



GENERAL OVERVIEW OF THE OIL AND GAS INDUSTRY: AN AGENDA FOR THE FUTURE

01-B

Expedient

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EXECUTIVE SUMMARY

:: The oil and gas industry plays a strategic **role in Brazil due to its importance as an energy source and for the benefits it provides to society**, such as attracting investments, generating employment and income for the country.

:: The industry represents 17% of the country's industrial GDP and will continue to contribute to the economic growth through planned investments in exploration and production of US\$ 173 billion, foreseen for the 2024 to 2033 period.

:: The national oil production should reach a total volume of approximately 4.5 million barrels per day in 2031, providing, in the upstream segment alone, more than 344,000 jobs on an annual average from 2024 to 2033. In the same period, more than US\$ 600 billion will be destined to the public coffers (Royalties, Income Tax, Special Participations, profit oil installments and investment obligations in Research & Development are considered). **::** The ongoing energy transition process is an opportunity for Brazil due to the country's unique greenhouse gas emissions profile, the high share of renewable sources in its energy matrix, and the relatively low level of emissions from oil production when compared to other countries.

In order to benefit from all the opportunities associated to the oil and gas production, a a business environment that provides:

i. legal certainty and assurance of existing contracts;

ii. tax simplification with regulation of the single phase of ICMS on derivatives, with *ad rem* rates;

iii. pricing liberty;

iv. incentive for competition in the natural gas and refining industries, as to attract investment;

v. multiple agents.

INDUSTRY OVERVIEW



The oil and gas industry is one of the main pillars of the Brazilian energy system, responsible for more than 40% of its internal **energy supply**¹. The industry's relevance is measured by its great capacity to generate employment and revenues from exports and domestic sales, in addition to the significant tax collection at municipal, state and federal levels. In addition, energy security and decarbonization have started walking side by side in recent years. Brazil has unique conditions to become a relevant energy exporter to the global markets. Every day, more than 4.2 million boe² (oil and gas) are produced in Brazil, and the refineries process around 2.0 million barrels³ that are transported to the most diverse locations in the country. This is done safely, efficiently, and with environmental responsability. According to IBP's estimates, over the next 10 years, the upstream industry alone is going to be responsible for more than 400 thou**sand jobs** on an annual average, holding investments of approximately USD 180 billion and securing more than USD 600 billion to the public coffers (considering Royalties, Income Tax, Special Participation, profit oil installments and investment obligations in Research & Development). The oil and gas industry is considered to be one of the most dynamic in the Brazilian economy, and guarantees the country an important position in the global market.

BRAZIL IS THE EIGHTH LARGEST OIL PRODUCER IN THE WORLD, THE EI-GHTH LARGEST CONSUMER, IN ADDI-TION TO HAVING THE NINTH LARGEST REFINING PARK. Oil and derivatives exports is one of the highlights in the Brazilian trade balance,

with revenues exceeding US\$ 54 billion in 2023⁴. Over the last eight years, the oil and derivatives segment generated more than US\$ 110 billion in trade surplus, being crude oil the third most important item in terms of value. Data from the Industry National Confederation (CNI)⁵ show that the O&G industry accounted for approximately 10% of industrial GDP in 2020.

Brazilian oil and natural gas industry's robustness results of opening the Exploration & Production (E&P) segment, which began in the 1990s and, more recently, of opening the natural gas and refining market. With effect since the 1997, the Petroleum Law, revised Petrobras' monopoly of the market, which led to the entry of new agents. This important milestone brought more company competition and diversification, reducing risks and providing an attractive business environment for investments, generating more jobs and income. Over the last 20 years, oil production went from just over 1 million barrels/day to 3,4 million barrels/ day⁶ . Brazil, which imported around 90% of the oil it consumed in the early 1970s, is a

A NET EXPORTER WITH A BALANCE OF MORE THAN 1 MILLION BARRELS/DAY. The initial opening movement took place with the presence of companies with diversified experiences, both national and foreign, while Petrobras tried focusing on activities in deep waters due to its high potential and the expressive results achieved.

Brazil currently has 84 groups in the upstream segment, 45 of which are national, with different sizes and acting profiles. Independent companies were responsible for 4% of national production in 2023 - around 237,000 barrels per day. According to a WoodMackenzie7 and 8 report, independent operators will invest US\$ 10 billion in projects foreseen until 2027, increasing these assets' production, which should reach a peak of 485 thousand barrels per day in five years. These companies are expected to increase these assets remaining reserves by 980 million barrels of oil equivalent (boe), a significant volume for those investing in projects to revitalize production.

Data taken from the Oil National Agency (ANP) indicate that production per concessionary, excluding Petrobras, was around 35% in 2023, which represents approximately 1.2 million barrels/day⁹. Figure 1 shows the production evolution, as well as an increase in the number of players in the sector throughout recent decades.

Figure 1: Evolution of national oil production

Millions of barrels per day, 2000-2023





Source: Elaborated by IBP with data taken from ANP 10

The production increase levels also led the country to an important position in exports of oil and derivatives.

IN 2022, BRAZIL APPEARED AMONGST THE LARGEST EXPORTERS OF OIL AND DERIVATIVES, WITH A TOTAL OF 1,9 MILLION B/D SENT ABROAD, AS SHOWN IN FIGURE 2.

Figure 2: Oil and derivatives exporters

Millions of barrels per day, 2022



Source: Elaborated by IBP with data taken from ANP and Energy Institute

⁹ 2022, ANP. Dynamic Panel. Available in: https://app.powerbi.com/view?r=eyJrljoiNzVmNzI1MzQtNTY1NC00ZGVhLTk5N2ltNzBkMDNhY2IxZTIxliwidCl6ljQ00TlmNGZmLTI0YTYt-NGI0Mi1iN2VmLTEyNGFmY2FkYzkxMyJ9

¹⁰ 2022, ANP. Dynamic Panel. Available in: https://app.powerbi.com/view?r=eyJrljoiNzVmNzI1MzQtNTY1NC00ZGVhLTk5N2ItNzBkMDNhY2IxZTIxliwidCl6IjQ00TlmNGZmLTI0Y-TYtNGI0Mi1iN2VmLTEyNGFmY2FkYzkxMyJ9



THE OIL AND GAS INDUSTRY IN THE ENERGY TRANSITION CONTEXT

Brazil has a privileged position in the energy transition discussions with a **share of more than 49.17% of renewable energies** in its energy matrix¹¹ - the world average, being less than 20%¹². Considering the electrical matrix, renewables correspond to 87%, while the world average stands at around 30%¹³. These data show how rich and diverse the energy sources are in Brazil.

The country's oil and natural gas industry also has competitive advantages in terms of energy transition, ensuring a strategic position in the global industry. Even though the world must move towards decarbonization, there is a consensus that **oil and natural gas will remain indispensable** to ensure energy supply and the well-being of the population in the years to come. Recent projections from the International Energy Agency (IEA) indicate that the global oil demand will be around 100 million barrels/day over the next decades. Even in a scenario that considers the already announced decarbonization targets, the global demand for oil will stay above 50 mb/d until 2050¹⁴. These projections clearly show that

A DECARBONIZED FUTURE WILL NOT BE A FUTURE WITHOUT OIL.

To address the global challenge of reducing emissions, oil and gas companies are already diversifying their investments to include new low-carbon technologies; implementing measures to reduce emissions associated with their operations; and prioritizing types of oil with lower carbon intensity. This is the case in Brazil: the country's oil production is characterized by a lower carbon intensity per barrel than most other producing countries, as per Figure 3.

Figure 3 – CO2 emission rate per barrel (2019)



kgCO₂/boe

Source: 2022, BP

Large world oil producers, such as Canada, Iran and Iraq, have CO2 emission rates per barrel considerably above the global average. In a medium- and long-term scenario, the lower emission rate of Brazilian oil, tends to benefit Brazil as a producing country.

Another competitive lead for Brazil relies on its emission profile. While in most countries, the energy industry is the main responsible for CO2 emissions, in Brazil, **most of the CO2 emissions come from agriculture and the change of land and forest usage**, as per Figure 4.

Figure 4: Annual Greenhouse Gas Emissions by Sector

1990-2019, Gigatons of CO₂ equivalent (GtCO₂e)



(*)) Includes emissions from activities related to heating buildings, manufacturing, transport and construction. Source: Elaborated by IBP with data from Financial Times and SEEG (2022)

The data shows that **decarbonization policies aimed at land and forest usage, and agriculture, tend to be more effective** in meeting the country's decarbonization commitments.

One aspect of energy transition in which the oil and gas sector can make significant contributions is in developing decarbonization technologies. Brazil has examples, such as projects of carbon capture, use and storage (CCUS)¹⁵ mechanisms, as well as the offshore wind potential, and green hydrogen development projects.

The industry companies in Brazil have extensive experience and a privileged position for technological development of offshore wind. The Brazilian coast length, as well as the wind currents, particularly in the Northeast of the country, are important differentials for expanding this energy source. At present time, **Brazil has almost 170 GW** of offshore wind energy projects with an open environmental licensing process at IBAMA¹⁶.

Another example is the CCUS Program, developed in the pre-salt fields by Petrobras, as a pioneer innovation, is the largest off-shore CO2 reinjection program in the world. The company also has a commitment to reinject 80 million tCO2 by 2025 in CCUS¹⁷ projects.

In terms of green hydrogen¹⁸, Brazil stands out due to the high share of renewable sources in its electrical matrix. This way, **the country has great competitive potential as an exporter**, thus, attracting the interest of several international players who have already signed an agreement for future production in the country.

To meet the climate goals and ensure the energy supply necessary for its economic development, it is important for Brazil to maintain a plural, diversified, balanced energy matrix with a high percentage of renewable sources. The energy transition process is a great opportunity for generating wealth through oil and gas resources exploration in Brazil. Our current moment is crucial to define the sector's trajectory in the country for the upcoming years.

For the refining segment, it is necessary to develop a modern regulatory process, including the new technological routes for biodiesel production, a strategy that has already been successfully adopted in several countries, enhancing and extending the useful life of the Brazilian refining park by starting to produce fuels with lower carbon levels. These technologies generate additional use of renewable biomass in Brazil, in addition to logistic optimization and more competition between different products with benefits in terms of price, quality and availability to consumers.



INDUSTRY'S PRIORITY AGENDA

THE OIL EXPLORATION & PRODUCTION SEGMENT

The investment cycle in the oil and gas industry is long, with a significant time gap between the start of investments in exploratory activities, and the start of production and revenue generation, as per Figure 5. Thus, investments in the sector have a long maturation period - five to seven years, on average - before an economically viable resource can be discovered. The production cycle can reach up to 35 years. It is also worth mentioning that, until the start of production, the projects operate with no revenue. This characteristic of a more prolonged phase of investments reflects the importance of tax regimes and legal security to attract new investors and maintain the existing ones.

The decommissioning stage consists of the permanent closure of operations and involves the abandonment of wells, the removal of structures, the proper management of materials and waste, and the environmental restoration of the area¹⁸.

According to a study by the Rio de Janeiro State Department of Economic Development in 2019, the closure activities of 21

Source: Elaborated by IBP with data taken from ABESPETRO (2022)

Figure 5: Typical investment cycle for E&P

¹⁸ 2022, FGV. Aspectos técnicos por trás das atividades de descomissionamento.



oil platforms in the Campos Basin had the potential to generate 50,000 jobs over a period of 4 to 5 years. A similar survey applied to Espírito Santo, carried out in 2020, concluded that projects in this phase could generate the opening of 2,000 direct and indirect jobs over a period of five years in the state¹⁹ and that each decommissioned onshore oil well could generate around 55 direct jobs²⁰.

Competition between countries to attract new investments in E&P takes place by designing tax and regulatory systems that are attractive and stimulate competition. This aspect is especially sensitive when it comes to Brazil, which has complex tax regimes, affecting competitiveness with international competitors.

To partially offset tax asymmetries in comparison to other countries, and ensure competition in the industry in Brazil, the REPETRO²¹ customs regime has been implemented. Established in 1997, **REPET-RO was the way designed to give Brazil the same fiscal treatment** used by other countries, without burdening investments or taxing revenues arising from production.

Without the presence of REPETRO, equipment purchased in the investment stage would suffer a significant increase in value due to customs taxes, which would make most of the exploration and production projects in Brazil, including the presalt, economically unfeasible. Thus, maintaining REPETRO is essential to ensure industry competitiveness in Brazil during exploratory stage – which concentrates investments to discover oil and gas fields and develop production – a stage in which there are no revenues from selling the oil.



CONSIDERING ONLY THE EXPLORATION & PRODUCTION (E&P) STEP, THE IBP PRO-JECTS MORE THAN 344 THOUSAND JOBS, ON THE ANNUAL AVERAGE UNTIL 2033. THE ESTIMATE POINTS TO MORE THAN US\$ 173 BILLION IN INVESTMENTS IN THIS PERIOD.

Without REPETRO, the industry would fail to generate almost US\$ 130 billion in investments over the next 10 years, and 322 thousand jobs, on an annual average, would no longer be provided. For this reason, **maintaining REPETRO is essential for the country's competitiveness and for the sector as well.**

It is important to point out that REPETRO does not represent a subsidy or tax waiver, but rather the taxation transfer from the initial investment step to the effective production step. This model follows the best practices observed in other major oil producers, such as United States, Canada and Norway.

Based on this entire context and the rationale outlined above, REPETRO was maintained until 2040 for CBS and IBS in the tax reform through Complementary Law 214. However, considering the long transition period, it is crucial that the current REPET-RO legislation, both at the federal and state levels, is not changed.

 ¹⁹ 2021, FGV. Descomissionamento offshore no Brasil: oportunidades, desafios e soluções.
²⁰ 2020, Fórum Capixaba de Petróleo e Gás. Disponível em: https://clickpetroleoegas.com.br/2-mil-empregos-serao-criados--no-espirito-santo-decorrentes-de-desativacoes-de-campos-de-petroleo-e-descomissionamento-de-plataformas/
²¹ O REPETRO é o regime aduaneiro especial de exportação e de importação de bens destinados às atividades de pesquisa e de lavra das jazidas de petróleo e de gás natural Nevertheless, contrary to the principles of tax reform, the E&P sector was the target of the creation of a Selective Tax on oil and gas extraction, which represents a disincentive to investment, especially given the already high tax burden on the industry.

From a regulatory point of view, it is important to strengthen the participation of regulatory agencies by maintaining definitions based on technical criteria, speeding up processes, promoting broad debate with social participation and assertive supervision of regulated activities, thus, ensuring a healthy and transparent business environment that also protects customers interests.

Another priority agenda should be improving the environmental licensing process. Given the industry specificities and the large volume of activities occurring in the exploration and production of oil and gas, celerity, regulations and standardization are still necessary.

The current international oil market context - in which energy security is increasingly relevant and has intensified competition - reinforces **the importance of developing fiscal and regulatory frameworks to maintain and increase the country's attractiveness.** In this context, the existence of instruments that ensure competitiveness, such as REPETRO, the stability of legal and regulatory framework and the improvement of environmental licensing are essential matters.



THE NATURAL GAS SEGMENT

In the context of the energy transition, natural gas plays an increasingly strategic role in the national energy mix, due to its potential to replace other more polluting fossil fuels used in industry and transportation, and due to its complementarity with renewable sources in electricity generation, promoting the security and resilience of the electricity supply.



NATURAL GAS EMITS ABOUT 45% LESS THAN COAL AND 29% LESS THAN DIESEL²⁰.

According to estimates by the Energy Information Administration (EIA), Brazil has great potential for increasing the share of natural gas in its energy mix. However, the use of this input and the viability of investments depend on the development of a broad and competitive market, with clear and stable rules, to promote the entry of more agents and investors. Estimates of the 2031 Ten-Year Energy Plan by the Energy Research Company (EPE) indicate that the natural gas net production, which in 2021 was 64 million m3 /day, could reach the mark of 136 million m3 /day in 2031. The expectation of an increase in natural gas production is associated with investment decisions that have matured in recent years, especially after the publication of Law 14.134/2021 (the New Gas Act). In addition, a substantial increase in infrastructure investments is expected in the coming vears, as shown in Exhibit 6.

Figure 6: Investments planned until 2034¹

Rating	Indicatives	
	Projects	R\$ bi
Drainage Pipelines	3	10,2
Transport Pipenlines	2	0,77
Compressor stations	2	0,15
LNG Regasification Terminals	1	0,3
UPGNs and Hubs	2	2,42
TOTAL	10 bi	13,84 bi

Fonte: (1) EPE 2022 (PDE 2031).

²⁰ Comparison using emissions in Kg of CO₂ per million of British Thermal Unit (BTU) based on data available in: https://www.eia.gov/environment/emissions/co2_vol_mass.php



Until recently, the natural gas chain. However, with the sale of Petrobras' transportation and distribution assets and other measures stemming from the Termination Commitment Agreement (TCC) signed between Petrobras and the Administrative Council for Economic Defense (CADE) and the implementation of Law 14.134/2021 (New Gas Act), new players have started working in the supply and demand of gas, as well as in the operation of transportation and distribution infrastructures, generating more competition and more business opportunities.



THE MAIN PURPOSE OF THE NEW GAS ACT AND SECONDARY REGULATION UNDER IMPLEMENTATION AT THE FEDERAL AND STATE LEVEL IS TO STIMU-LATE COMPETITION AND THE DIVERSIFICATION OF SOURCES AND AGENTS IN THE SUPPLY, INCREASING THE AVAILABILITY OF GAS FOR THE MARKET AND ITS COMPETITIVENESS FOR THE END CONSUMER.

The regulation improvement by ANP, the reconciliation of state regulations and tax adequacy, are elements still in progress and vital to attract investments in the sector.

In 2024, we made important progress in the sector, such as the start-up of the "Route 3" gas pipeline, which will supply up to 18 MMm3/day, and the final investment decision (of approximately US\$9 billion) for the development of the Raia field, operated by Equinor (35%) in partnership with Petrobras (30%) and Repsol (35%). Expected to start operating in 2028, this field alone will supply 16 MMm3/day, equivalent to 30% of Brazil's steady natural gas market.

The year 2024 was also marked by the signing of the first contracts to import Argentinian natural gas, via the existing infrastructure in Bolivia and the Bolivia-Brazil gas pipeline. Two new LNG regasification terminals were also inaugurated in 2024 (in Santa Catarina and Pará), and the Sergipe regasification terminal was connected to the transportation network.

These advances not only strengthen the country's energy security by increasing the domestic supply of natural gas and diversifying sources of supply but also demonstrate the commitment of exploration and production (E&P) companies to the development of the natural gas sector in Brazil. A commitment that reflects the understanding of the strategic role of natural gas for a fair, balanced, and safe transition.

²¹ The Administrative Council of Economic Defense (Cade) is a federal autarchy, affiliated to the Department of Justice, with

headquarters and jurisdiction in the Federal District, which exercises, throughout the national territory, attributions given by Law nº 12.529/2011.

THE DOWNSTREAM SECTOR

Refining, production of lubricants, logistics and distribution of oil and biofuel byproducts play an essential role in the workings of the Brazilian economy by securing national supply. The sector's performance is directly related to energy security, freight and passenger transportation, urban mobility, competitiveness of national industry, integration of regional markets, and the country's macroeconomic stability.

The **Downstream sector** is the part of the oil and gas chain that **connects this industry to others**, such as agribusiness. It also **holds a direct communication channel with consumers** through the regular delivery of fuels and lubricants, ensuring that these products reach their final destination efficiently and reliably.

REFINING

Even though Brazil has important comparative advantages, such as the 9th largest refinery in the world, an abundance of biomass and recognized expertise in producing biofuels, **the challenge lies in putting this potential into practice on a productive and competitive scale**, both nationally and internationally. The accumulated knowledge must be used to expand the supply of products such as green diesel, sustainable aviation fuel (SAF), second-generation ethanol and lubricants based on renewable sources - the so-called green lubricants - and consolidate the country's leading role in the energy transition. The recent passing of the **Fuel for the Future Act** was an important step in this direction. By setting targets for reducing carbon intensity, extending blending mandates and encouraging innovative technological routes, the new legislation represents a regulatory framework in line with sustainable development goals and international best practices.

LOGISTICS

Despite its strategic importance, the sector faces a **significant logistics infrastructure deficit**. The gap between the growing demand for liquid fuels and the existing infrastructure has led to logistical bottlenecks, higher operating costs and increased exposure to supply risks, requiring investments of around BRL 130 billion in sector and multi-sector infrastructure to secure supply by 2035.

The need for investment is becoming even more urgent due to the challenges the energy transition poses and increasingly severe climate events. The fuel sector is at the heart of transformations aimed at decarbonizing the transportation grid. Modernizing the refining park, adapting it to process renewable cargoes and developing compatible and resilient infrastructure in this new scenario will require significant planning, regulation and financing efforts. In this context, it is worth highlighting the positive externalities of investments in infrastructure: every BRL 1 invested in logistics infrastructure generates a total impact of BRL 3.82 on GDP, in addition to generating jobs and income.

Other advances are worth highlighting, such as **the tax reform and the concentration of taxes** on fuels, such as discussions aimed at defining persistent debtors.

However, policy success lies not only in a **technical and modern regulation**, but mostly in a **dynamic, ethical and transparent business environment** that allows for investment predictability. Promoting **competitive equality among agents**, preserving fair competition in the sector and encouraging innovation and better services for consumers.

It is worth pointing out that in a globalized world, in which capital seeks stable and efficient environments in which to establish itself, the **business environment is crucial**. Brazil must demonstrate consistency in its energy strategy, ensuring attractive conditions for private and public investment, focusing on sustainable industrialization and on making the most of its natural and technological resources.

The Downstream sector, with its solid technical foundation and operational capillarity, is ready to provide **solutions that combine efficiency, sustainability and regional development.** It is vital that the state, the private sector and society act in a coordinated manner, around a common agenda that strengthens supply, promotes innovation and positions Brazil as a leader in the new energy economy.



CONCLUSION

The oil and gas industry plays a strategic role in Brazil both from an energy and a socioeconomic point of view, considering its ability to attract investments, as well as generate jobs and income. The industry's robustness is associated with great changes that have occurred in recent decades towards its opening, which have increased competitiveness and turned Brazil into a highly relevant player in the international market. The contribution to the public sector is extremely relevant as well. According to ANP's calculations, Union, states and municipalities should collect R\$ 90 billion in royalties and special participations in 2024, R\$ 99 billion in 2025, R\$ 108 billion in 2026, and R\$ 105 billion in 2027. In 2024 alone, for instance, the states shall collect R\$ 28 billion, while municipalities are expected to collect R\$ 20 billion. The remaining revenues (R\$ 42 billion) are divided between resources from the Union and the Special Fund.

The energy transition process also unfolds a series of opportunities for Brazil due to some specific characteristics of the country: the unique emission profile, the high share of renewable sources, as well as the relatively low carbon intensity in oil production give the country the possibility of being a protagonist in this industry. In this context, the industry can be an important ally through its contributions focused on technological solutions, such as offshore wind, CCUS, geothermal and green hydrogen.

It is also important to highlight that **bringing these opportunities to reality also depends on an attractive business environment**, which must go through setting up a legal, tax and regulatory system that promotes the sector competition.

| 0&G Sector General Overview: An agenda for the future



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