INSTITUTO BRASILEIRO DE PETRÓLEO E GÁS

BRAZILIAN CHAMBER OF COMMERCE IN GREAT BRITAIN

BRAZIL OIL & GAS SCENARIO:HOW THE COUNTRY IS ADDRESSING THE ENERGY TRANSITION

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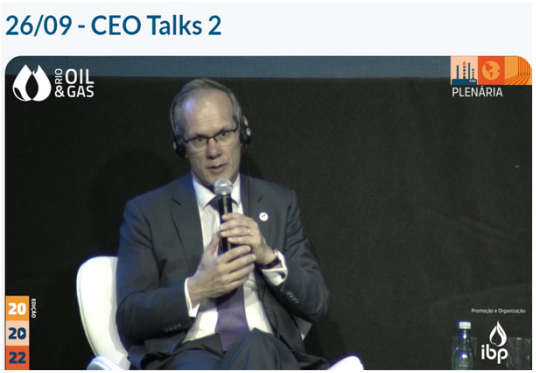
CEO

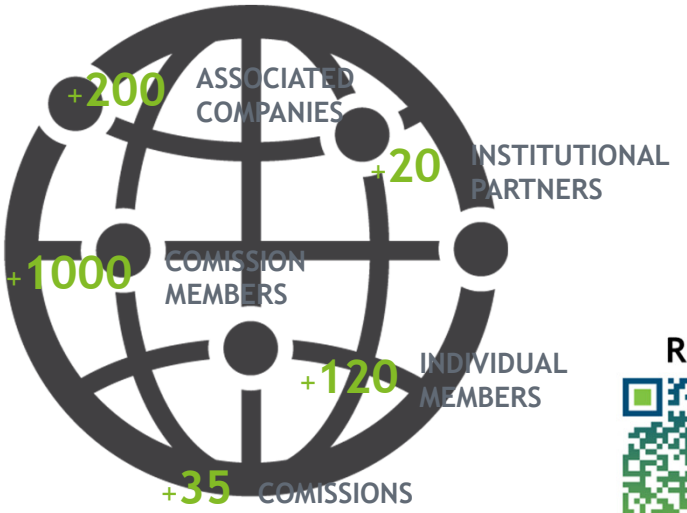
#IssoGeraEnergia

February 25th, 2025

About the IBP

Active for more than 66 years, the Brazilian Institute of Oil and Natural Gas (IBP) serves as the institutional representative for the oil and gas sector in Brazil





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With more than 40 years of experience, IBP organizes the biggest and most important oil & gas and energy congresses, exhibitions and forums. There are an average of 25 events per year, bringing together market professionals, authorities, industry representatives, the press, young professionals, and students.

The events organized by IBP have a high technical level recognized by the market and present the latest in innovation, technology, decarbonization and ESG, offering the perfect environment for networking and doing business among all agents of the energy chain.

IN 2025, IBP WILL KEEP CONNECTING THE INDUSTRY THROUGH MAJOR EVENTS.

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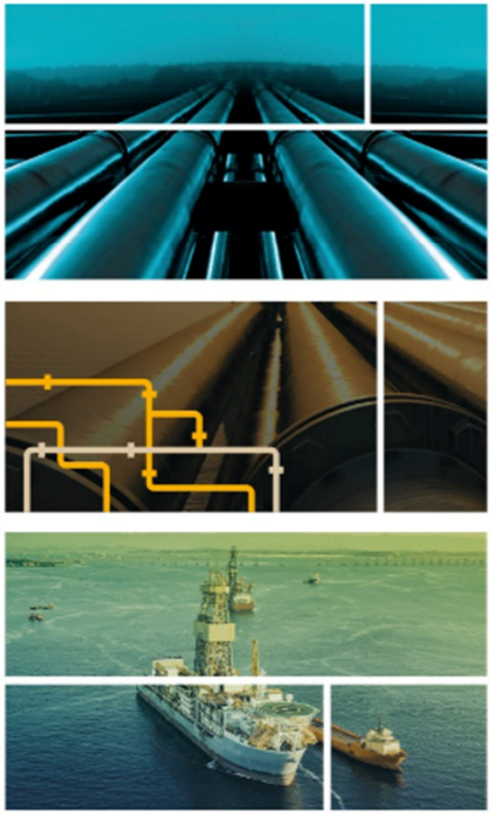

SEMINAR OF NATURAL GAS

May 14th and 15th, 2025
Fairmont Rio | Rio de Janeiro, Brazil

RIO PIPELINE
CONFERENCE & EXHIBITION

September 9th to 11th, 2025
ExpoMag | Rio de Janeiro, Brazil

OFFSHORE TECHNOLOGY CONFERENCE BRASIL

An event organized by IBP and OTC

October 28th to 30th, 2025
ExpoMag | Rio de Janeiro, Brazil

iup A gente diz sim ao futuro

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iUP IS IBP'S INNOVATION HUB

Our purpose is to foster collaboration and synergy between academia, companies, public authorities, and startups, driving innovation to meet the challenges of the O&G and energy sector, including decarbonization and energy transition, by exchanging knowledge, enabling partnerships, and creating business opportunities.

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- Matchmaking with companies in the sector
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- Energy School
- Exploration and Production School
- Natural Gas School
- Midstream and Downstream School
- Business School
- Technology and Innovation School

Brazil oil & gas value chain.

Economic impact of the sector

8º producer of oil in the world[1]

9º largest refining park[2]

17% Industrial Brazilian GDP [6]

8º Consumer world market [3]

45% of the offer Internal energy (OIE)[4]

2º largest producer global biofuels

> 1,6 million of direct and indirect jobs[5]

19 refineries
359 ethanol plants
50 Biodiesel producers
42 thousand gas stations
161 distributors
557 importers of oil and derivatives

upstream — *midstream* — *downstream*

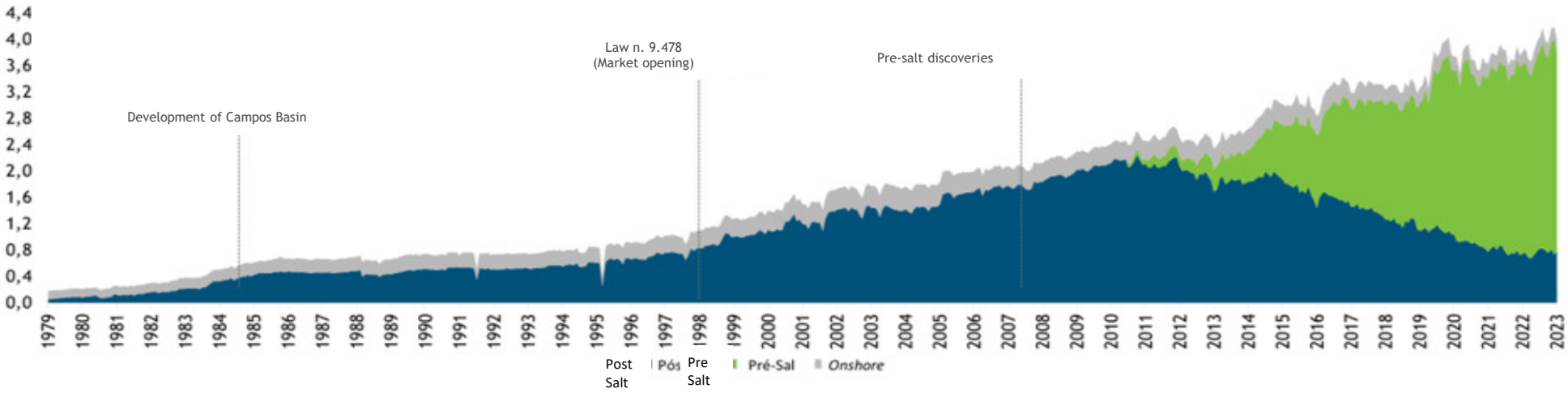
Exploration & Production (E&P)	Transport and Storage	Derivatives production and biofuels	Primary logistics	Distribution	Sales and B2B
 Biomass production	 Oil and gas E&P	 Marine transport	 Pipes and Terminals	 Refineries and Petrochemical Plants	 Biofuel production plants	 Cabotage	 Pipes and Terminals	 Bases and Terminals	 Tank trucks	 Ferries	 Railways	 Airports	 TRR	 Service stations

Notes:
(1) Energy Institute Statistical Review of World Energy 2024; (2) Energy Institute Statistical Review of World Energy 2024; (3) Energy Institute Statistical Review of World Energy 2024; (4) EPE BEN 2024; (5) Estimation based on CAGED data. Number of indirect positions estimated via the Input-Product Matrix multiplier; (6) CNI - 2023, latest data available
Source: IBP preparation based on BCG, IEA, CNI, BP, EPE and ANP data.

The opening of the oil & gas upstream market positively impacted the sector, expanding dramatically the production

Players Diversification → Risk reduction → Increase in investment capacity → Increase in reserves and production → More jobs and income generation

Brazilian oil production
1978, 2023*, million of barrels per day



Oil production grew significantly after the opening of the market due to the expansion of investment capacity

(*) Data up to March 2023
Source: IBP with data from ANP

Oil and natural gas production in Brazil by operator (2023)

Operador	Petróleo (bbl/d)	Gás Natural (Mm³/d)	Produção Total (boe/d)
Petrobras	2.999.322	137.717	3.865.534
Petro Rio	90.640	999	96.920
Equinor	88.634	216	89.989
TotalEnergies	46.139	1.663	56.601
3R Petroleum	41.320	1.494	50.717
PetroReconcavo	16.132	1.900	28.082
Shell	25.975	282	27.751
Karoon	24.769	202	26.036
Trident Energy	22.395	402	24.923
Eneva	351	2.993	19.174
Perenco	14.220	50	14.532
Enauta	7.466	53	7.801
Outras	1.864	1.429	10.855
Total	3.401.622	149.800	4.343.838

Fonte: Elaboração IBP com dados ANP

Oil and natural gas production in Brazil by concessionaire (2023)

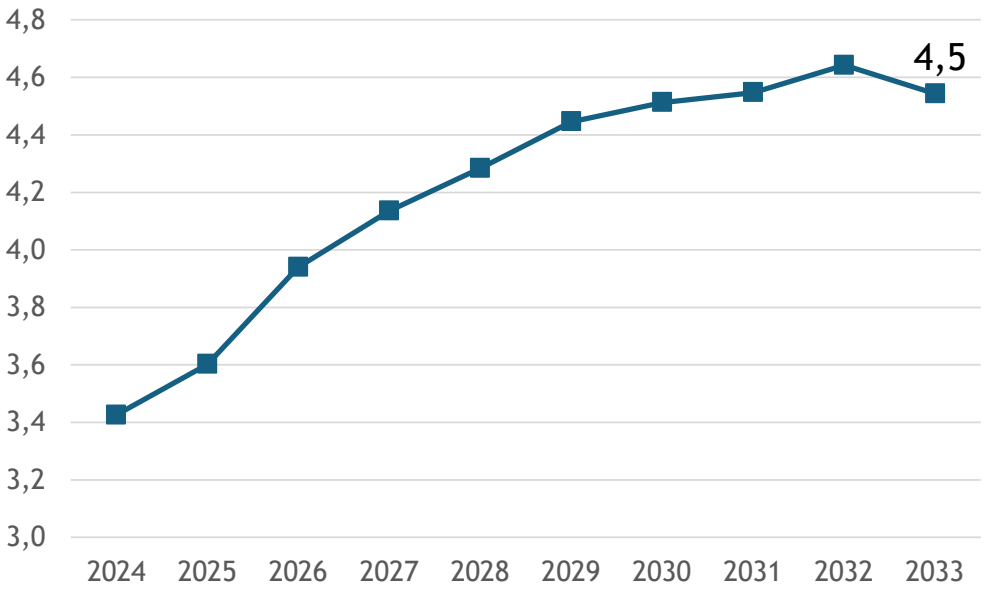
Oil Companies	Oil (bbl/d)	Natural Gas (Mm³/d)	Total production (boe/d)
Petrobras	2.166.245	99.356	2.791.175
Shell	381.754	17.430	491.382
TotalEnergies	137.619	5.797	174.082
Petrogal	101.845	4.557	130.510
Equinor	83.180	921	88.973
Petro Rio	83.997	2	84.008
Repsol Sinopec	57.990	2.524	73.867
CNOOC	66.083	1	66.088
Petronas	52.349	1.060	59.015
CNODC	43.092	2.276	57.406
3R Petroleum	28.756	1.491	38.136
Sinochem	35.453	86	35.996
QatarEnergy	26.861	773	31.723
PetroReconcavo	15.505	1.792	26.777
Karoon	24.769	202	26.036
Trident Energy	22.395	402	24.923
Eneva	351	2.993	19.174
Perenco	14.220	50	14.532
Enauta	7.536	827	12.736
Other	39.116	6.566	80.414
Total	3.401.622	149.800	4.343.838

Source: IBP with ANP data

Oil production continues its upward trajectory into the next decade, reaching 4.5 million barrels per day in 2033.

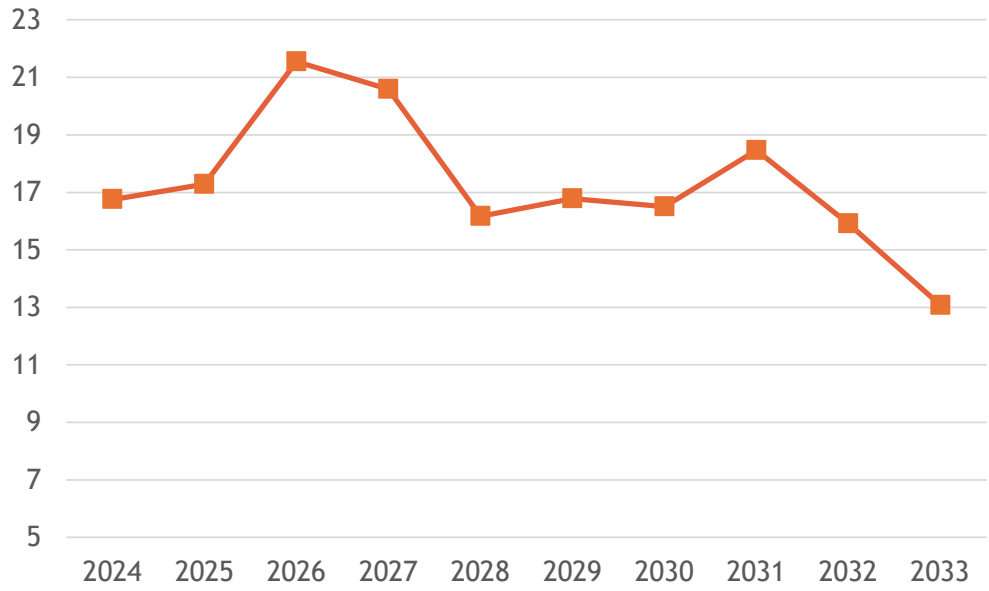
Evolution of oil production

2024-2033, millions of barrels per day



Investments in E&P

2024-2033, US$ billions



Volume of investments in E&P around $173 billion between 2024 and 2033.

.Source: IBP with data obtained from Vantage - IHS Markit

Investments, employment and research

5,2 MMbbl/d of oil in 2031.

US$183 billion in investments between 2022 and 2031.

400 thousand jobs will be supported by the sector on average until 2031.

US$200 billion in royalties and special interests will be raised between 2024 and 2031.

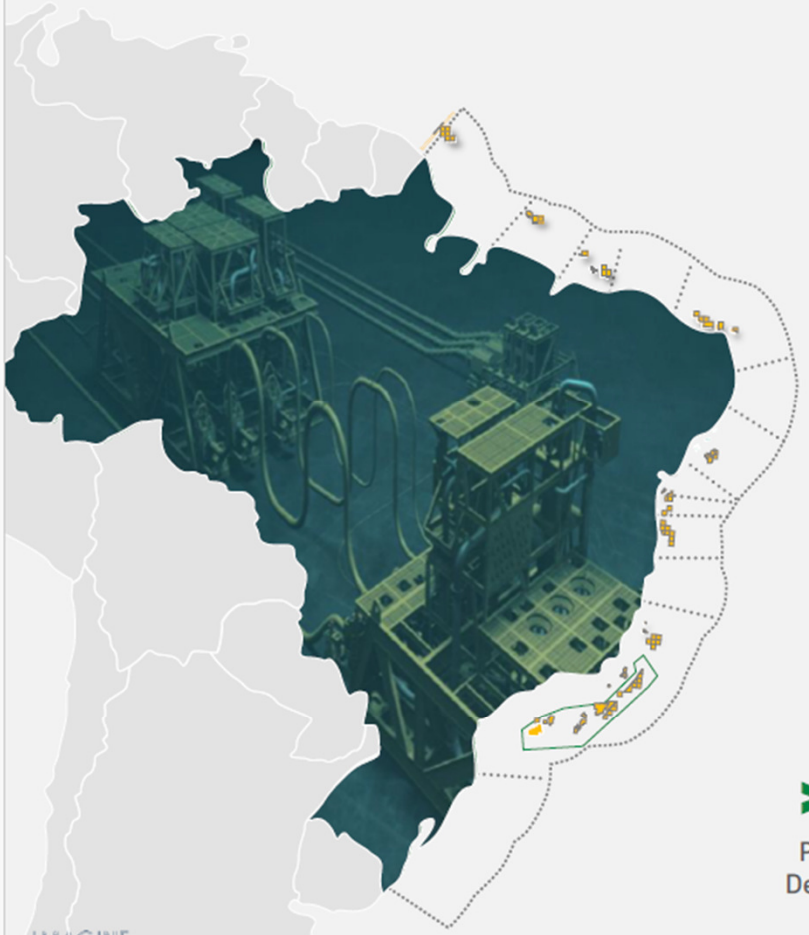
Research, Development and Innovation[2]

- **U$ 1 billion** in investments in 2024.
- **15%** of investments related to energy efficiency and renewable energy sources.

Source: (1) IBP, 2023; (2) ANP, 2024.

E&P INVESTMENTS IN THE NEXT 5 YEARS

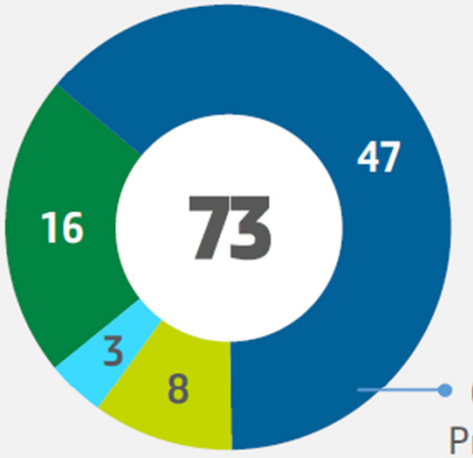
PETROBRAS



PETROBRAS STRATEGIC PLAN

CAPEX 2024–28

US$ Billion



>160
Production Development Wells

>211
Subsea Equipment

14
New FPSOS

>102
Complementary Projects (Brownfield)

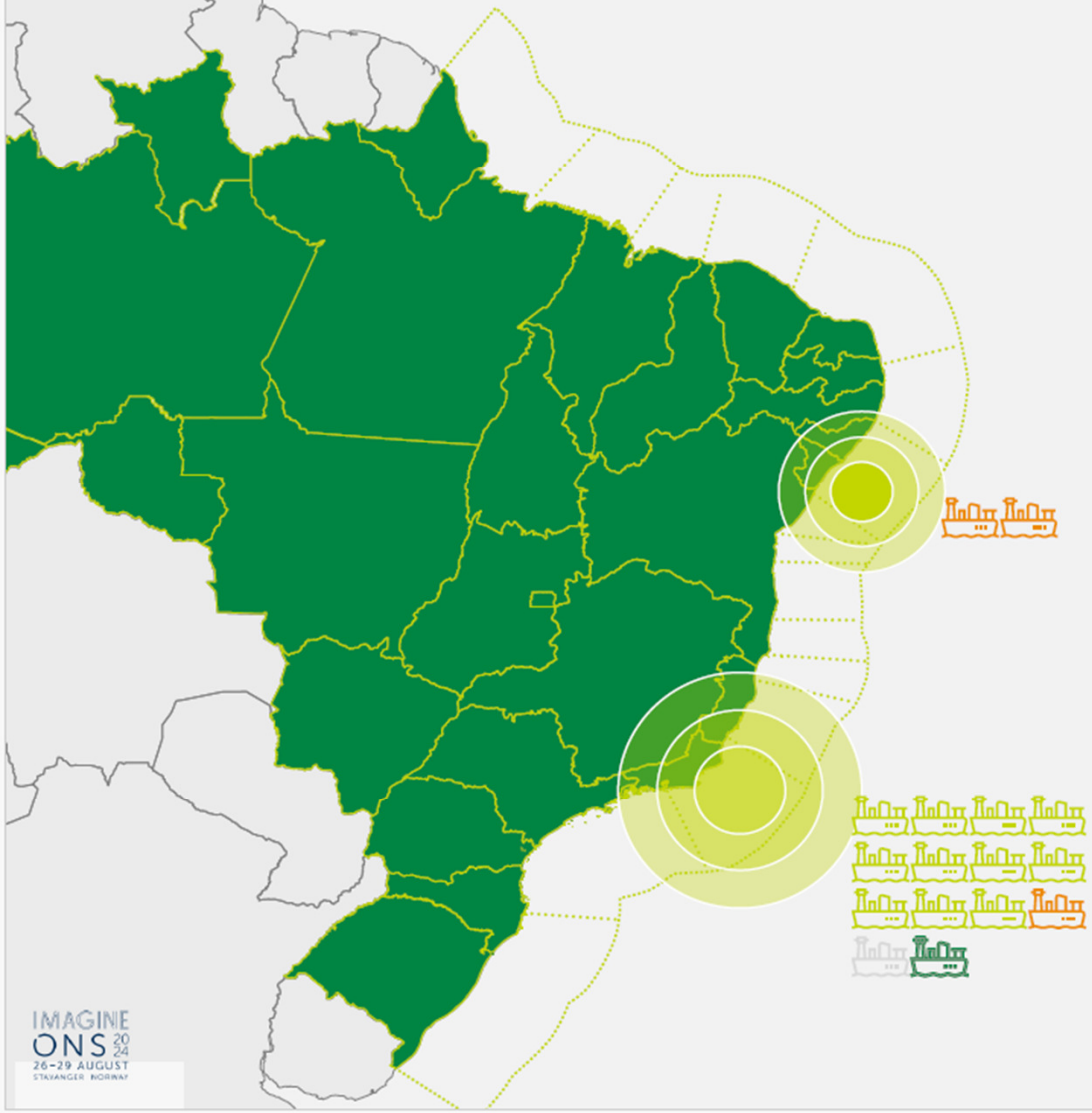
>4,000 km
1.092 km Rigid
1.018 km Flexible
867 km Umbilicals
1.063 km Optical Cables

23
Platforms to be Decommissioned

WE HAVE ALREADY SIGNED CONTRACTS FOR THE CONSTRUCTION OF 12 FPSOs

AND ARE WORKING ON THE PROCESS OF CONTRACTING AN ADDITIONAL 5 UNITS

PETROBRAS



UNDER CONSTRUCTION

P-78	P-79	P-80	P-82	P-83	P-84
P-85	FPMDC	FPMQT	FPTAM	FPAG	RAIA

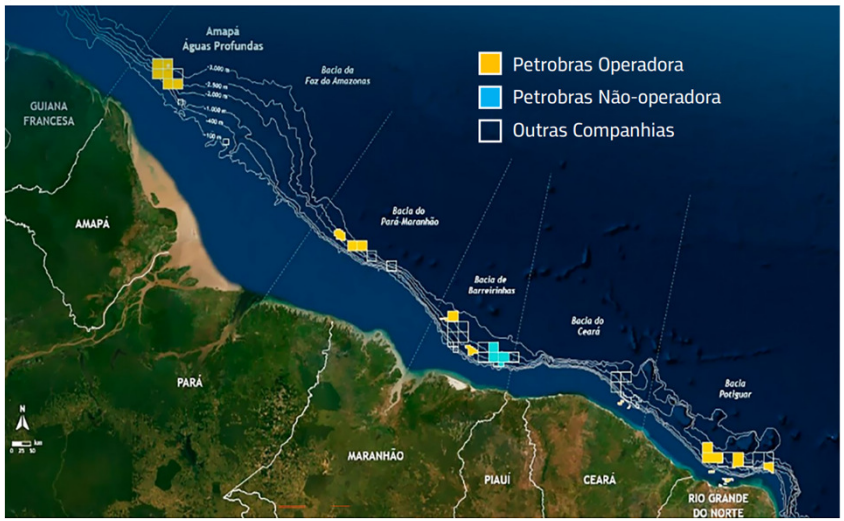
UNDER PROCUREMENT/ PREPARATION

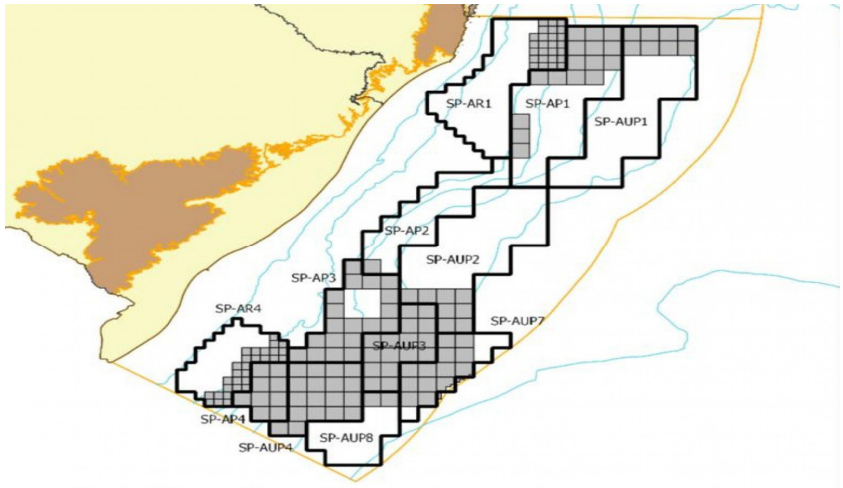
Revit BRC-CRT	SEAP 1	SEAP 2	Revit MLS-MLL	Revit AB	

- Pre-salt implemented/under implementation
- Post-salt under procurement
- Pre-salt under procurement
- Non-operated

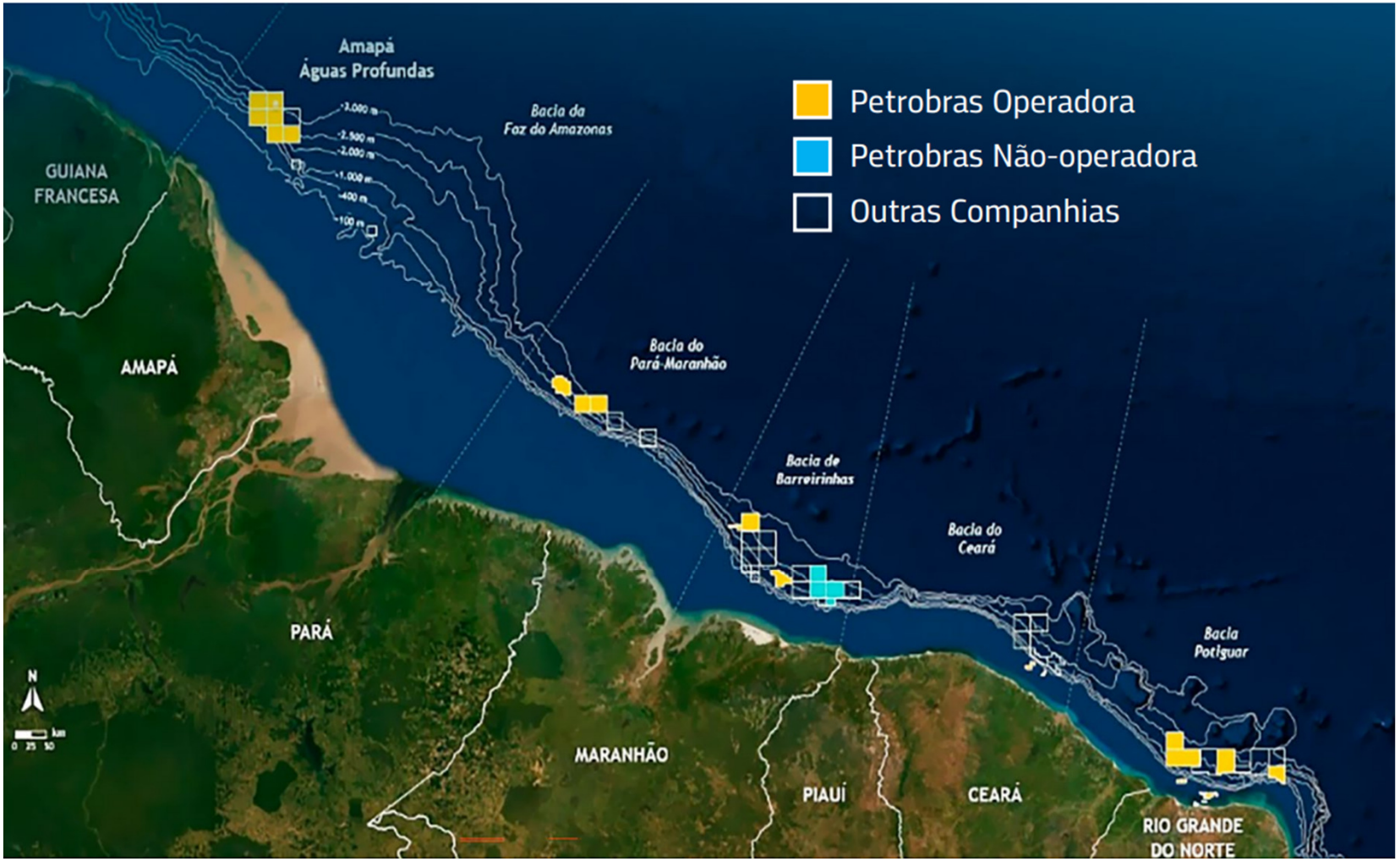
IMAGINE ONS 2024 26–29 AUGUST STAVANGER NORWAY

Pelotas and the Equatorial Margin





The Equatorial Margin



New exploration areas: Equatorial Margin

The first drillings in the Equatorial Margin occurred in the 1970s

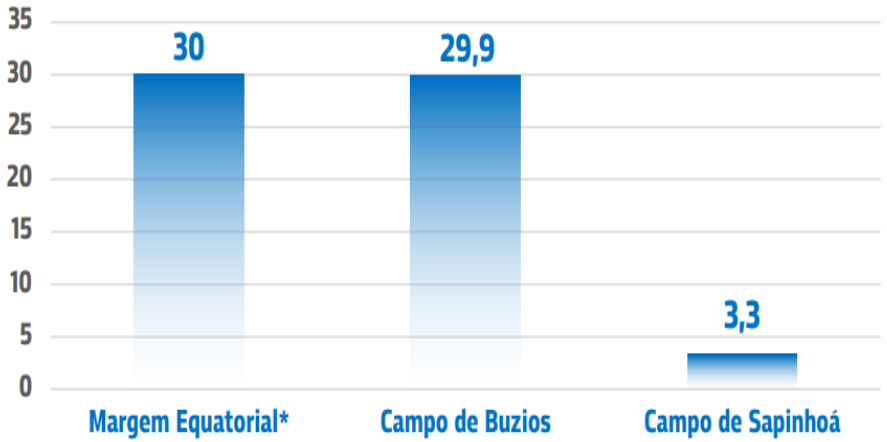
Most exploratory activities took place in shallow waters, however, there is an expectation of great potential in deeper regions;

Most of the exploratory blocks granted in the region are the result of the 11th Bidding Round of the National Agency of Petroleum, Natural Gas and Biofuels (ANP);

Oil exploration in the Brazilian Equatorial Margin has the **potential to add 1.106 million bpd** to the national production curve starting from 2029.

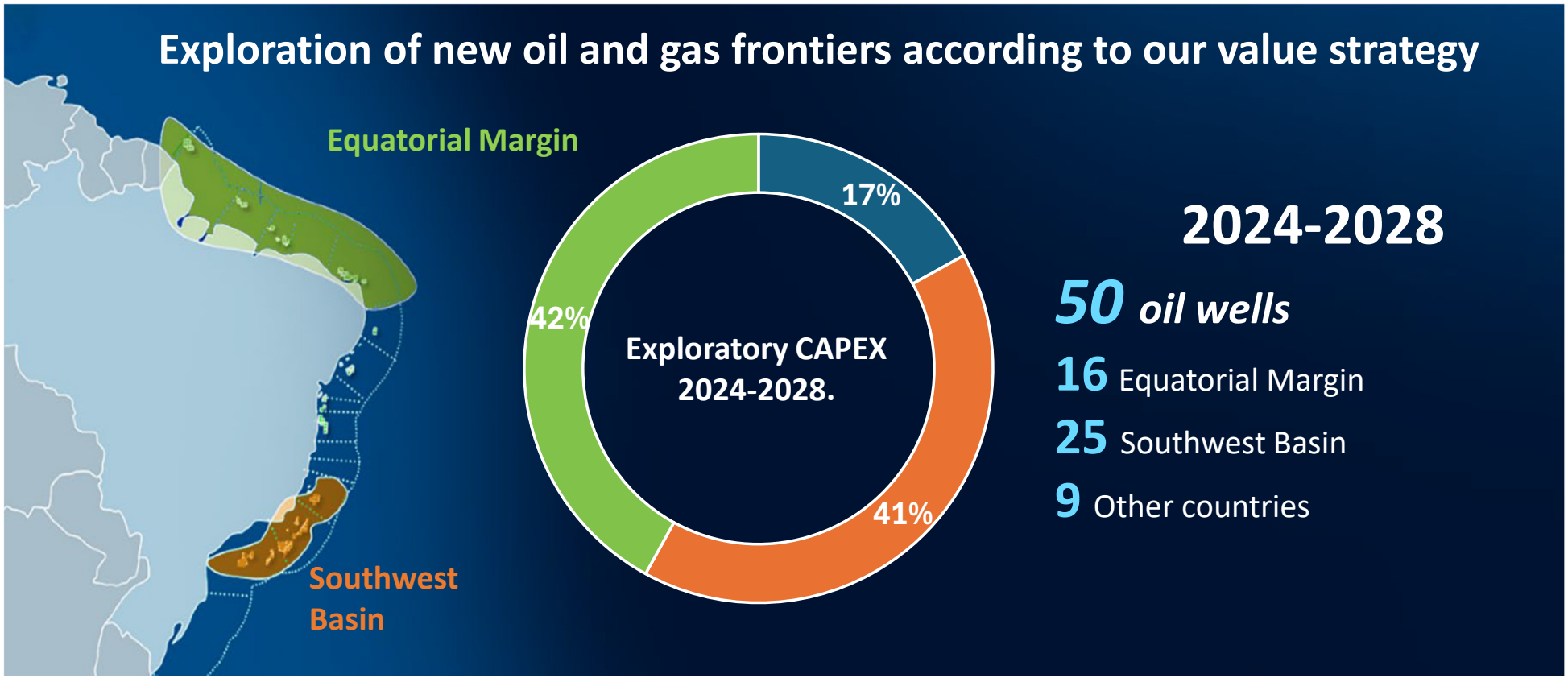
Production potential

Oil volume - in billions of barrels



The Equatorial Margin in Petrobras' 2024-2028 business plan

Total investments in exploration until 2028: **US$ 7.5 billion.**
Investments planned for exploration in the Equatorial Margin until 2028**: US$ 3.1 billion (41.5%).**



Pelotas Basin

20 thousand km2 in exploratory area in the South region.

Petrobras, in partnership with Shell, signed **26 concession contracts with ANP** for exploration in the Pelotas Basin.

The consortium will have Petrobras as the operator, with a 70% stake, and Shell with a 30% stake.

The expected investment is **R$ 1.5 billion.**

Upcoming bid rounds

The 5th Cycle of the Open Acreage of **Concession**

332 exploratory blocks in Campos, Ceará, Espírito Santo, Foz do Amazonas, Paraná, Parecis, Pelotas, Pernambuco-Paraíba, Potiguar, Santos and Tucano Sedimentary Basins.

June 17, 2025 in Rio de Janeiro

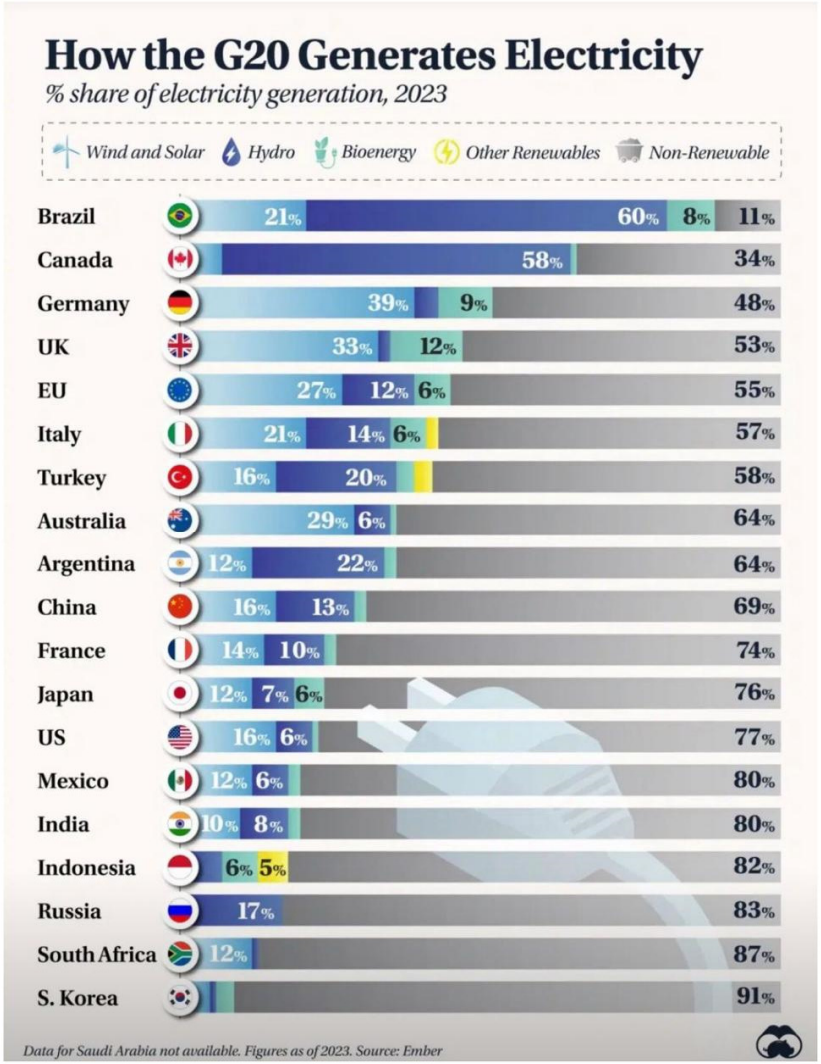
89 companies already registered

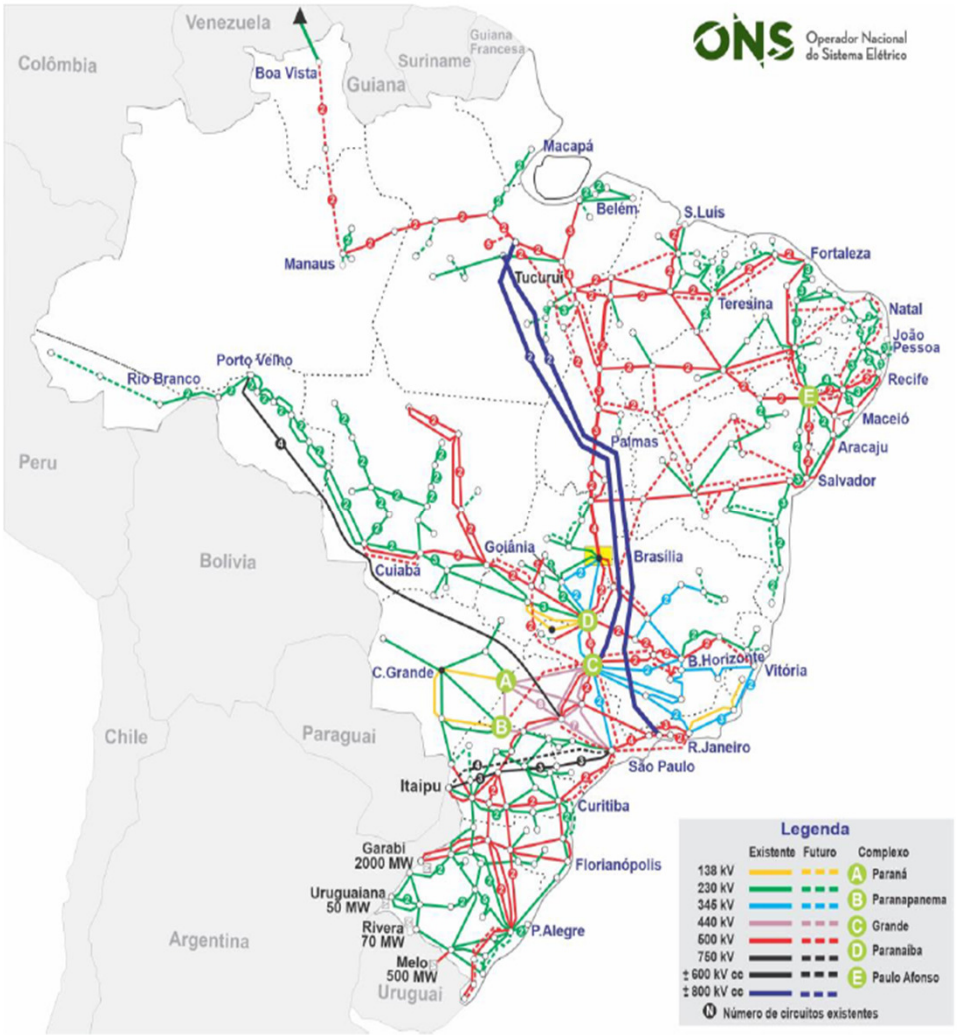
Upcoming bid rounds:
The 5th Cycle of the Open Acreage of **Production Sharing**

14 exploratory blocks at the pre-salt region (Campos and Santos Basins). Among them, Aragonita, Calcedônia, Cerussita, Rodocrosita, Malaquita, Opala and Quartzo

December 2025 (scheduled)

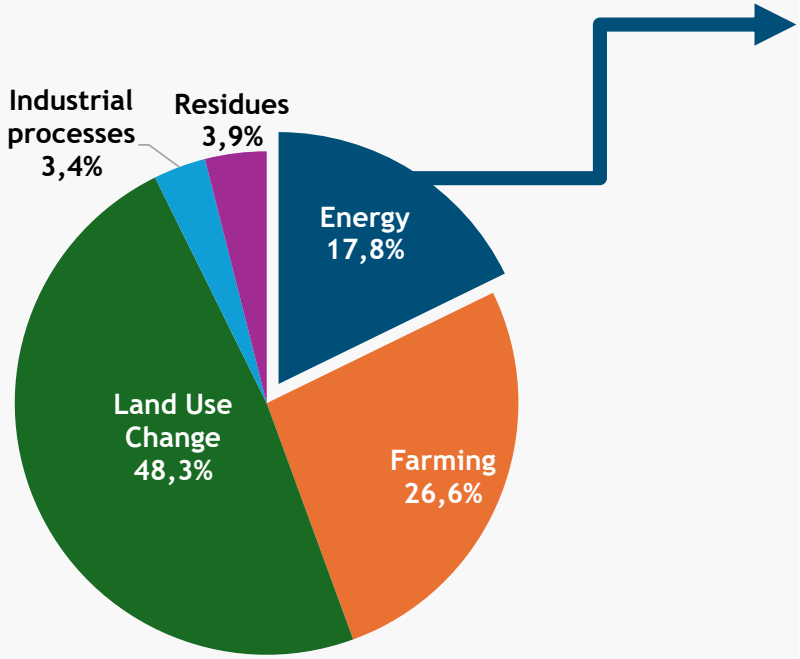
G20 Countries and Electrical Generation





Profile of CO2e Emissions in Brazil in 2022

CO2e emissions in Brazil by sector 2022, %



(*) Percentages of total emissions in 2022

CO2e Emissions of Categories in the Energy Sector

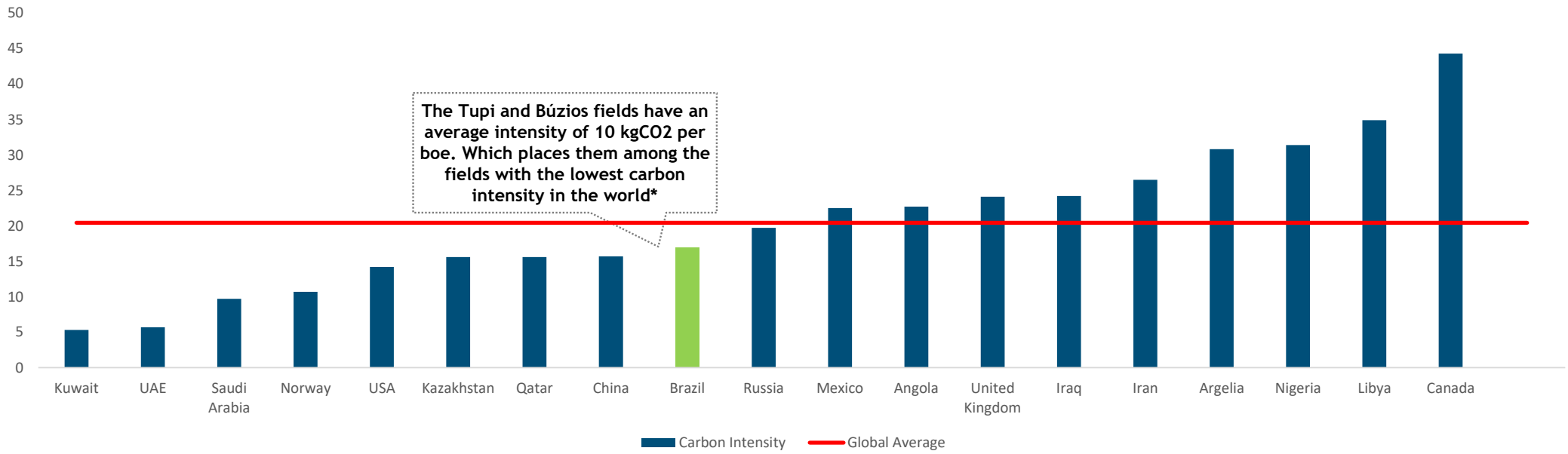
Categories	10^6 ton. CO_2e	%*
Transport	**216,88**	**9,35%**
Industrial	**67,68**	**2,92%**
Fuel production	**54,29**	**2,34%**
Oil refining	25,82	1,11%
Oil and natural gas exploration	22,56	0,97%
Transportation of oil and natural gas	2,21	0,10%
Production of mineral coal and others	1,72	0,07%
Alcohol production	1,29	0,06%
Charcoal production	0,67	0,03%
Residential	**27,23**	**1,17%**
Electricity generation (public service)	**22,18**	**0,96%**
Agriculture	**21,24**	**0,92%**
Commercial	**2,13**	**0,09%**
Public	**0,86**	**0,04%**
Total Energy Sector	**412,49**	**17,79%**

Brazil has a unique profile in terms of CO2e emissions. O&G exploration and refining segments represent only 2.1% of total CO2e emissions

Source: SEEG, 2024.

Brazilian oil has a lower carbon intensity than the global average, an important characteristic in a transition context

Average carbon intensity of oil production 2019,
kgCO2/boe



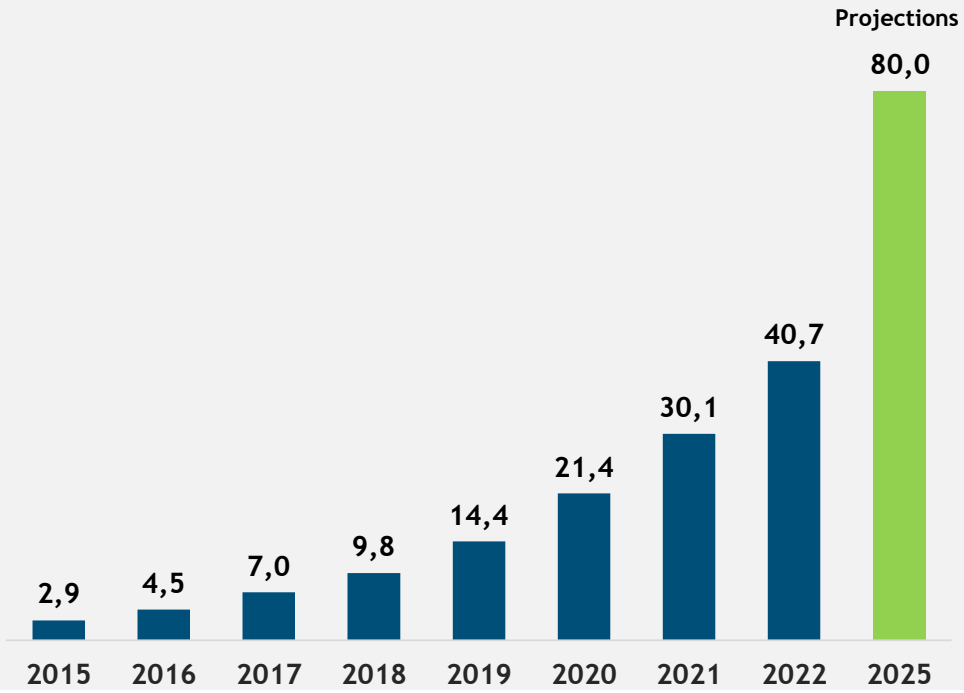
Source: BP

Considering the demand for oil over the next few decades, producing a barrel with lower carbon intensity is an important competitive advantage in the context of decarbonization.

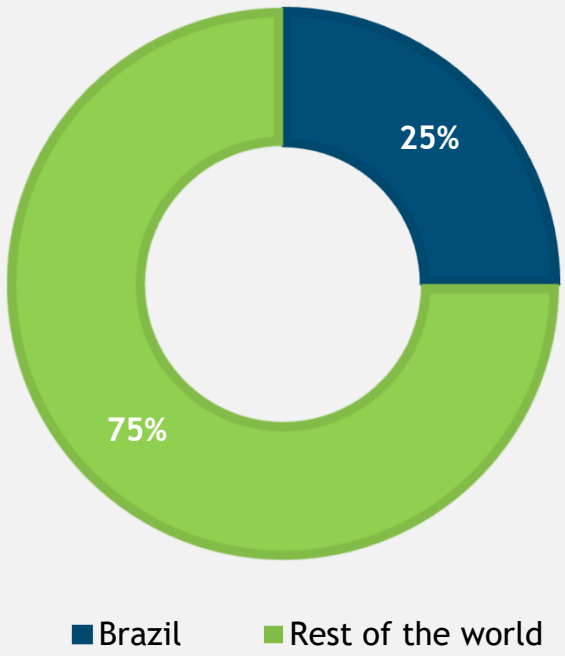
(*) Nota: Revista Digital Oil & Gas Brasil Online em 03 de maio de 2022.

Brazil in the Energy Transition: CCS Projects

Accumulated CO_2 reinjection in Brazil
Millions of tons of CO_2, 2015-2025



Brazil's share in global CO_2 capture capacity in 2022



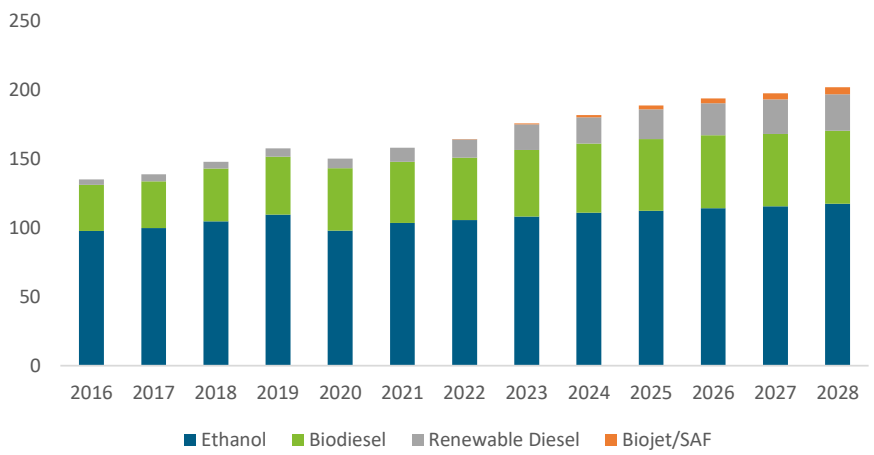
Source: IBP, based on data from the Global CCUS Institute and Petrobras

The global demand for biofuels is projected to witness a 23% increase, reaching 200 billion liters by 2028.[1]

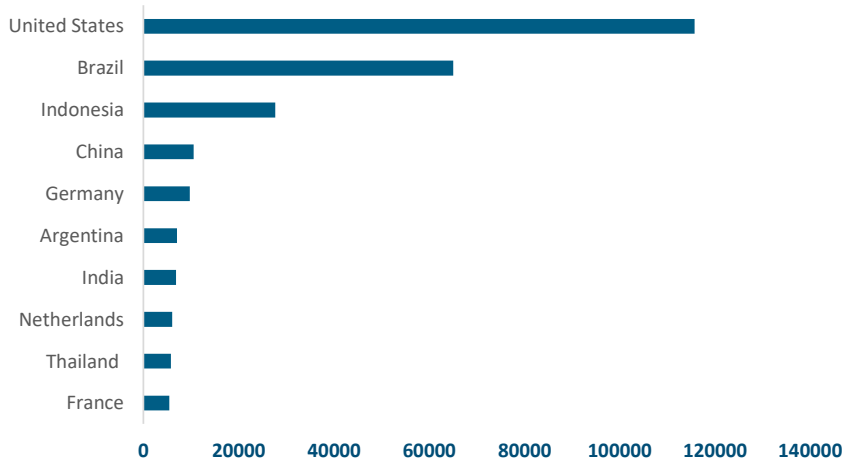
Renewable diesel and ethanol are poised to play a substantial role, contributing to two-thirds of this growth while the remaining third is earmarked for biodiesel and biojet fuel/SAF.

Brazil is the second largest producer of biofuels in the world and has the potential to emerge as a frontrunner in the sector, potentially accounting for up to 40% of the expansion through 2028.

Global biofuel demand[1]
billions liters per year

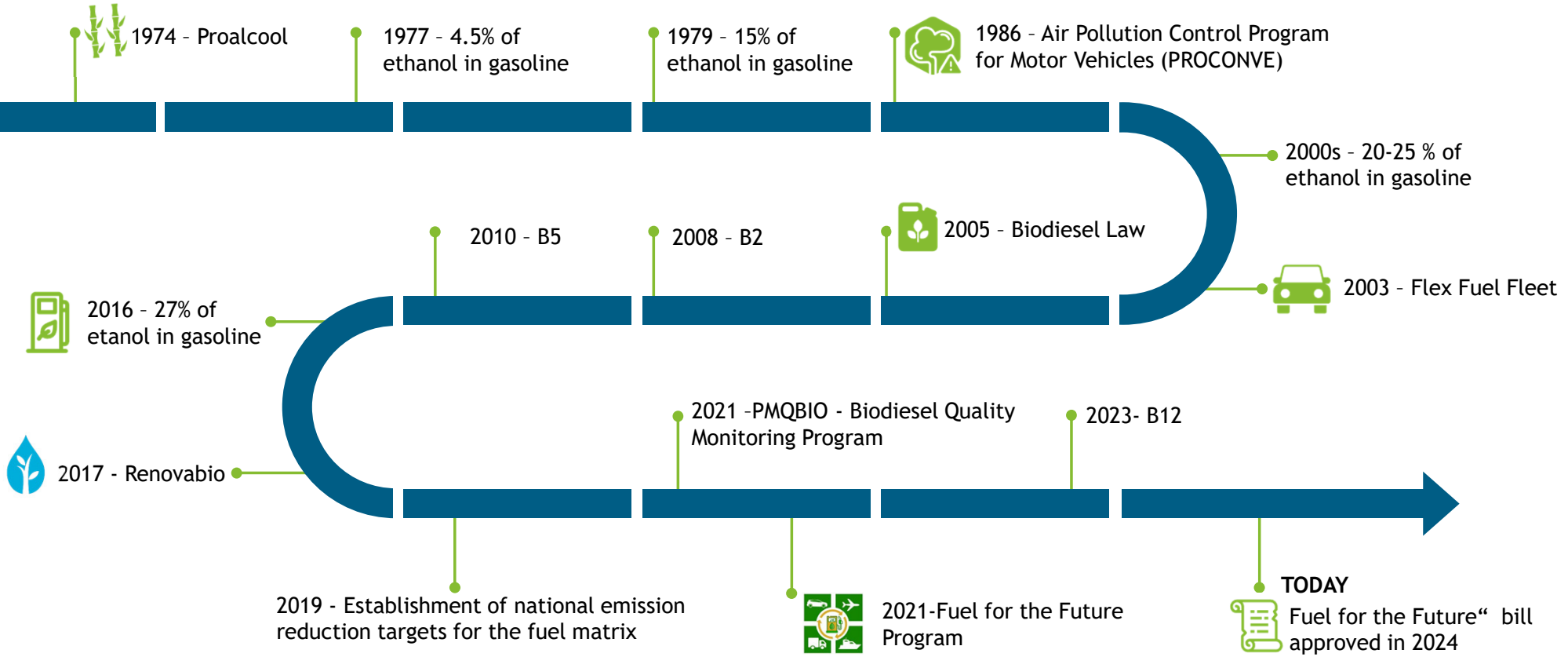


Main biofuel-producing countries in 2022[2]
Thousands of cubic meters (m^3) per day



Source: (1) IEA, 2023 – Renewables 2023; (2) BP Statistical Review, 2023.

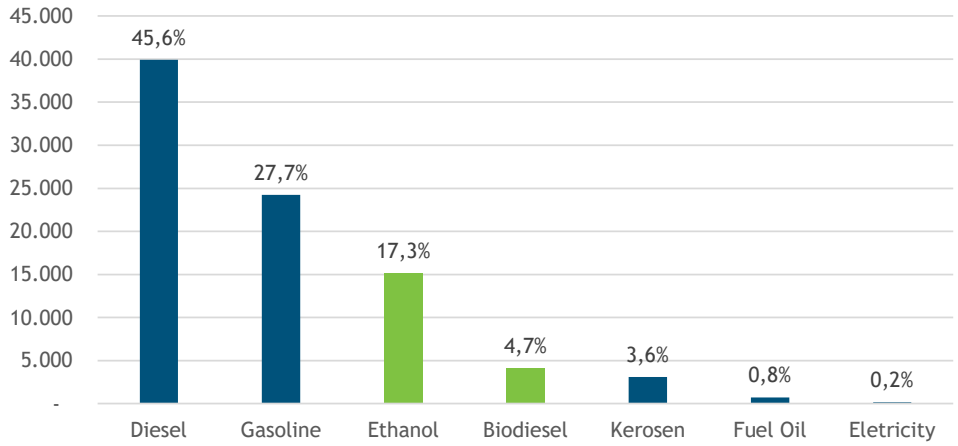
Brazilian biofuels timeline of public policies



Biofuels can offer opportunities to advance in the decarbonization of the transport sector

In 2022, ethanol and biodiesel accounted for 22% of the energy demand in the transport sector.

Final energy consumption in the transportation sector
2022, thousand tons of oil equivalent



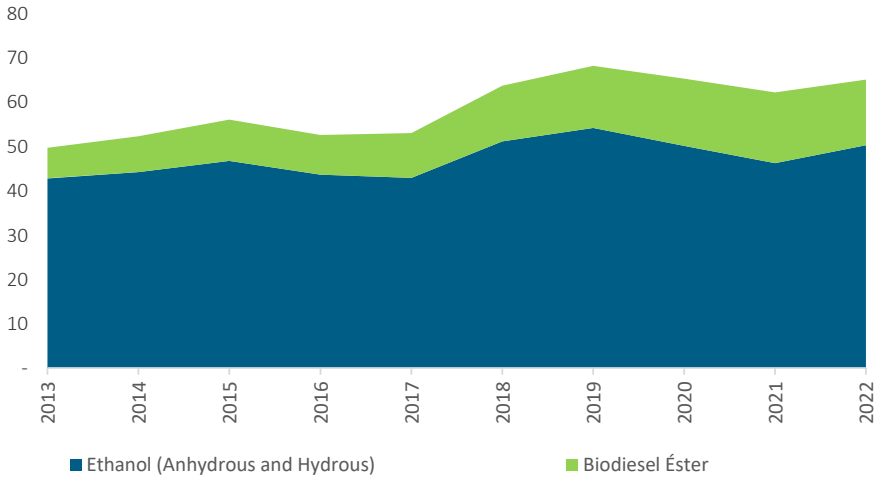
The Brazilian energy research company (EPE) anticipates that the utilization of ethanol has the potential to prevent the emission of 58.8 $MtCO_2$ in transportation under the most conservative scenario and 68.2 $MtCO_2$ in the optimistic scenario for the year 2033.

Source: (1) EPE 2022 (PDE 2031); (2) EPE 2022 (Supply scenarios forethanol supply and demand Otto cycle 2024-2033).

Brazil has a long tradition of implementing public policies and working with the private sector to boost the development of biofuels.

The country has consolidated biofuel industry with a wide variety of players operating along the value chain.The Brazilian production profile is concentrated on anhydrous and hydrous ethanol and biodiesel, with 360 and 59 production units, respectively.

Brazil biofuel production
billions liters per day



The progress of biofuels has a special relevance for the country, given its vast geographical extension and heavy dependence on road transportation.

Anhydrous ethanol is added to 27.5% of the volume of gasoline, and biodiesel added up to 12% to reduce fuels carbon footprint.

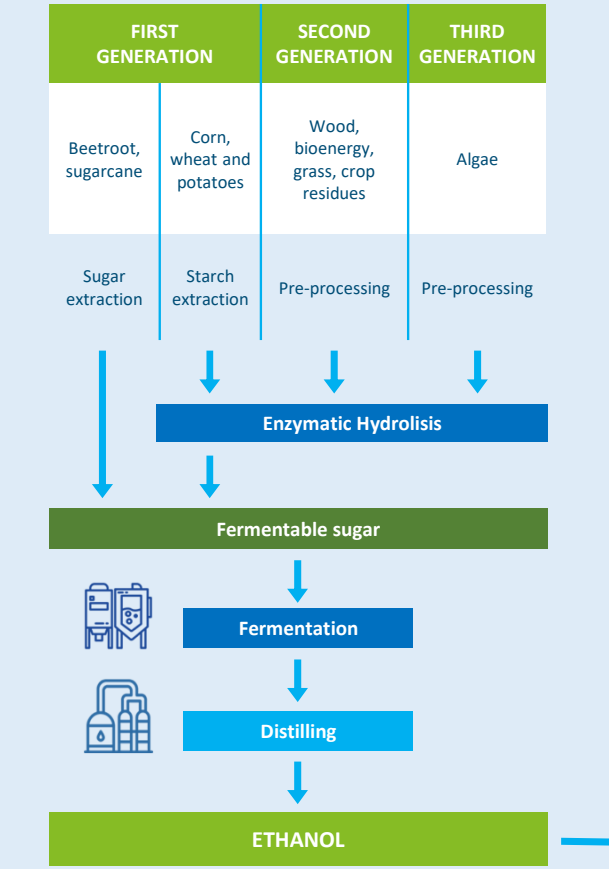
Source:BP Statistical Review, 2023. .

Brazil has a wide variety of feedstock to produce biofuels from different categories of biomass

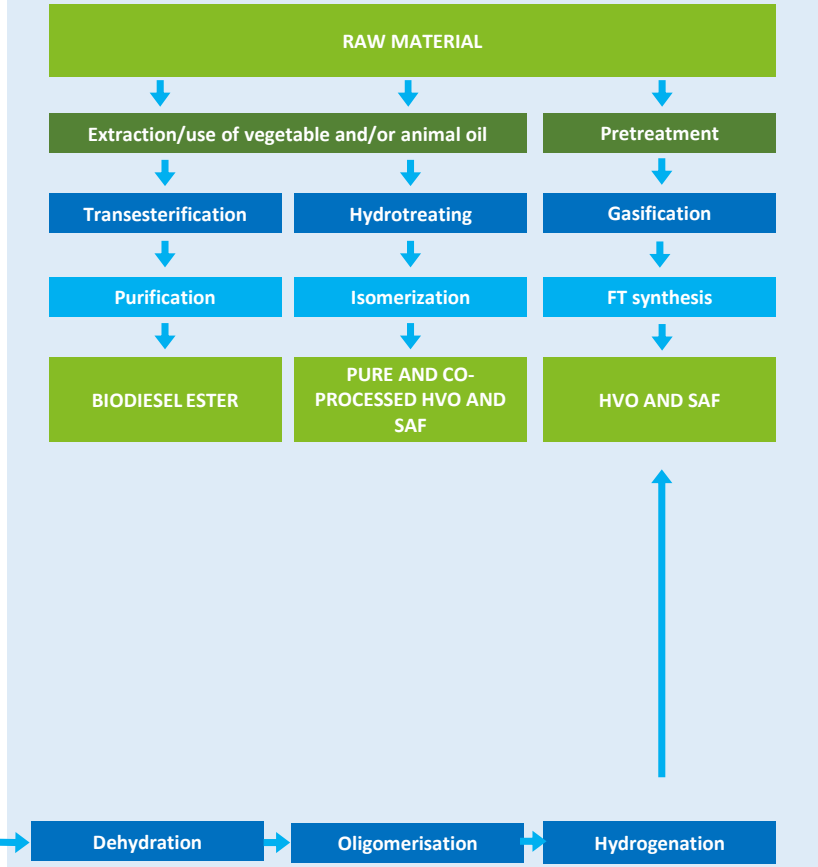
The country is seeking to make further progress in biofuels industry, aiming to overcome the challenges that prevent the widespread competitive adoption of new environmentally efficient technological options.

The development of new biofuel technology routes (HVO, co-processing and SAF) in Brazil is a key driver for the industry.

Technologies for ethanol production



Technologies for HVO and SAF production



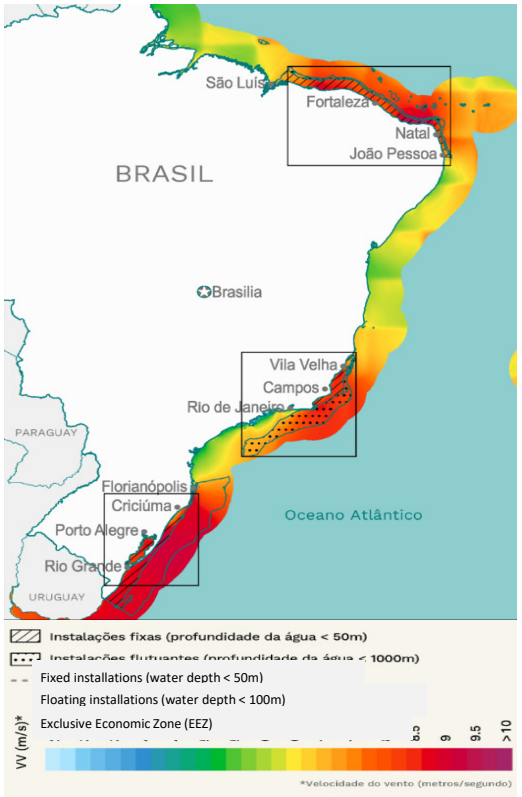
Source: UF-IFAS, 2023.

Brazil in the Energy Transition

Offshore Wind energy

Wind speed

100 m - ERA5 base



Brazilian offshore wind potential

Total **6.91 TW**

697 GW

Up to 50 meters deep

(7.0 - 7.5 m/s)

Brazilian offshore wind potential by region

Region	Potential (GW) 0-20m	20-50m
North	78	119
North-East	146	210
South-East	10	37
South	42	55

There are around 189 GW in offshore wind projects under environmental licensing processing Brazil

Regulatory framework is progressing: (i) Decree No. 10,946/2022 (guidelines for offshore wind projects): (ii) PL 576/2021 (regulatory framework for the wind farm concession process).

Expansion of offshore wind energy in Brazil converges with the objective of maintaining high share of renewable energies in the energy mix.

Despite recent cost inflation, the offshore wind industry is competitive in terms of inputs, especially considering the increase in fossil fuel prices in recent months.

Fonte: 2018, EPE. Roadmap Eólica Offshore Brasil.

Some Sustainability Indicators in the Oil and Gas Sector

Average Carbon Intensity in E&P[1]

World ..... **20** $KgCO_2$/barrel produced

National ..... **17** $KgCO_2$/barrel produced

Pré-sal ..... **10** $KgCO_2$/barrel produced

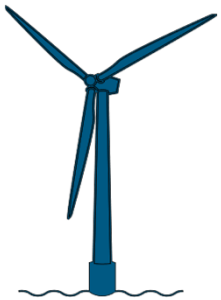
Carbon Capture, Utilization and Storage[2]

Between 2008 and 2021, Petrobras has already reinjected **30,1 Mt CO_2** and expects to reach **80 Mt CO_2** unitl 2025.

Biofuels[4]

- **2° largest producer of biofuels in the world.**
- Ethanol and biodiesel accounted for 22% of energy demand in the transport sector in 2022.

Brazilian offshore wind potential[3]



Total potetial **6.91 TW**

697 GW
Up to 50 meters deep
(7.0 - 7.5 m/s)

- **189 GW** in offshore wind projects with an open environmental licensing process at Ibama.

Source: (1) Energy Institute,2023; (2) Petrobras,2022; (3) EPE,2018; (4) IEA,2023; (5) SEEG, 2024.

EXPANDING OPERATIONS IN LOW-CARBON BUSINESSES

PETROBRAS

SOLAR & *ONSHORE WIND*

M&A and investments for the development of projects in Brazil

OFFSHORE WIND

Studies in Brazil aiming at participating in bids and environmental licensing in Brazil

CCUS

Pilot project CCUS Rio de Janeiro hub

Studies for CCUS projects

HYDROGEN

Studies for projects in Brazil

R&D Investments

BIOREFINING

Expansion of biorefining projects, focused on Bio Jet Fuel and Diesel R

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