

The offshore O&G sector in Brazil

OTC 2023

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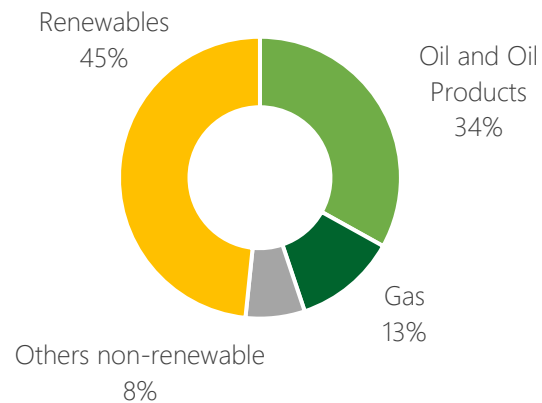
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Brazil at a glance

A country of plenty and diverse energy resources




Energy Mix



Source: EPE – BEN2022

The largest economy in **Latin America** 

 **4th** largest recipient of Foreign Direct Investment (Q1 2022 – OECD)

 **9th**

Largest **Crude Oil and Condensate** producer (BP Statistical Review 2022)

 **8th**

Largest **Oil Products Consumer** (BP Statistical Review 2022)
A domestic market of over **215 million inhabitants**

Among the **10th** largest crude oil exporters in the world

 **2nd**

Largest Producer and Consumer of **Biofuels** (BP Statistical Review 2022)

 **3rd**

Largest **Hydropower** generation in 2021 (Our World in Data)

 **6th**

Largest **Wind Generation Capacity** (GWEC 2021)




#1


Exploration & Production Overview

Brazil is taking a leading role in the E&P sector



Nowadays

Production:  **3.3** Million bpd of oil production (Feb 2023) **146** Million m³/d of gas production (Feb 2023)

Reserves:  **13.3B** Bbl in proved oil reserves (Dec 2022) **381B** m³ in proved gas reserves (Dec 2022)

 **US\$ 90B**
in E&P investment in the next 5 Years

Forecast

Potential to reach a production of more than

4

Million bpd of oil by 2025 (ANP)

5

Million bpd of oil by 2030 (EPE)

E&P at a glance

95% of O&G production in Brazil comes from offshore; 96% of forecasted investments are offshore



Pre-Salt

One of the best plays in the world and the most competitive deepwater assets.

75% of production
130 producer wells
24,171 Average well production (boe/d)

Post-Salt

Green and brownfields, deep and shallow waters.

20% of production
367 producer wells
2,236 Average well production (boe/d)

Onshore

Mature basins and new frontier basins (gas prone).

5% of production
5,651 producer wells
38 Average well production (boe/d)

(Oct 2022)

26.5B

Barrels equivalent of O&G produced to date

423

Fields under development or production

271

Exploratory Blocks

400+

Production Installations

90

Billion dollars E&P Investments Forecast 2022 – 2026

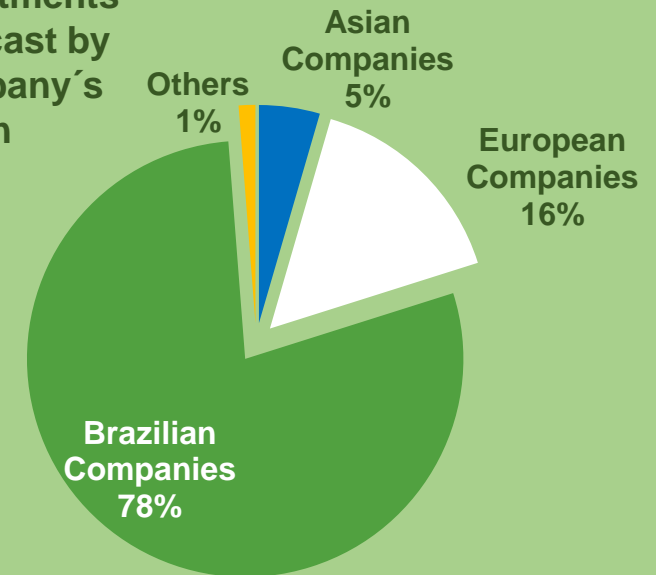
19,000+

Km of O&G pipelines

30,000+

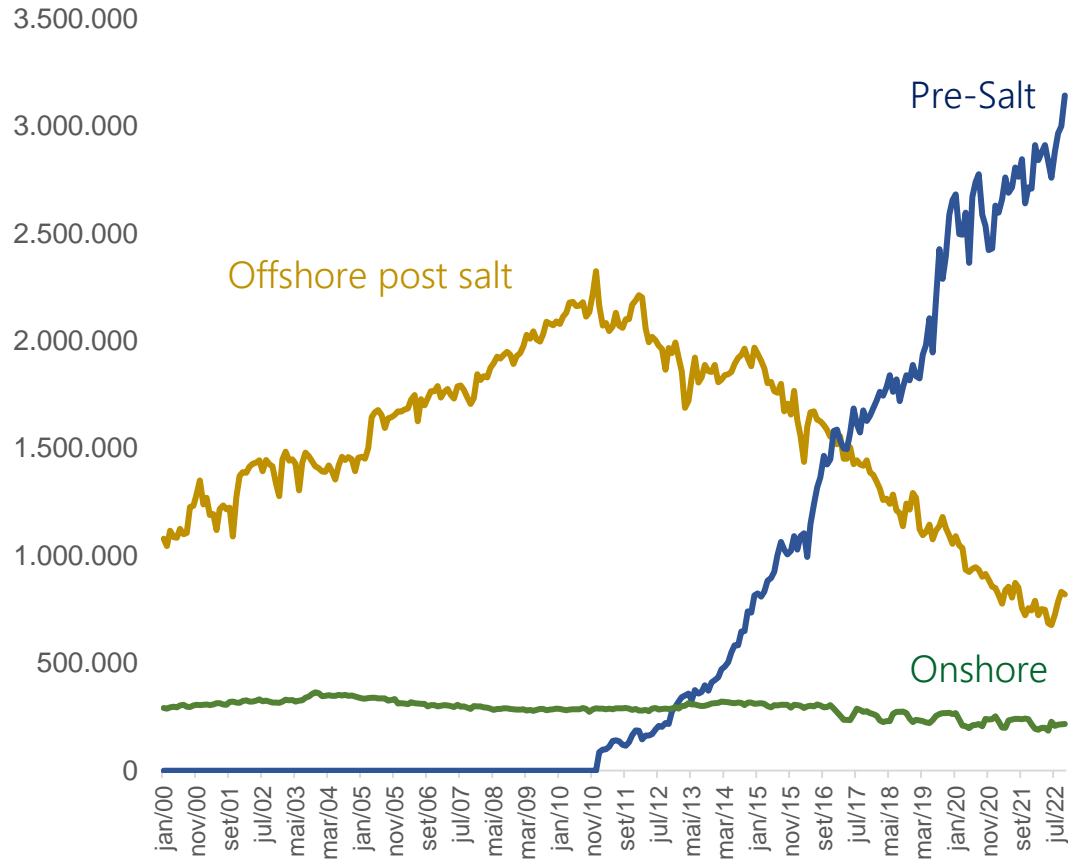
Wells drilled

Investments Forecast by Company's Origin



The offshore numbers

The offshore production will continue to grow due to pre-salt production. Post-salt mature fields production is expected to increase due to increasing investments in RF.



135
Exploratory Blocks

+100K km²
contracted areas

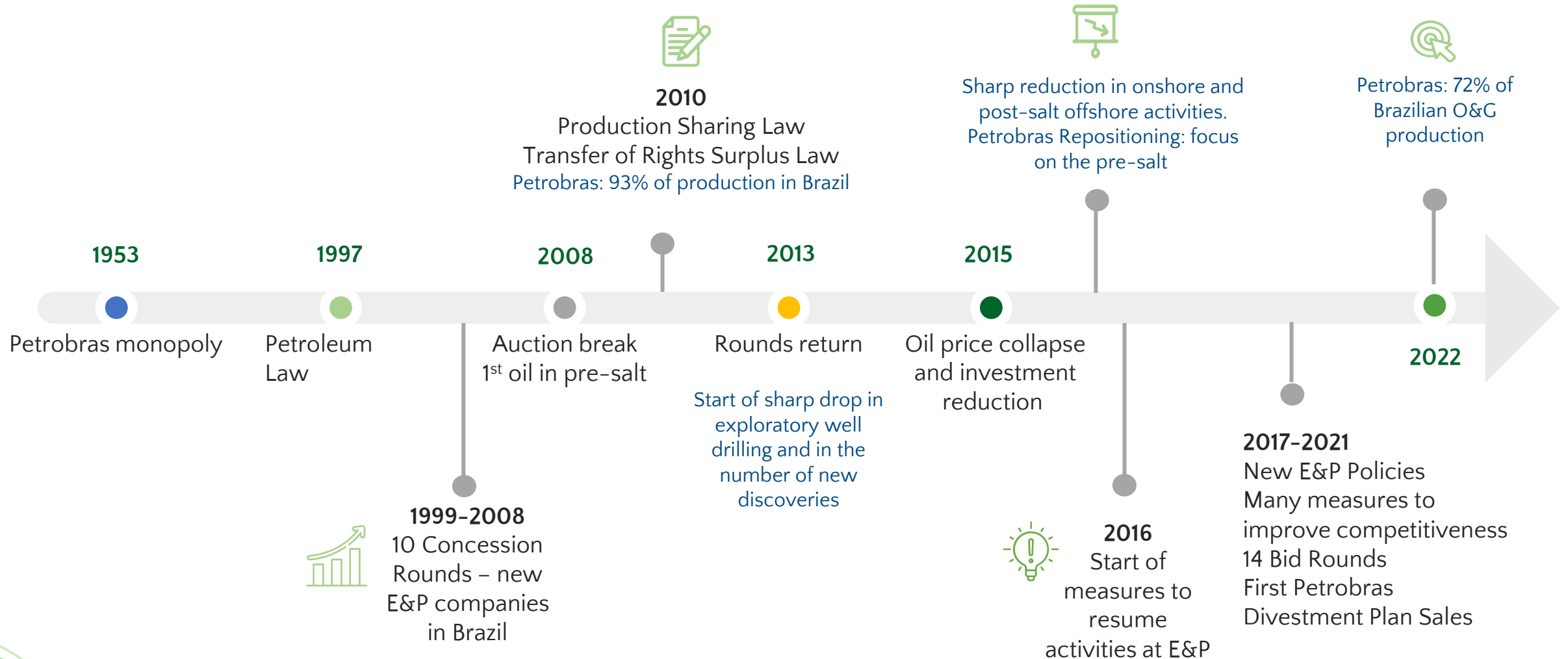
115
Fields

+150
Offshore Production
Installations



E&P history in Brazil

From a monopoly towards an open market



Many measures have already been taken to encourage E&P activities

2018

Local Content waivers
(ANP Resolution n° 726/2018)

Royalty reduction on the incremental production
(ANP Resolution n° 749/2018)

Reserve Based Lending
(ANP Resolution n° 785/2019)

Mandatory investment or M&A in onshore and shallow water fields; deadline for Petrobras divestment
(RD n° 568/2018)

2019

A new type of auction:
Open Acreage

Unlocking the **Transfer of Rights Auction**

2020

ANP Resolutions:
Flexibility as a result of the pandemic

2021

Royalties' reduction for S&M companies
(ANP Resolution n° 853/2021)

Adjustment Agreement to Local Content
(ANP Resolution n° 848/2021)

Area Nomination
(ANP Resolution 837/2021)

Decommissioning Guarantees
(ANP Resolution n° 854/2021)

All onshore data for free

2022

Marginal Fields Definition
(ANP Resolution n°877/2022)

Well offshore data for free

Extension of the Exploration Phase for 18 months
(ANP Resolution n° 878/2022)

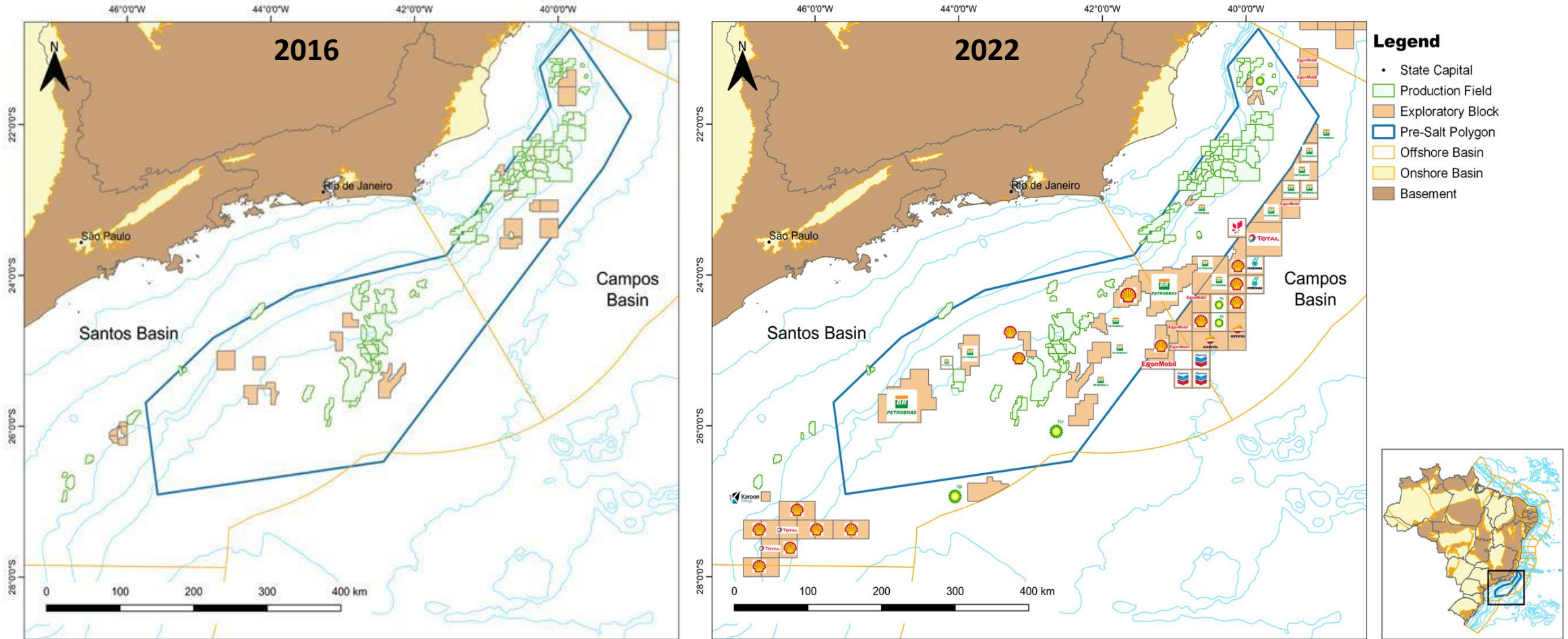


Bid Rounds
R\$ 123.6 B in signature bonuses
(2017/2022)

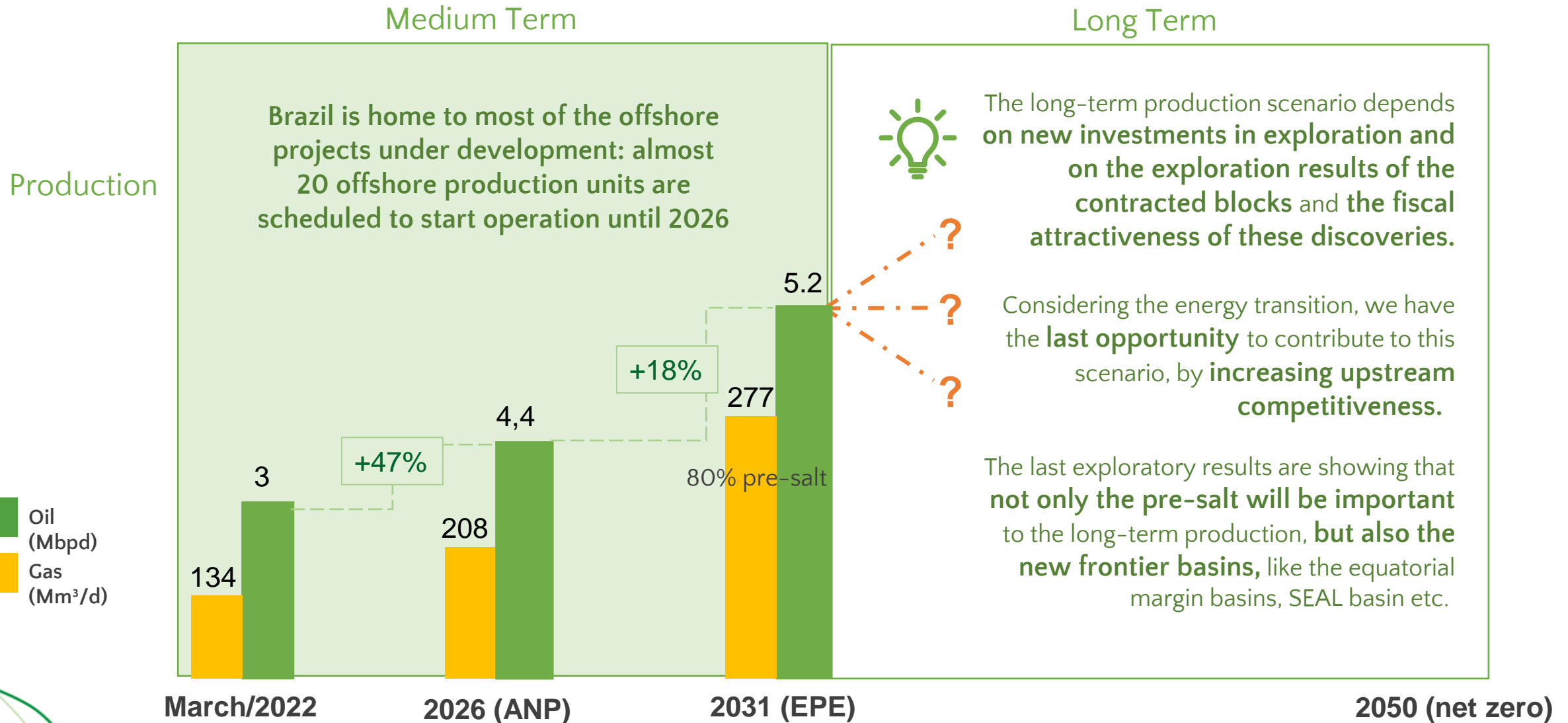
Brazil was the country that sold more blocks in 2022, according to Rystad Energy



Results from 2017 bidding rounds in Campos and Santos basins



Brazil is poised to be one of the key sources of growth over the medium term, but still need to keep taking measures for the long term



E&P strategic goals remains the same



THE RIGHT ASSETS IN THE RIGHT HANDS

Petrobras
Divestment Plan
opened space for 'junior companies'.
Support small and medium producers market



INCREASE THE RECOVERY FACTOR

Brazil's Current RF: 10%
This represents an enormous opportunity in the **mature fields**.
Need to reduce OPEX and decommissioning costs



INCREASE EXPLORATORY ACTIVITIES

The recent events accelerated **energy transition** discussions and reinforced the **sense of urgency** in exploring our resources



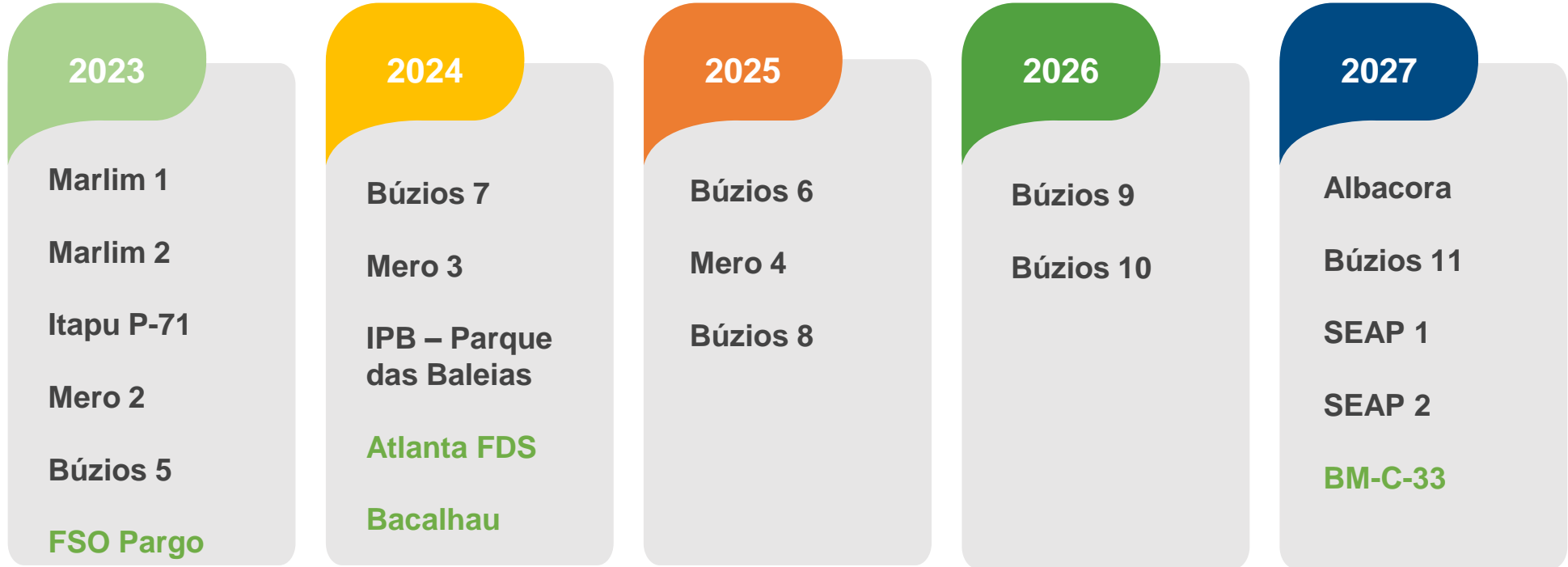
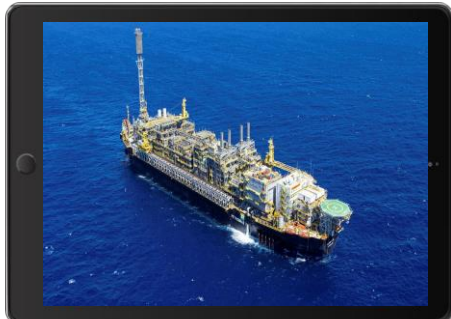
UNLOCK MARGINAL DISCOVERIES VIABILITY

There are **many marginal discoveries** in the **different environments** that could be developed if we address the correct incentives to make them viable

We need to keep increasing **above ground competitiveness** in order to achieve our main goals

Brazil is poised to be one of the key sources of growth over the medium term

BRAZIL is home for the MAJORITY of world's offshore projects under development
21 new production units to start operation until 2027



*Non-Petrobras Operator

Offshore Highlights & Opportunities



PRE-SALT

Giant oil reserves **with lower costs and emission rates**. One well can produce more than 50,000 bpd of oil

Well (July/21)	Oil (bpd)	Gas (km ³ /d)
7-BUZ-10	55,064	1,874
7-BUZ-31D	51,121	2,119

IHS yet to be found resources estimates in the pre-salt: more than 50Bboe



POST-SALT

Shallow water fields being divested, as well as some of the deepwater assets.

Independents, specialized in mature fields jumping into these opportunities.

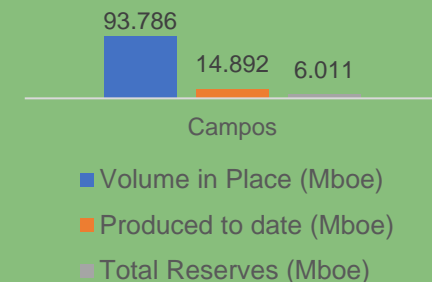
New operators are working on **reducing OPEX and decommissioning costs, revitalizing production facilities and implementing IOR opportunities** to leverage existing underutilized facilities

Investment commitment of **more than 1.5 billion dollars** in the new Development Plans presented for shallow water assets of Trident, Perenco and BW.

CAMPOS BASIN: home to most opportunities of improving RF

Since the first discover in 1974 (Garoupa Field), we have produced only **16% of the volume in place** and we estimate 22% of RF.

Each 1% more in Campos Basin RF represents almost **1 Bboe** of new oil.



IHS Markit YTF resource estimates

Basin name	Play name	Total (billion boe)
Sergipe-Alagoas	Deepwater cretaceous ⁽¹⁾	6.92
Espirito Santo	Pre-salt	1.60
Campos	Post-salt ⁽²⁾	1.26
	Pre-salt	18.00
Santos	Post-salt ⁽²⁾	1.78
	Pre-salt	36.01

Note: (1) Estimated in 4th quarter of 2019; (2) Estimated in 1st quarter of 2020.

Source: IHS Markit

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Local content requirements since 2017

EXPLORATION PHASE	Onshore:	50%
	Offshore:	18%

DEVELOPMENT STAGE	Onshore:	50%	
	Offshore	Wells	25%
		Subsea Platform	40%
		Platform	25%

- ✓ No waivers and no longer LC as a bid fator (fixed percentages)
- ✓ These requirements are being applied since the 14th bidding round (2017)



LC percentage and structure – dealing with the past

Ongoing contracts

255 Contracts amended: new rules

EXPLORATION PHASE	Onshore:	50%
	Offshore:	18%

DEVELOPMENT STAGE	Onshore:	50%	
	Offshore	Wells	25%
		Subsea	40%
		Platform - engineering	40%
		Platform - equipments	
Platform - construction			

Concluded phases

Conduct adjustment agreement

- **Res. ANP n° 848/2021 – Aug/2021**
- Replace fines with new LC commitments
- Examples: Goods for exportation or seismic acquisition in non-contracted áreas
- Proposals under evaluation: US\$ 350 mi



Decarbonization in the upstream

01

Since 2009, O&G production operated by Petrobras (which operates more than 90% of the O&G production in Brazil) increased more than 40% without increasing absolute emissions. Also, Petrobras established several ESG commitments in the E&P like **zero routine flaring by 2030**, **32% reduction in carbon intensity and 30-50% reduction in methane emissions by 2025**. Brazil has already a high produced gas utilization rate (-98%).

10 Sustainability Commitments



CLIMATE



WATER



WASTE



BIODIVERSITY



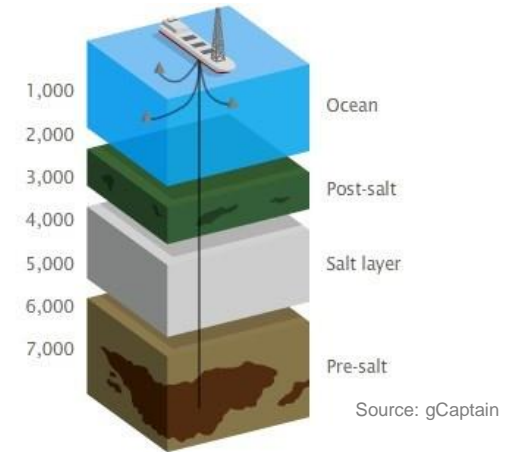
SOCIAL RESPONSIBILITY

1. Zero growth in absolute operating emissions until 2025
2. Zero routine flaring by 2030
3. -40 MM ton CO₂ reinjection in CCUS (*Carbon Capture, Utilization and Storage*) projects
4. 32% reduction in carbon intensity in the E&P segment by 2025, reaching 15 kgCO₂e/boe
5. 30%-50% reduction in methane emission intensity in the E&P segment by 2025
6. 16% reduction in carbon intensity in the refining segment by 2025, reaching 36 kgCO₂e/CWT
7. 30% reduction in freshwater capture in our operations with focus on increasing reuse by 2025
8. Zero increase in waste generation by 2025
9. 100% of Petrobras facilities with a biodiversity action plan by 2025
10. Investments in environmental and social projects

*Note: Carbon commitments related to 2015 base. Other commitments based on 2018.

Source: Petrobras (ESG Presentation, Oct 2020)

02



Pre-Salt: globally competitive assets in the energy transition scenario, with low breakeven and low GHG emissions

- ✓ Low sulfur content
- ✓ High productivity

Pre-salt projects carbon intensity is around **10kg** of carbon dioxide (CO₂e) per barrel, against a global average around 20 kg per barrel (OGCI).

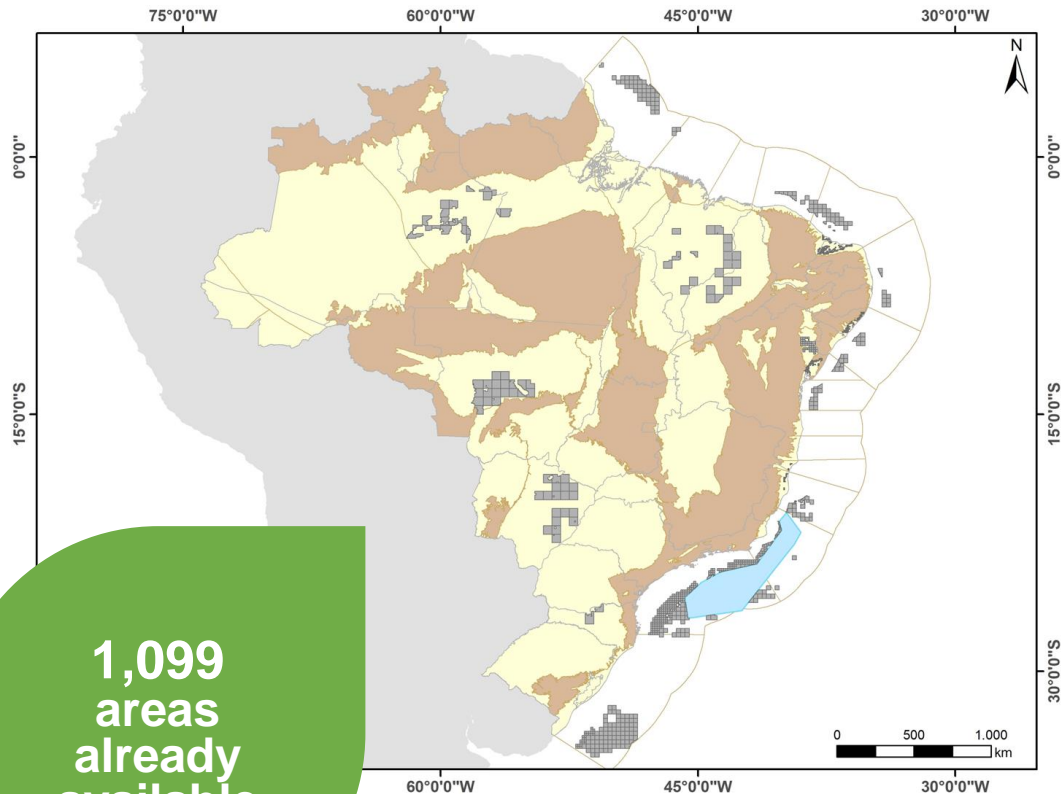


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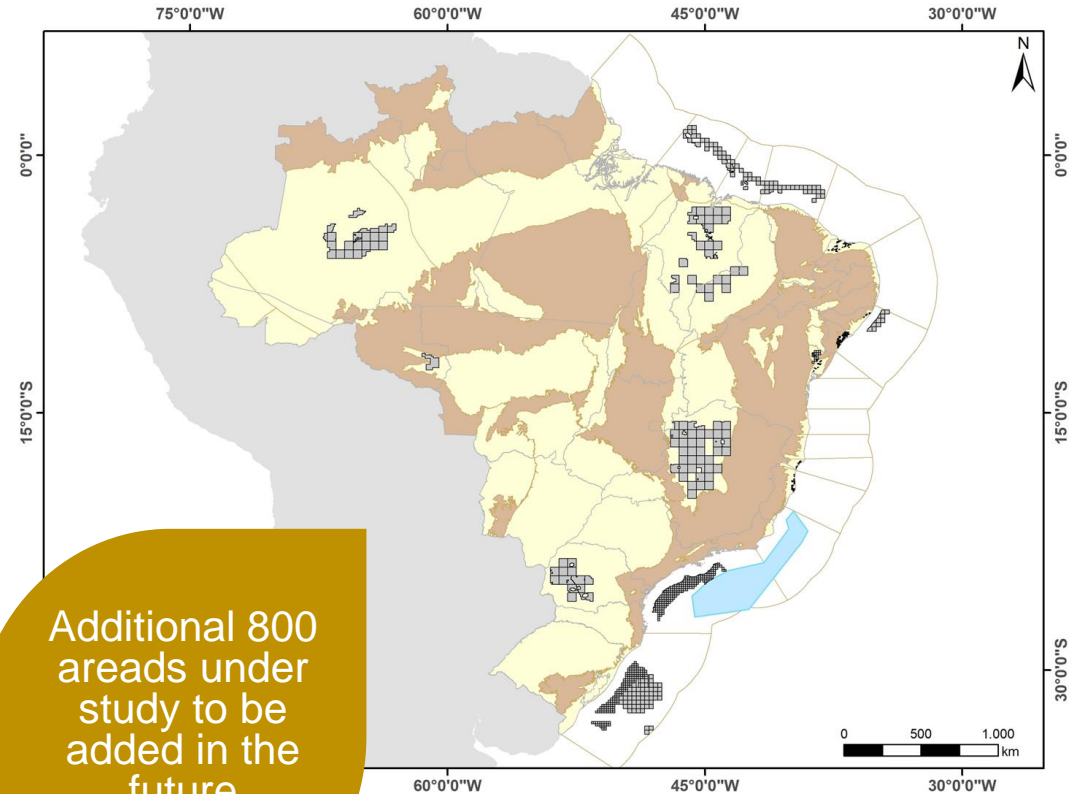
Opportunities in the upcoming Bidding Rounds

Opportunities in the Concession Open Acreage

The Open Acreage allows the market to decide when bidding rounds will take place and what areas from the stock will be offered. The 4th cycle will start when any registered company declares interest in at least one area.

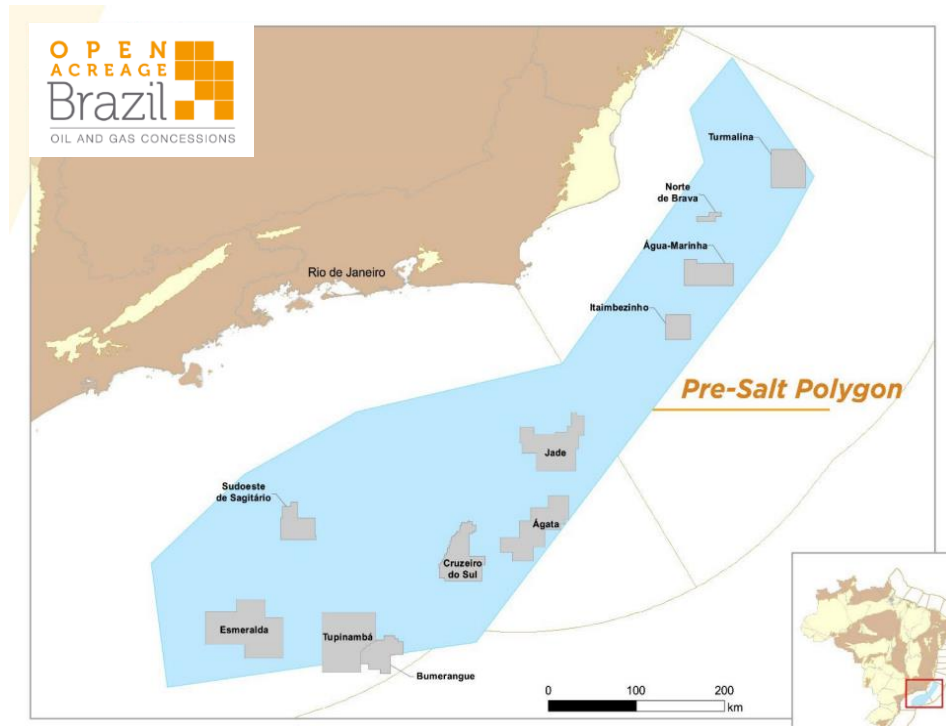


1,099
areas
already
available



Additional 800
areas under
study to be
added in the
future

Opportunities in the Open Acreage PSA (Production Sharing Contracts)



7 blocks on offer

Ametista is to be added and ANP suggested another 4 blocks to the government: **ONIX, LARIMAR, MOGNO, CITRINO e JASPE**

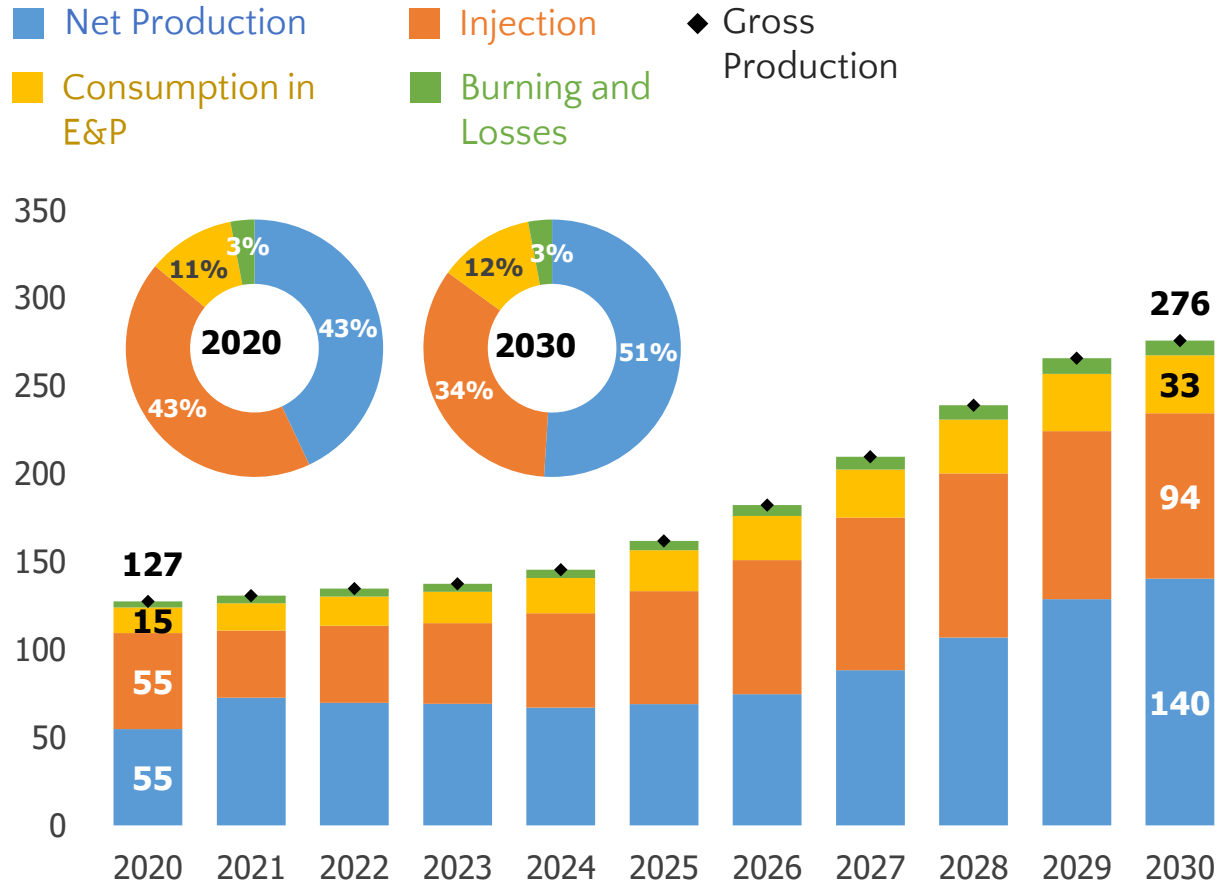
ANP is currently studying other opportunities to submit to the government

13 operators have subscribed to the PSA Open Acreage so far

#3

Natural Gas Market

The national gas production has the potential to double by 2030, but all efforts should be done to monetize it



Source: EPE PDE 2030

The main driver of growth will be the **pre-salt production**

EPE expects the pre-salt liquid gas production reach more than **70 million m³/d in 2030**

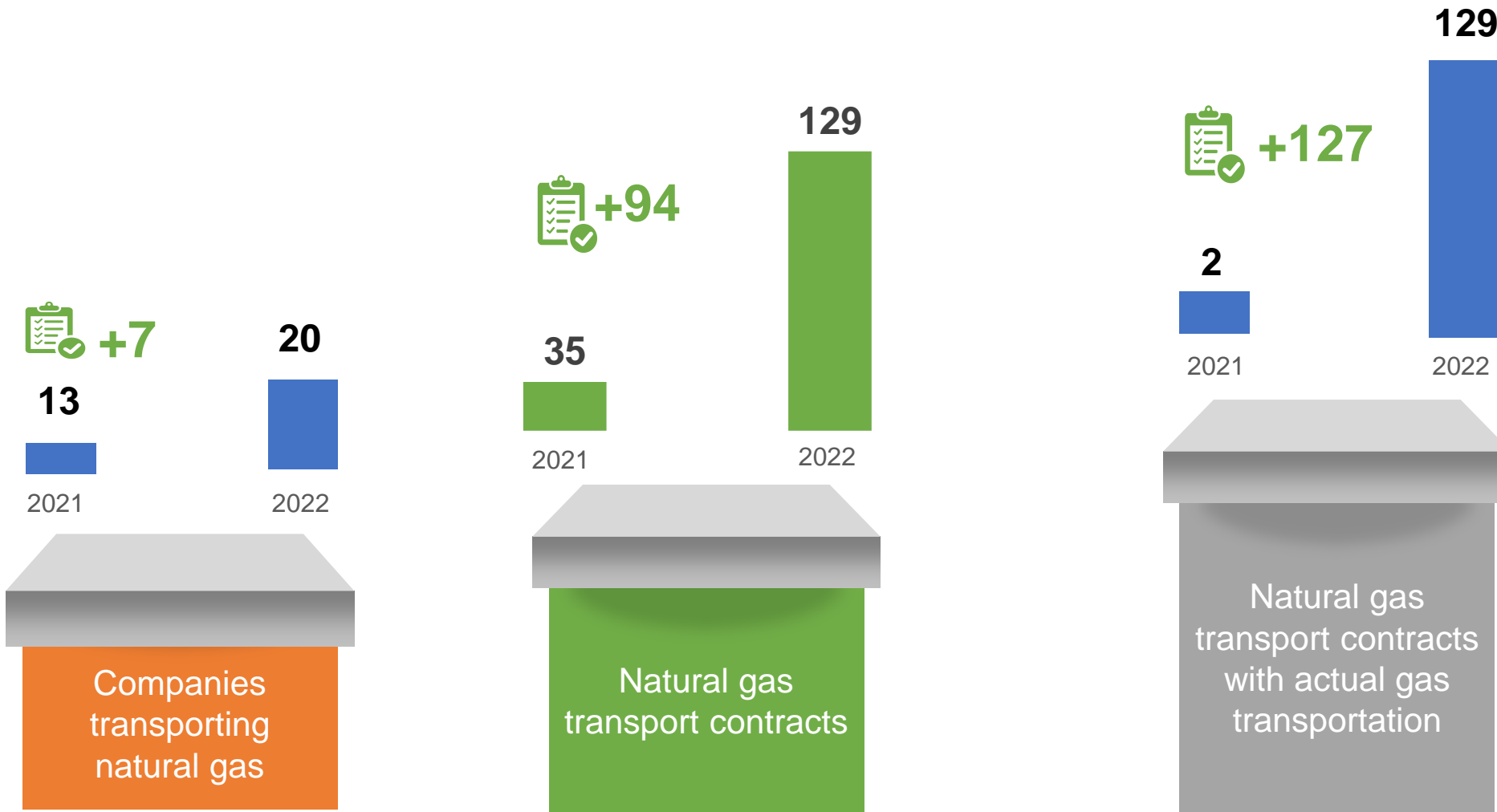
Need to **expand the gas pipeline infrastructure** to bring the gas to shore (**at least 1 or 2 more routes**)

**Capacity limit of Routes 1, 2 and 3:
44-48 million m³/d**



The interest in the Brazilian gas market is increasing

Since TBCs 1st Open Season, starting in Feb. 2019, many new commercialization, shipping and import authorizations were granted





#4

Energy Transition

Emissions in the energy sector represent less than half of world average

01

Brazil is not ranked in the top emitters in the energy sector

Top Emitters in Energy Sector (All GHG)

2018	CO ₂ e
Others	12.57Gt
China	10.32Gt
United States	5.27Gt
India	2.42Gt
Russia	2.28Gt
Japan	1.09Gt
Iran	716.76Mt
Germany	713.82Mt
Canada	626.07Mt
South Korea	617.23Mt
Indonesia	598.17Mt

...
Brazil (437,33 Mt)

Source: Climate Watch (CAIT)

02

Energy makes up nearly three-quarters of global emissions, but in Brazil it represents around 30% of the total emissions

Emissions by Sector – World (All GHG)

2018

Energy	76%
Agriculture	12%
Industrial Processes	5.9%
Waste	3.3%
Land-Use Change and Forestry	2.8%

Emissions by Sector – Brazil (All GHG)

2018

Agriculture	35%
Energy	31%
Land-Use Change and Forestry	27%
Waste	4.9%
Industrial Processes	2.0%

03

Brazil accounts for 1.3% of global fossil fuel and cement emissions

Top Fossil Fuel and Cement Emitters (CO₂)

2019

Others	34%
China	28%
United States	15%
India	7.2%
Russia	4.6%
Japan	3.0%
Iran	2.1%
Germany	1.9%
Indonesia	1.7%
South Korea	1.7%
Saudi Arabia	1.6%

...
Brazil (1,3%)

Source: Climate Watch (GCP)

CO₂ emissions per capita: on average, each Brazilian emits 1/7 of what an American emits and 1/3 of what a citizen of the European Union or a Chinese emits in the production and consumption of energy

Brazil is well-positioned in the energy transition



Brazil has huge and diverse potential for renewables (solar, hydrogen, wind, biofuels, biogas/biomeythane). Brazil is currently among the five most attractive emerging markets for investments in renewable energy. (<https://global-climatescope.org/>)



Brazil is the 2nd largest producer and consumer of biofuels and benefits from a longstanding well-established industry: 70% to 80% of our automobiles are flex-fuel; 30% of the vehicle matrix is fueled by renewables



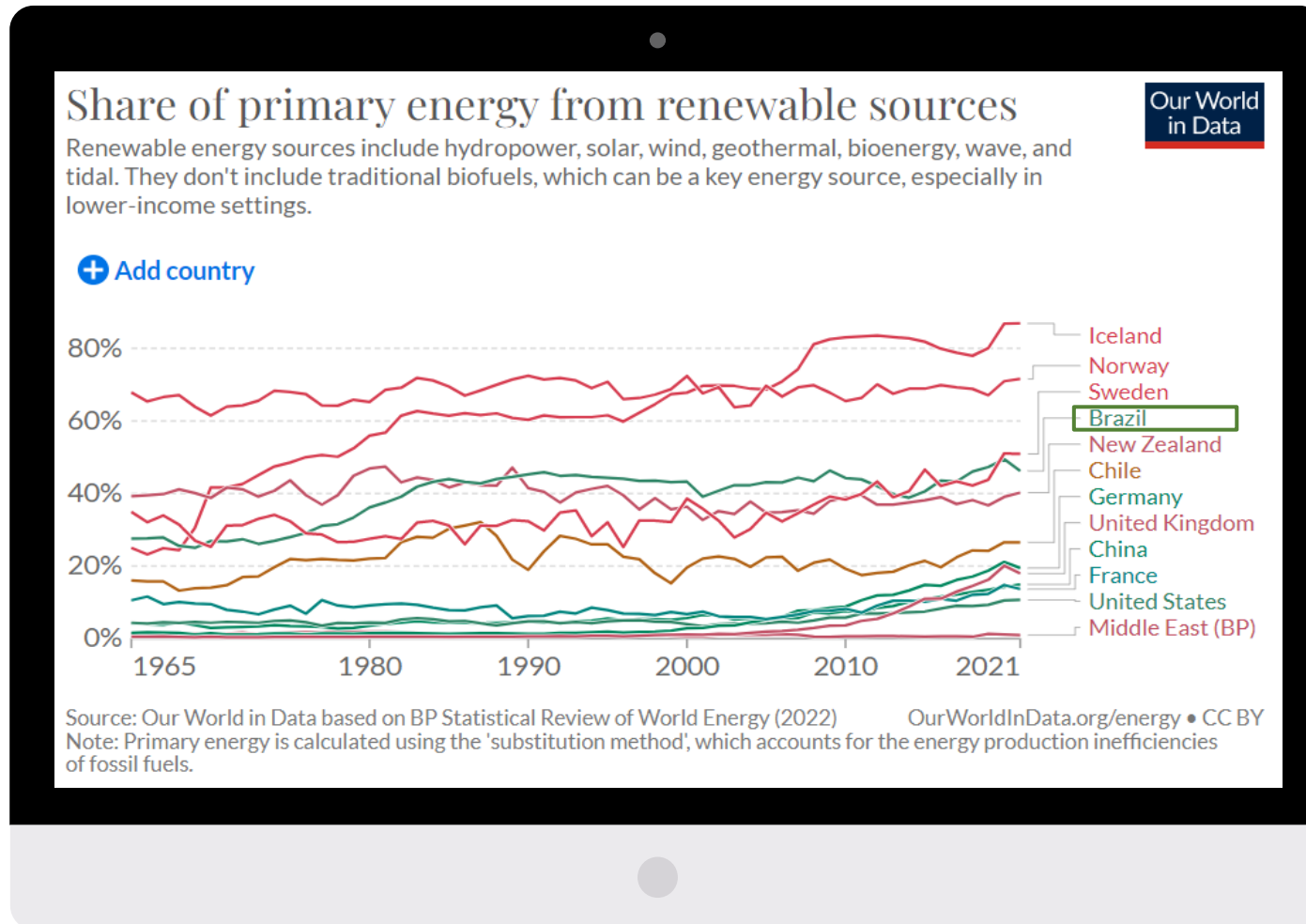
Oil majors are also betting on the Brazilian renewables market. We believe they will integrate their portfolio with cleaner energy projects, while capitalizing on synergies and tapping the huge potential in Brazil for renewable energy projects.



Public policies like Renovabio Program show the country will continue to advance in this agenda. In 2020, more than **14 million tons of greenhouse gas emissions were avoided**. A new government program (**Fuel of the future**) is in place, dealing with advanced fuels.

Brazil: Leadership in the context of the energy transition

Iceland, Norway, Sweden and Brazil are the countries with the highest share of renewable energies in the energy matrix in the world



Biofuels in the vehicle matrix: **~28%**

O&G Industry plays a key role in the pathway to net zero



>50% of primary energy come from O&G

O&G play critical roles in today's energy and economic systems and that affordable and reliable supplies are necessary parts in the pathway to net zero.

Also, the O&G industry has the skills, infrastructure and capital to help unlock net zero solutions such as CCS, low-carbon hydrogen and offshore wind.



Carbon reduction is imperative in the O&G sector

Regardless of the velocity and the pathways of the transition, climate impacts will become more visible and severe over the coming years. Emissions reductions isn't just an option if the sector wants to retain its social license to operate. The competitive landscape will also be about the lower carbon footprint.



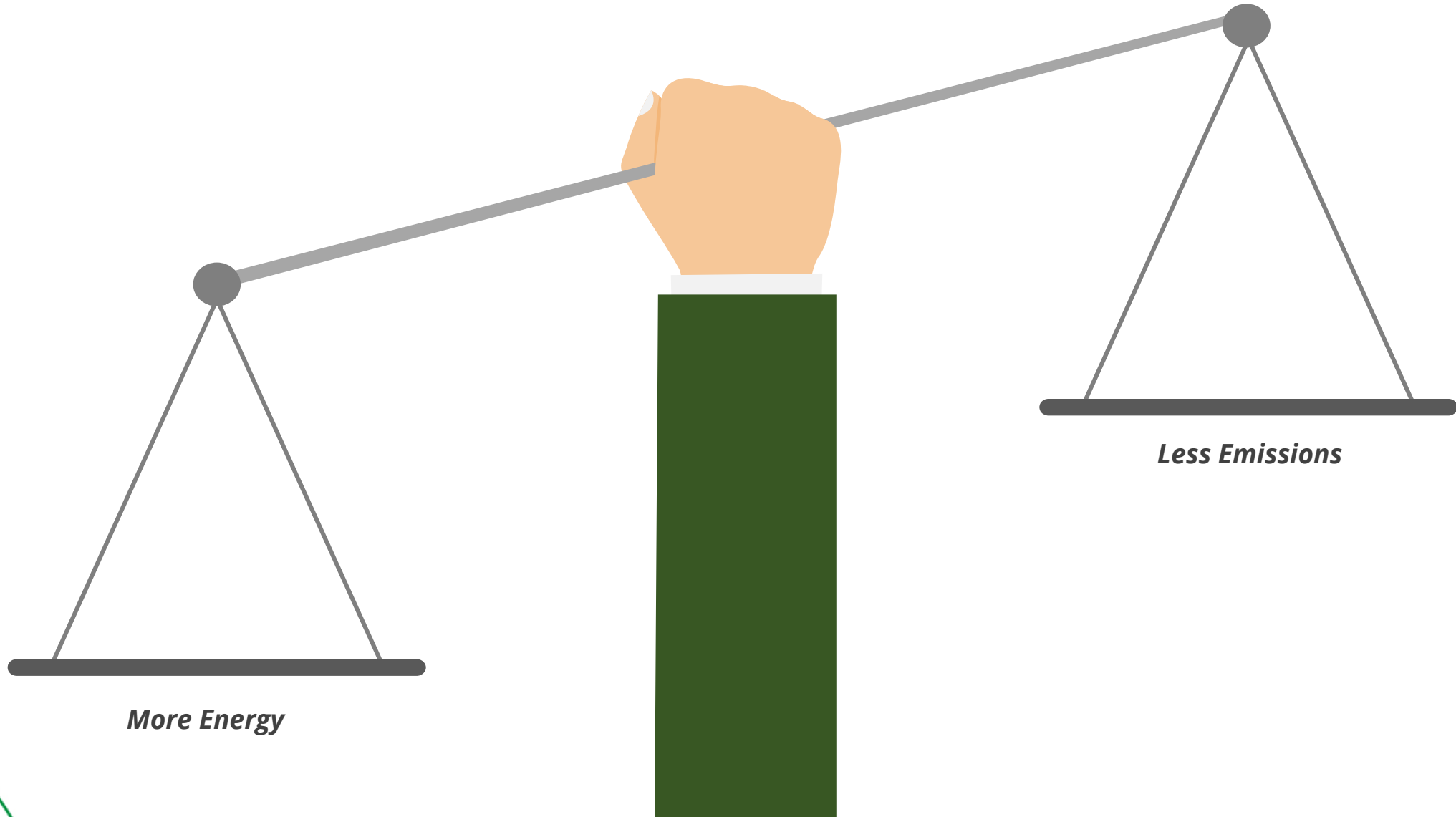
O&G demand should decrease before supply does

The energy crisis shows that investments in traditional sources are still needed if there is demand. Energy security is a priority for any country.

The world cannot dismantle today's fossil fuel energy system before the low-carbon energy system of the future is ready to take over.

The imperative pathway in the Brazilian energy sector

As a developing country, we need more energy, including more O&G production to meet the needs of society (O&G represents 48% of primary energy in Brazil). But our mission is to be able to produce this energy in a sustainable/low emissions way.



RD&I: Government and operators are seeking to support the development of green/clean technologies





Number of RD&I projects (2018-2022)	
SOLAR ENERGY	13
BIOFUELS	60
CCUS	9
E&P ENVIRONMENT IMPACT	31
HYDROGEN	11
OCEANS ENERGY	1
WIND ENERGY	8
HYBRID SYSTEMS	20
GHG EMISSIONS	25
MINIMIZING WASTE - REDUCTION, REUSE AND RECYCLING	8
MODELING AND PREVENTION OF ENVIRONMENTAL IMPACTS	29
MONITORING AREAS IMPACTED BY O&G ACTIVITIES	20
REMEDICATION AND RECOVERY OF IMPACTED AREAS	27
TOTAL	262

O&G companies in Brazil are investing, on average, **10%** of the total R&D budget to develop and support green technologies, decarbonization and environment impacts.

Due to the quality of our offshore assets, we can maintain our position as a competitive O&G producer, with low carbon emissions

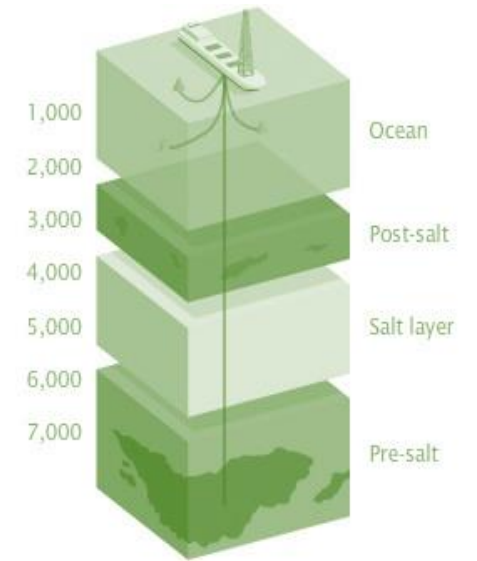
01 Pre-Salt: globally competitive assets in the energy transition scenario, with low breakeven and low GHG emissions

 High productivity and low sulfur content

 **9 – 10 kgCO₂e/boe**
(half of OGCI Upstream Average – 19.5kgCO₂e/boe in 2020)

02 Net zero commitments from the largest offshore operators, such as **Petrobras**, which will require efforts to increase operational efficiency, reduce routine flaring/fugitive emissions, electrification, integration with renewable projects.

03 The ANP has published **upstream emissions data**. Flaring in Brazil already historically published: 2% of associated gas production. CNPE Resolution 5/2022: ANP and EPE must submit, by Feb/23, a report with proposals for GHG mitigation and compensation instruments in the E&P.



#5

Final Remarks

ANP remains committed to increasing E&P attractiveness

Under study:

01

Royalties reduction for marginal fields development

02

Incentives for marginal discoveries and tiebacks

03

Incentives for offshore natural gas monetization

04

Bidding rounds rules improvements

05

Adjustments to bidding rounds parameters for riskier less potential pre-salt exploratory opportunities

Brazil is a country of great opportunities



Our Strengths

Sanctity of Contract

Predictable and transparent regulation

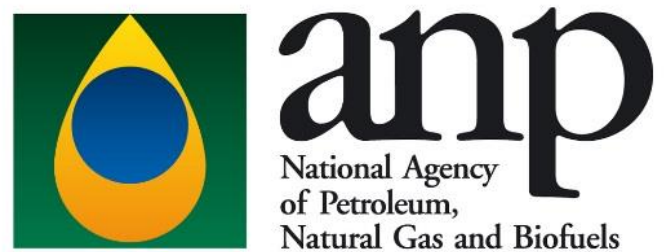
Geological potential

Pre-salt: world-class assets with low carbon intensity

Market Opening in the midstream (New Gas Law) and downstream

One of the largest fuel markets

Great Potential for renewables



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/
www.gov.br/anp/pt-br

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