turn, LPG consumption—cooking gas cylinders—will increase from 37,000 m³/d to 39,000 m³/d between 2025 and 2029, an increase of 4.5%.

Chart 34 – Demand for Liquefied Petroleum Gas (GLP)

2024-2029, thousands of m³ per day

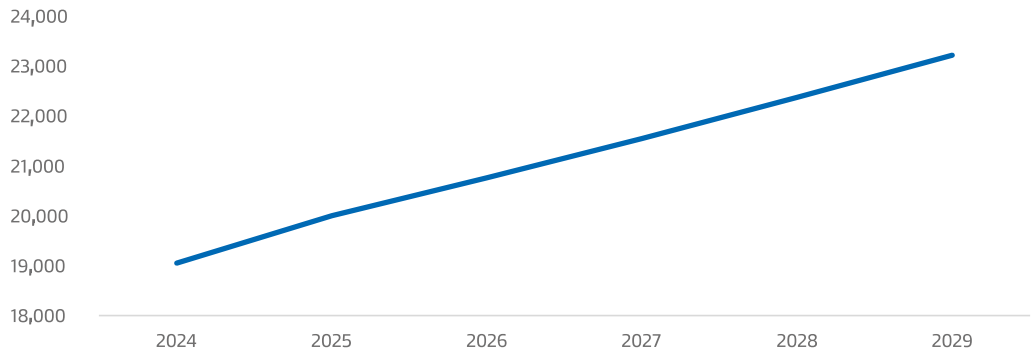


Source: Designed by the IBP based on ANP data (2024).

While aviation kerosene recorded significant growth, from 19,000 m³/d to 23,000 m³/d, equivalent to a 22% increase in the period. Such expansion follows the recovery of the air transportation sector, especially on domestic and regional routes, consolidating the recovery observed in the post-pandemic period.

Chart 35 – Demand for aviation kerosene

2024-2029, thousands of m³ per day



Source: Designed by the IBP based on ANP data (2024).

Overall, the analysis per product confirms the predominance of diesel and gasoline in the Brazilian oil derivatives mix, while indicating consistent growth margins for products such as aviation kerosene and LPG. These results point to a scenario of continuity in the consumption structure of derivatives, even in the face of pressures for decarbonization and technological substitution on the energy transition horizon.

Forecasts for sectoral consumption of derivatives in Brazil between 2025 and 2029 indicate a moderate growth trajectory. Such movement is primarily driven by the expansion of the road sector, although all segments show positive variations in consumption.

In the road sector, which accounts for most of the demand, the projection reflects the continued predominance of freight and passenger road transportation, even in the face of advances in alternatives such as vehicle electrification and biofuels.

The residential sector shows more moderate growth, with its expansion following demographic trends and the continued consumption of LPG in homes, despite efforts to replace it with alternative sources in urban areas.

In the agriculture and other uses segment, the evolution reflects the intensification of agricultural mechanization, increased productivity, and the continued use of diesel in rural areas, in line with the dynamism of Brazilian agribusiness. In the aviation sector, the commercial aviation sector is expected to recover and the national air network to expand, increasing aviation kerosene consumption.

Projections for demand for petroleum products between 2025 and 2029 show that the transportation sector will continue to be central to the consumption of liquid fuels in Brazil, especially diesel and gasoline.

Road transport will continue to be the main destination for derivatives, supported by the country's logistics structure and the expansion of the vehicle fleet. Aviation shows signs of recovery but is still subject to the volatility of the global macroeconomic scenario. Marine fuel consumption, although more stable, may be impacted by environmental regulatory requirements in the coming years. Demand for industrial and residential products, such as LPG and naphtha, will depend on economic activity and technological substitution in end uses.

Despite the advance of alternative energy sources and the beginning of the energy transition in some segments, liquid fossil fuels will still play an essential role in meeting Brazil's energy needs in the short and medium term. In this context, understanding the evolution of product and sector demand is fundamental to ensuring energy security, the efficient allocation of investments, and the formulation of public policies consistent with the national reality.

2.3 Biofuels

• Ethanol and biodiesel production forecasts

The table below shows the evolution of biofuel production in Brazil between 2025 and 2029, measured in thousand barrels per day. The data indicate a steady growth trajectory driven mainly by increased ethanol production.

Ethanol production is expected to grow from 658,000 b/d in 2025 to 709,000 b/d in 2029, representing a cumulative increase of 7.8% over the period. The average annual expansion is approximately 1.9%, reflecting demand growth until the end of the decade.

Biodiesel production is expected to increase from 159,000 b/d to 170,000 b/d between 2025 and 2029, with a cumulative variation of 6.9%. The average annual growth rate is slightly lower than that of ethanol, at around 1.7% per year. This growth is in line with the policy of gradually increasing the mandatory blend of biodiesel in fossil diesel, as provided for in the guidelines of the CNPE (National Energy Policy Council).

Total biofuel production will grow from 817,000 b/d in 2025 to 880,000 b/d in 2029, equivalent to an increase of 7.7% over the period. This expansion supports the trajectory of partial substitution of fossil derivatives in the transport sector, in line with the objectives of RenovaBio and the decarbonization targets assumed by Brazil under its NDC (Nationally Determined Contribution).

Table 07 – Ethanol and biodiesel production forecast

2025-2029, thousands of b/d

Products	2025	2026	2027	2028	2029
Ethanol	658	681	689	698	709
Biodiesel	159	165	166	168	170
Total	817	846	855	867	880

Source: Designed by the IBP based on OPEC data (2025).

The continued growth in biofuel production reinforces its strategic importance for energy security and the transition to a lower-carbon transport system, reducing greenhouse gas emissions and promoting the use of renewable resources from domestic sources.

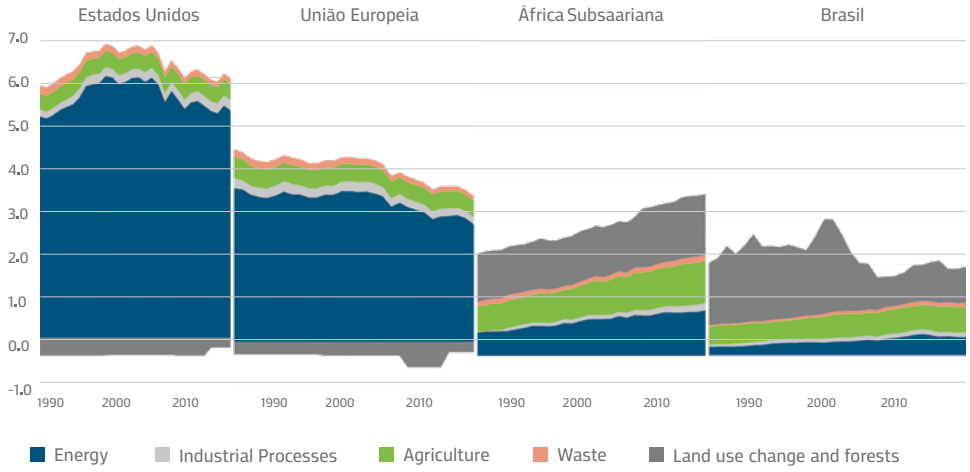
2.4 Energy Transition

Greenhouse gas (GHG) emissions in Brazil have a particular profile, marked by a high contribution from non-energy sources, especially those related to land use and agricultural activities. This feature distinguishes the country from other major economies, in which the energy sector plays a central role in total emissions.

In Brazil, according to SEEG (Emissions Estimation System, 2024) data, direct emissions associated with the energy sector account for about 18% of the national total, while land use change accounts for 46% and agriculture for 28%.

Chart 36 – Annual GHG emissions per sector in selected regions (1990-2019)

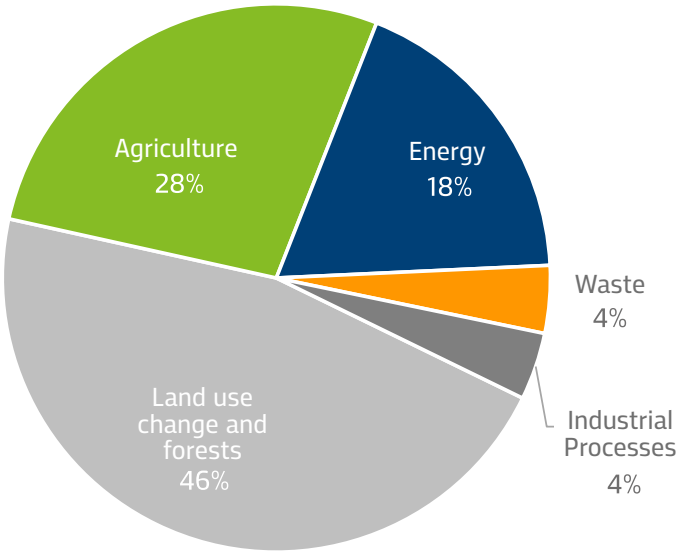
In gigatons of CO2 equivalent ($GtCO_2e$)



Source: Designed by the IBP based on Financial Times and SEEG data (2024).

Chart 37 - CO_2e emissions in Brazil per sector

2023, %



Source: SEEG (2024).

Brazilian oil production stands out for its volume and stability and for the lower carbon intensity associated with the oil extracted. In a global scenario marked by the urgency of energy transition and the search for less emission-intensive sources, this differential takes on strategic relevance. While the global average carbon intensity is around 20 kg of CO2 per barrel of oil equivalent (boe), Brazilian oil has a lower average, around 17 kgCO2/boe. Even more impressive are the pre-salt fields, notably Tupi and Búzios, whose intensity is around 10 kgCO2/boe – a level that places them among the most efficient assets in the world in terms of climate. Although not the main emitter, the energy sector—and especially the oil and gas industry—plays a decisive role in building solutions to climate challenges. The Brazilian energy mix already stands out internationally for its high share of renewable sources, the result of decades of investment and an integrated strategic approach. In this context, the oil and gas industry has actively contributed to the diversification and modernization of the mix by investing in low-carbon technologies, operational efficiency, carbon capture (CCUS), offshore wind, and the production of advanced biofuels, such as green diesel and SAF (Sustainable Aviation Fuel).

- Carbon Capture, Utilization and Storage (CCUS)

Brazil has the potential to advance Carbon Capture, Utilization, and Storage (CCUS) activities due to its geological storage capacity, the technological expertise of oil operators, and opportunities to use CO2 in bioenergy generation systems.

According to recent estimates, the country has a capture potential of approximately 190 million tons of CO2 per year (MtCO2/year). The sectors with the greatest potential for implementing CCUS projects are energy, industrial applications, and fuel production. Of this estimated total, about 130 MtCO2/year—corresponding to 68%—comes from the energy sector, representing 32% of the sector's own emissions and about 8% of Brazil's total greenhouse gas emissions in 2023.

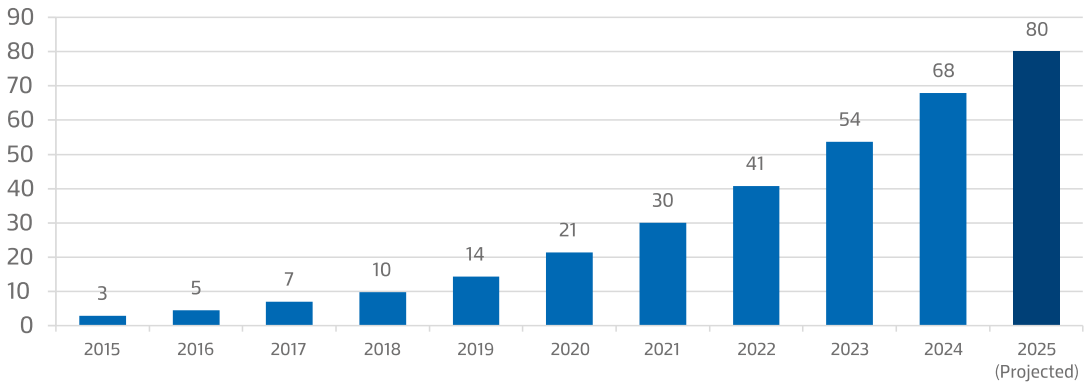
In addition to the energy sector's decarbonization potential, CCUS can also act as a carbon removal technology when combined with the use of renewable biomass, in what is known as BECCS (Bioenergy with Carbon Capture and Storage). In this context, BECCS represents the second largest capture potential, accounting for about 20% of the total, driven by the long history of the ethanol market in the country and the growing—yet still underexploited—potential for biogas production. Next is the industrial sector, with about 15% of the estimated potential.

Currently, CO2 capture and storage activities in Brazil are concentrated in injection operations in the pre-salt fields of the Santos Basin, led by Petrobras. The growing interest of the agro-energy sector in BECCS technologies has also driven the implementation of projects focused on this technological route in the country.

In the production of pre-salt oil in the Santos Basin, Petrobras carries out CO2 injection associated with enhanced oil recovery (EOR) on 22 platforms, positioning itself as the second largest operation of its kind in the world in 2023, according to data from the ANP (National Agency of Petroleum, Natural Gas and Biofuels). In 2024, 14.2 million tons (Mt) of CO2 were reinjected, totaling more than 67.9 Mt since 2008. Petrobras has set a goal of reaching a cumulative volume of 80 Mt of CO2 reinjected by 2025.

Chart 39 – Accumulated reinjection of CO2 in Brazil

015–2025, millions of tons of CO_2



Source: Designed by the IBP based on Petrobras data, 2025.

Among the BECCS initiatives, one project stands out: a project being developed by FS Agrisolutions Indústria de Biocombustíveis, one of Brazil's leading ethanol producers. This pioneering project, the first of its kind in the country, is being developed for the Lucas do Rio Verde plant in the state of Mato Grosso. The goal is to capture all CO2 generated during the fermentation stage, with an estimated daily injection of 1,160 tons of CO2. Operations are scheduled to begin in 2025.

In addition, Petrobras has expressed interest in developing CCUS hubs as new business opportunities and risk-sharing mechanisms. The company has already identified eight potential locations for these hubs across the country. In December 2023, during COP28, Petrobras signed a memorandum of understanding with the state of Rio de Janeiro to jointly evaluate the development of a CCUS hub and explore combined solutions, such as low-carbon hydrogen.

Brazil has made progress in creating regulatory frameworks to promote the adoption of CCUS technologies as a productive activity, through regulatory guidelines and specific incentives. In August 2023, the Federal Senate passed Bill No. 1,425/2022, which aims to create a comprehensive legislative and regulatory framework for CO2 geological storage activities. Subsequently, in October 2024, Brazil took a major step forward with the enactment of the Fuel of the Future Act (Act No. 14,993/2024), which established the legal framework and obligations for operators to have access to geological storage sites.

In addition, two additional programs were recently introduced: the Brazilian Emissions Trading System (SBCE) and the Energy Transition Acceleration Program (PATEN), which encourage the development of low-carbon energy products, including those associated with CCUS technologies, according to an analysis by the CCS Institute (MME, 2025).

As for incentive policies, there are currently no specific instruments dedicated exclusively to CCUS. However, public financing is available through credit lines aimed at reducing emissions, such as the BNDES RenovaBio Program, which was used in the FS Bioenergia project. Between 2017 and 2023, approximately 8% of the R&D resources of concessionaires in Brazil were allocated to projects related to CCUS.

• Offshore wind

Brazil's offshore wind resources are among the most favorable in the world, with a technical potential exceeding 1,200 GW, according to the World Bank study Scenarios for Offshore Wind Development in Brazil. This potential includes approximately 480 GW suitable for fixed foundations (at depths of less than 70 meters) and 748 GW for floating foundations (at depths between 70 and 1,000 meters). These figures underscore the country's substantial capacity for developing offshore wind power, with the potential to increase the share of renewable sources in the national electricity mix.

Exhibit 01 – Technical Potential of Offshore Wind in Brazil

Source: Designed by the IBP based on World Bank data (2024).

To enable this expansion, Brazil enacted Act No. 15,097 in January 2025, establishing a transparent regulatory framework for the development of offshore wind power. This law allows people to install wind farms in territorial waters, the exclusive economic zone, and the continental shelf, with areas being allocated through competitive processes. By boosting energy security, attracting investments, and expanding the use of renewable sources, the new law aims to overcome the legal hurdles that previously held back these projects.

One of the main drivers of offshore wind energy development in Brazil is the oil and gas sector, which has established itself as a strategic partner, especially in the technological and regulatory fields. The expertise accumulated in maritime operations, infrastructure installation, and logistics can be leveraged to support the development of offshore wind energy. This synergy stems from common challenges, such as knowledge of the marine environment, the installation of floating platforms, and the adaptation of materials. The oil and gas sector's expe-

rience in offshore operations can contribute to cost reduction and knowledge transfer, especially in the construction and operation stages of assets. Furthermore, technological advancement and cost reduction depend on specialized engineering, large-scale project management, and capital mobilization—skills intrinsic to the oil and gas industry.

- Biofuel

Brazil has consolidated its position as a global leader in biofuel production, ranking second in the world, behind only the United States. According to EPE's 2024 National Energy Balance, approximately 22.5% of the country's transportation sector energy consumption is supplied by biofuels. The national infrastructure includes 359 ethanol plants and 58 biodiesel plants, reflecting public policies and initiatives that promote biofuels as a strategic component of the energy mix.

Ethanol is the main biofuel used in Brazilian transportation, produced mainly from sugarcane, though corn is gaining relevance, especially in the off-season. The National Energy Policy Council (CNPE) mandates the addition of 30% anhydrous ethanol to gasoline (E30). In addition, hydrated ethanol is available in its pure form, allowing consumers to choose between gasoline and biofuel in flex-fuel vehicles, which already represent more than 80% of the country's light vehicle fleet, according to EPE data.

In heavy transportation, it is mandatory to blend 15% biodiesel (FAME) with fossil diesel (B15), according to CNPE guidelines. Produced predominantly from soybean oil, Brazilian biodiesel also uses beef tallow and palm oil. In 2024, average production was 0.16 mb/d.

Expanding beyond liquid biofuels, the New Gas Act (2021) incorporated biomethane into the energy mix. Obtained through the purification of biogas generated from the decomposition of organic waste, biomethane is now regulated as an equivalent substitute for natural gas, provided it meets ANP standards. Although promising, this segment is still in its early stages, with ten plants in operation.

This transformation is driven by the National Biofuels Policy (RenovaBio), established in 2017, which sets annual decarbonization targets for fuel distributors. To meet these targets, these agents must purchase Decarbonization Credits (CBIOs). These credits, which are tradable on the stock exchange, are generated by biofuel producers based on the CO2 emissions avoided compared to the use of fossil fuels.

In addition to contributing to the reduction of emissions, biofuels optimize the Brazilian refining sector. The use of existing infrastructure and the adoption of co-processing techniques allow refineries greater flexibility in the face of new energy demands, efficiency gains, and a reduction in the need for investments in new facilities — contributing to a low-carbon economy. According to UNICA (Sugarcane Industry Union), biofuels can emit up to 80% less greenhouse gases (GHG) throughout their life cycle, compared to fossil fuels.

It should be noted that the Future Fuel Act is a legislative initiative aimed at expanding the share of renewable sources in the Brazilian energy matrix, with a focus on decarbonizing mobility in the country.

The legislation integrates existing public policies—such as RenovaBio, the Green Mobility Program (MOVER), and the Brazilian Vehicle Labeling Program (PBE Veicular)—while updating biofuel use mandates and introducing new ones, such as SAF and green diesel (HVO - Hydrotreated Vegetable Oil).

The law also incorporated the concept of Life Cycle Assessment (LCA), from well to wheel (well--to-wheel), considering all stages of the fuel – from extraction to end use – to measure the emissions associated with the different energy sources used in transportation. This includes everything from energy generation, through extraction and production, to final consumption, to reduce greenhouse gas emissions more efficiently and economically.

Table 8 – Biomethane and biofuel policies

Biofuel	Metric	Forecast
SAF (Sustainable Aviation Fuel)	GHG reduction minimum yearly percentage.	1% starting 2027. 1 percentage point per year growth starting 2029, reaching 10% in 2037.
Green Diesel (HVO)	Mandatory percentage, volume-wise, to be added to diesel.	1% per year starting 2026. No exceeding 10% reduction in emissions.
Biomethane	GHG and emissions reduction goal for the natural gas market.	1% per year starting 2026. No exceeding 10% reduction in emissions.
FAME (Biodiesel)	Mandatory percentage of biodiesel, volume-wise, to be added to diesel.	15% in 2025. 1 percentage point per year growth up to 20% in 2030. It may vary between 13% and 25%.
Ethanol	Mandatory percentage of anhydrous ethanol, volume-wise, to be added to gasoline.	Established in 27%. May vary between 22% and 35%.

Fonte: Elaboração IBP (2025).

• Natural Gas

The energy transition must be gradual, orderly, and just to avoid disruptions in energy supply and ensure the accessibility of the energy system. Thus, in the process of transitioning to a low-carbon mix, it is crucial to bear in mind the need for security of supply and the pursuit of affordable energy for consumers.

In this context, natural gas is an appropriate energy source to support the transition to an increasingly decarbonized economy, given its lower CO2 emissions and the availability of consolidated technologies.

In Brazil, natural gas stands out for its use in the electricity sector as a complement to renewable energies (hydroelectric, wind, and solar) in view of the intermittency of generation from these sources. Gas-fired thermoelectric plants ensure the security of electricity supply in the face of variations in renewable sources and offer flexibility to the system in periods of high demand. This role of complementarity and supply guarantee indicates the relevance of natural gas, allowing for the expected substantial growth of renewable sources due to the increasing electrification of the economy.

In addition to its important role in the electricity sector, natural gas has the potential to

contribute to the decarbonization of the land transportation segment and to replace solid and liquid fossil fuels in industrial processes. Natural gas is also an ally, precursor, and facilitator of the insertion of biomethane into the country's energy mix, with high potential for biomethane production from agricultural waste and urban waste.

It is important to note that fossil-based natural gas can complement and support the growth of its renewable counterpart, which will benefit from economies of scale, infrastructure, and the development of fossil natural gas regulation. The growing supply of biomethane and its complementary role with natural gas in supplying the same consumers, in addition to creating new markets, is another aspect of the role of natural gas (fossil and renewable) in the energy transition.

The ongoing transformations in the natural gas sector have the potential to expand the supply of this resource, contributing to meeting future energy demand. Furthermore, these changes are in line with the requirements of the energy transition by promoting the use of less carbon-intensive sources.

Based on the previous discussions on renewables, biofuels, new carbon sequestration technologies, and the use of natural gas, it can be observed that Brazil plays a strategic role in the global energy transition process. Although the country already has a significantly more renewable energy mix than the global average, it continues to advance through the design of public policies and the implementation of programs aimed at developing renewable and low-carbon sources.

Final Remarks

The Brazilian oil and gas industry is one of the most important economic sectors in the country, with a complex production chain that extends from energy generation in its various forms (i.e., crude oil, derivatives, biofuels) to inputs for various industrial segments (i.e., petrochemicals). Its cross-cutting nature highlights its relevance to the national and global economy.

Given the importance of the O&G industry for economic development and energy supply security in the country, current analyses allow us to measure the development of hydrocarbon exploration and production activities, as well as the refining and distribution of derivatives, which is essential to understanding the industry's growth trajectory.

Brazilian oil production has been growing since 1980, reaching around 3.4 million barrels/day in 2024, making Brazil the 8th largest global producer. Natural gas production was 153.1 million m^3/day, indicating the development of this important industry for the energy transition. It is worth noting that in 2024, oil became the country's most exported product, contributing to the balance of trade.

As for the downstream segment, this study emphasizes the demand for diesel oil in Brazil, which remained the most representative fuel in terms of sales, accounting for 43% of the total volume. Hydrated ethanol accounted for 14% of total sales, with growth of approximately 33%, reaching a volume of 21.6 million m^3 in 2024.

This outlook, linked to economic development, points to the evolution of the sector, based on

the expansion of production and investments. In this sense, the IBP 2025 Outlook indicates continued growth in oil production in the coming years, reaching a peak of 4.2 million barrels/day in 2028. Natural gas production, on the other hand, is expected to reach 68 million m³ per day in 2029.

To enable the expansion of exploration and production in the sector, investments are forecast to grow by 36.5% between 2025 and 2026, reaching approximately US$21.3 billion. Total biofuel production will grow from 817,000 b/d in 2025 to 880,000 b/d in 2029, which amounts to a 7.7% increase over the period. It is important to note that growth and production projections in Brazil's oil and natural gas industry have been accompanied by investments in decarbonization through the development of CCS projects, as well as investments in renewable energy sources such as solar and wind.

The expansion of oil and natural gas production in the country, as well as biofuels that are part of the mobility segment, is essential to sustain security of supply in the face of economic growth and increased consumption in the coming years. Continuous production also ensures protection against external supply fluctuations, promoting long-term planning in the sector and preserving access to energy.

It is worth noting that the development of oil production has an impact on the national economy, as it provides revenue for state entities, guarantees inputs to various industrial segments, and generates jobs in the oil chain and in economic segments related to upstream, fuel, and non-energy product production, distribution, and consumption of these products.

Given the relevance of the oil and gas sector to the economy and the energy sector, analyses of the current scenario and projected scenarios are essential to understand its development process and ensure its proper planning.

Thus, the IBP Outlook 2025, in line with the Institute's commitment to generating knowledge, sought to present data and economic analyses on the sector's outlook, the energy transition process, and production and investment projections for the coming years, to provide Members and society with useful, up-to-date content that serves as a reference for the energy industry.

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