



BRAZIL:
Opportunities in the O&G business

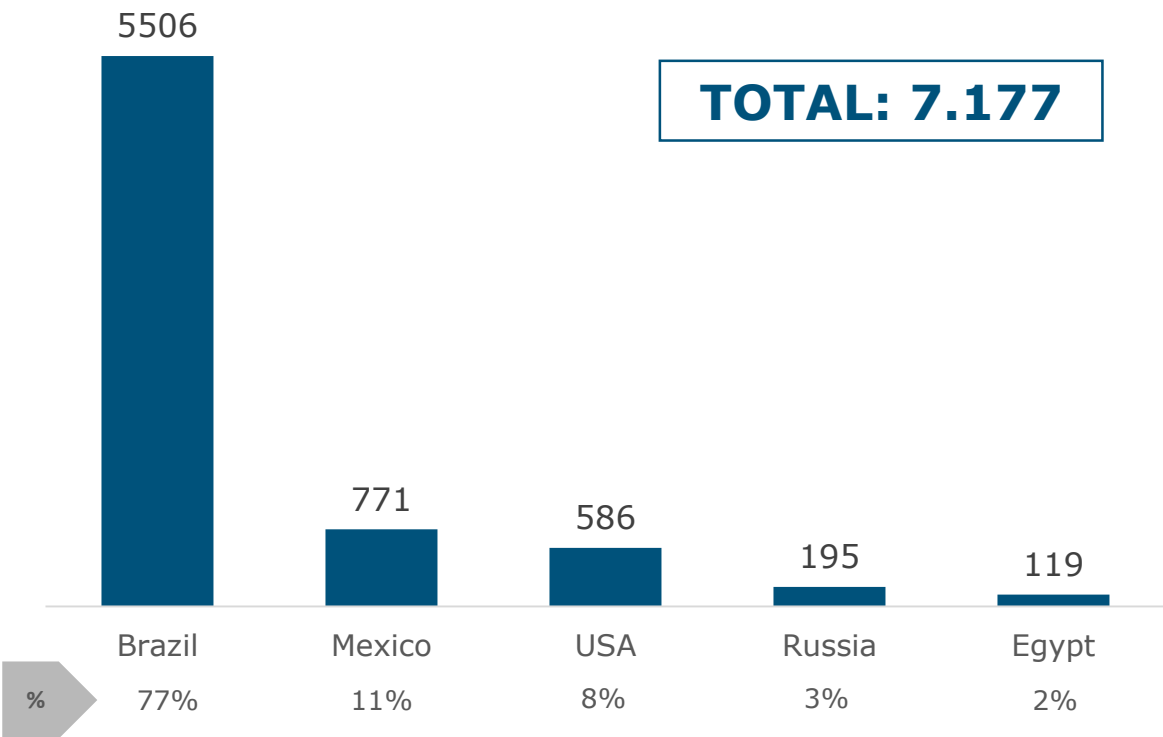


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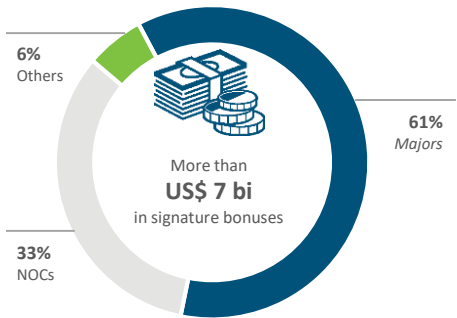
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Why has Brazil captured 77% of signature bonuses payed globally between 2016 and 2018 ?

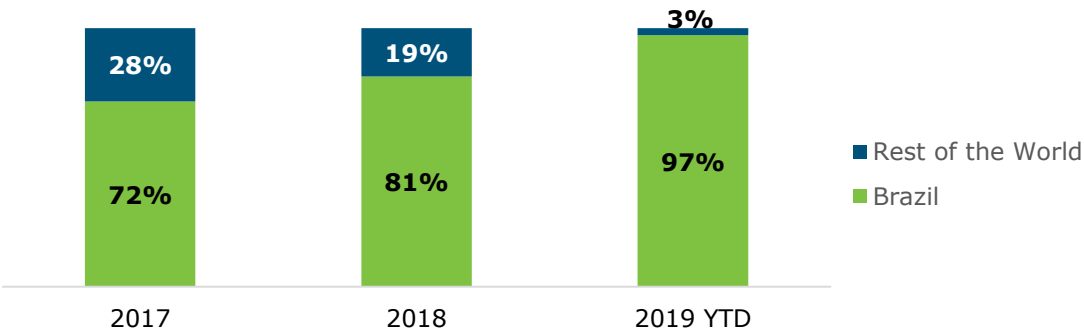
Signature bonuses by country between 2016 and 2018
US\$ Million



Signature bonuses by company type
2016-2018, %



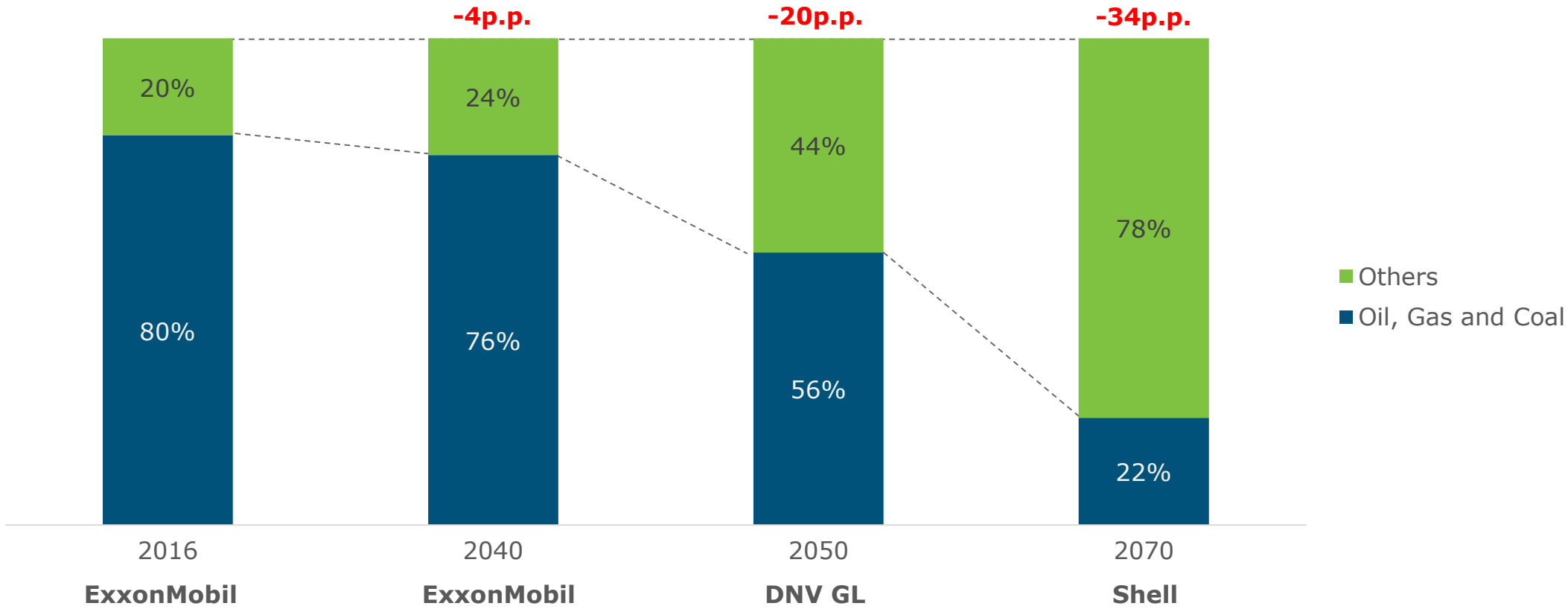
Total signature bonuses
2019, US\$ Million



Private companies were responsible for 67% of the signature bonuses paid from 2016 to 2018.

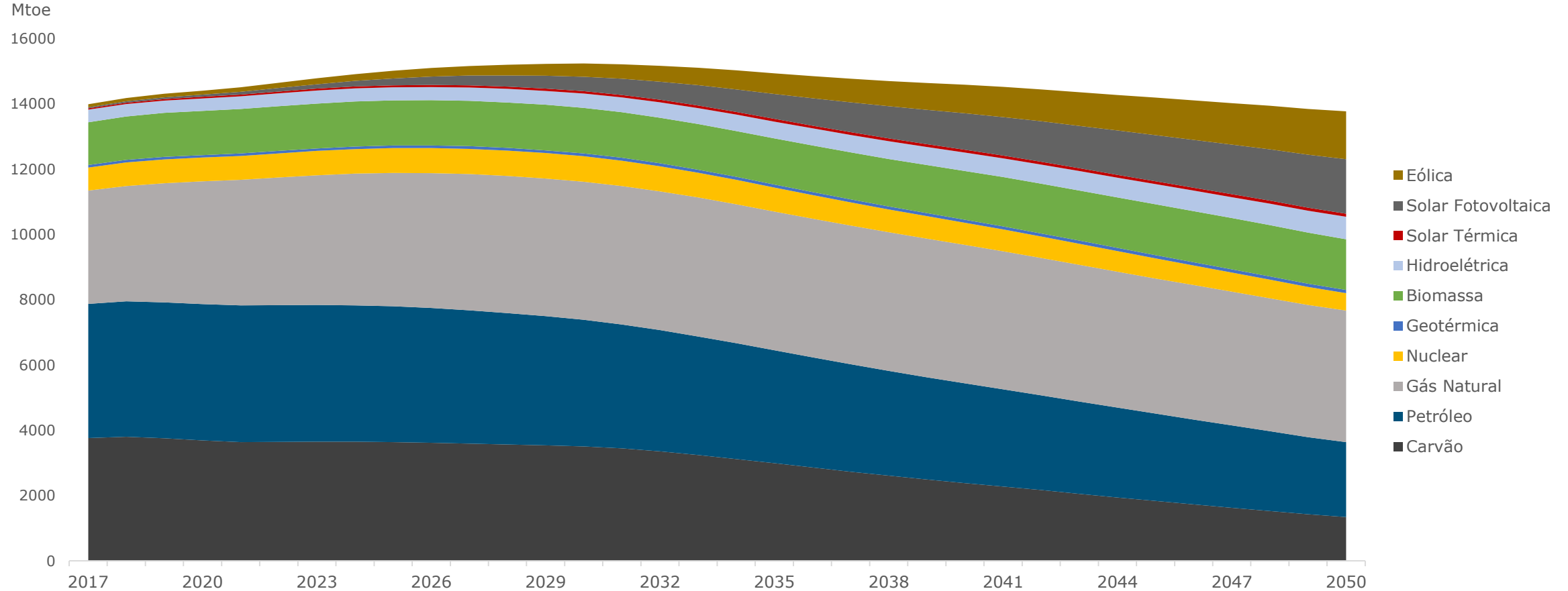
Fossil fuels participation in the global energy matrix is expected to decline in the next decades

Global energy matrix projections
%



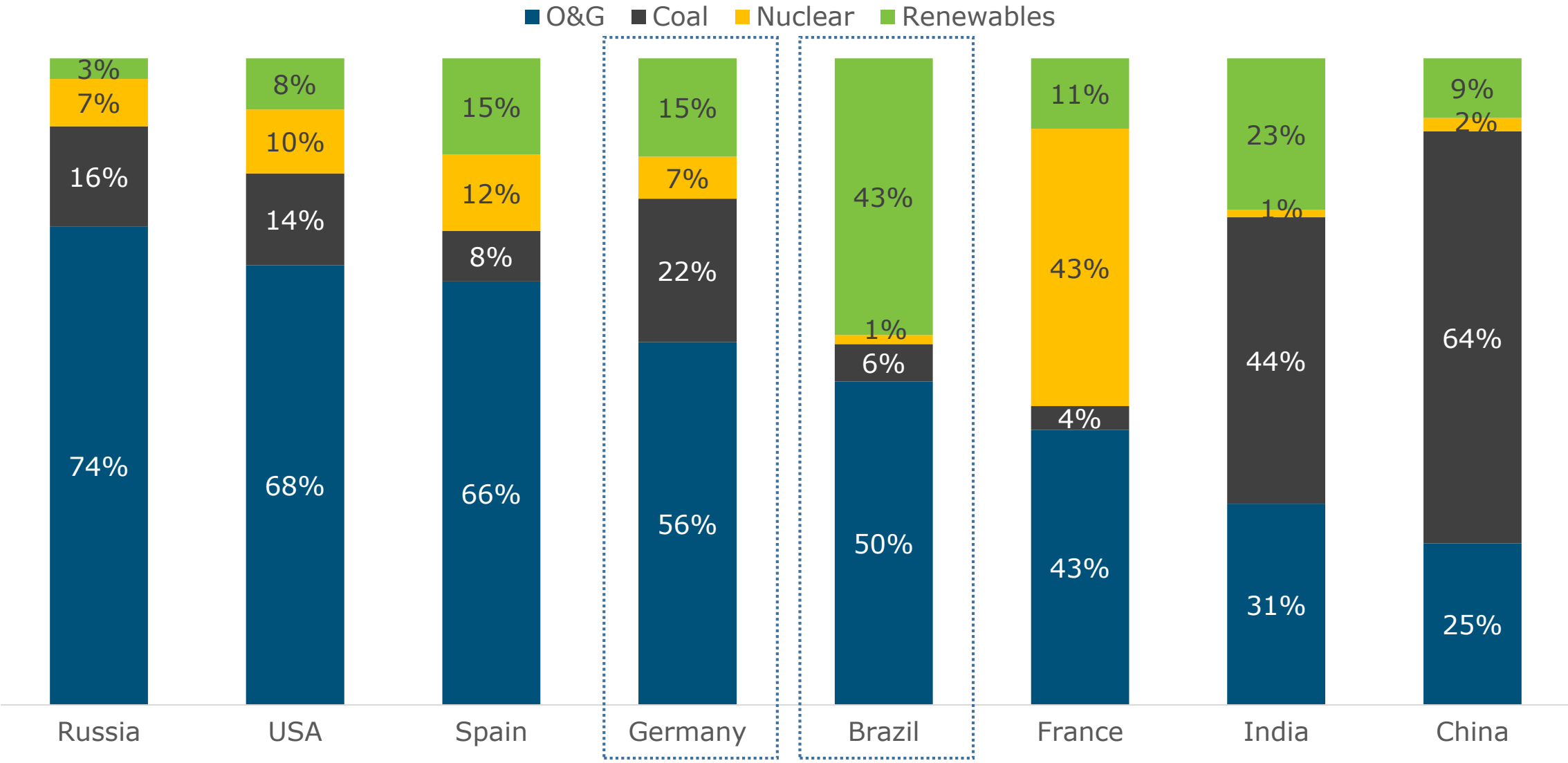
Source: Elaborated by IBP with data from ExxonMobil, DNV GL and Shell

Energy matrix projection - 2050



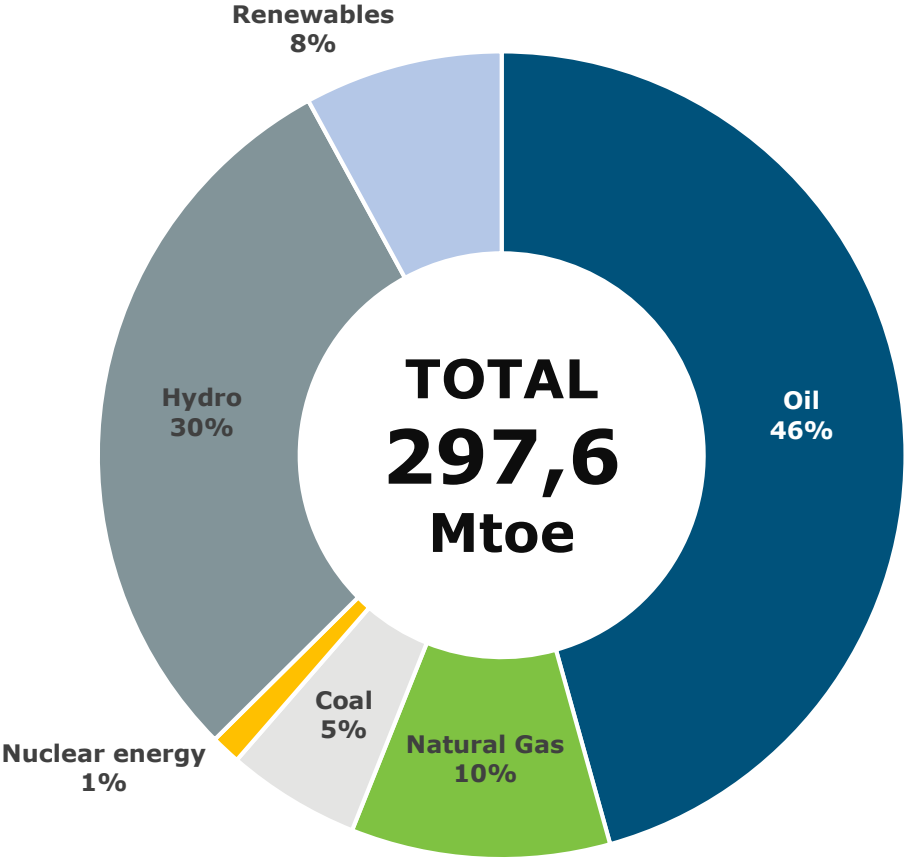
According to DNV GL, by **2050**, **coal**, **oil** and **natural gas** will be **responsible for**
around **56%** of the energy offer.

The world's biggest economies have strong fossil fuel participation in the energy matrix

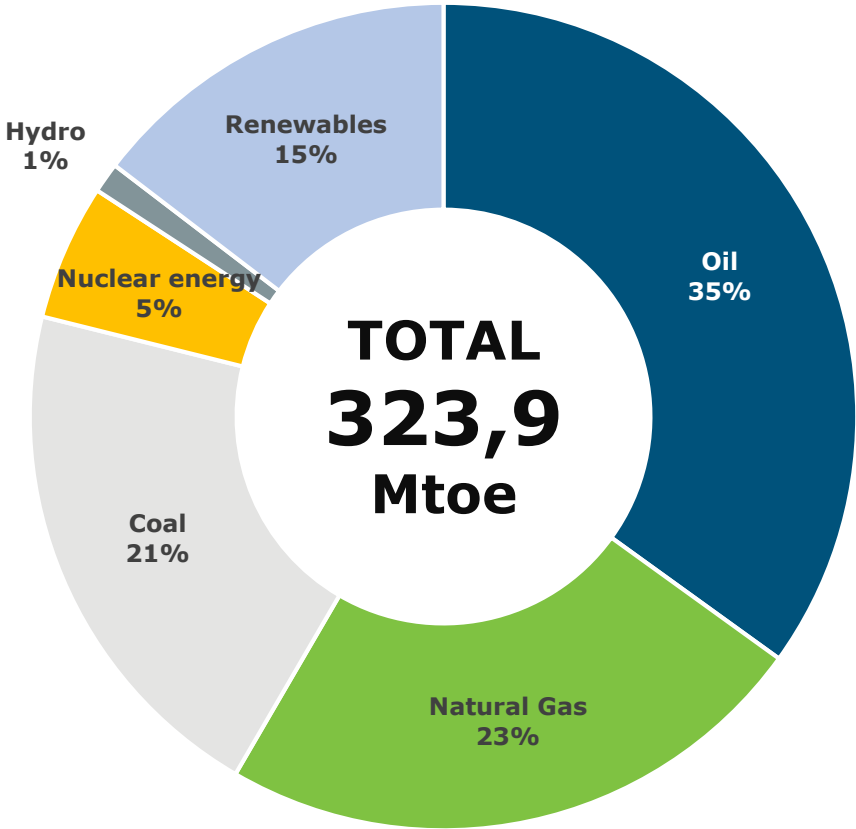


Source: Elaborated by IBP with data retrieved from IEA (2017)

Brazil's Energy Matrix



Germany's Energy Matrix



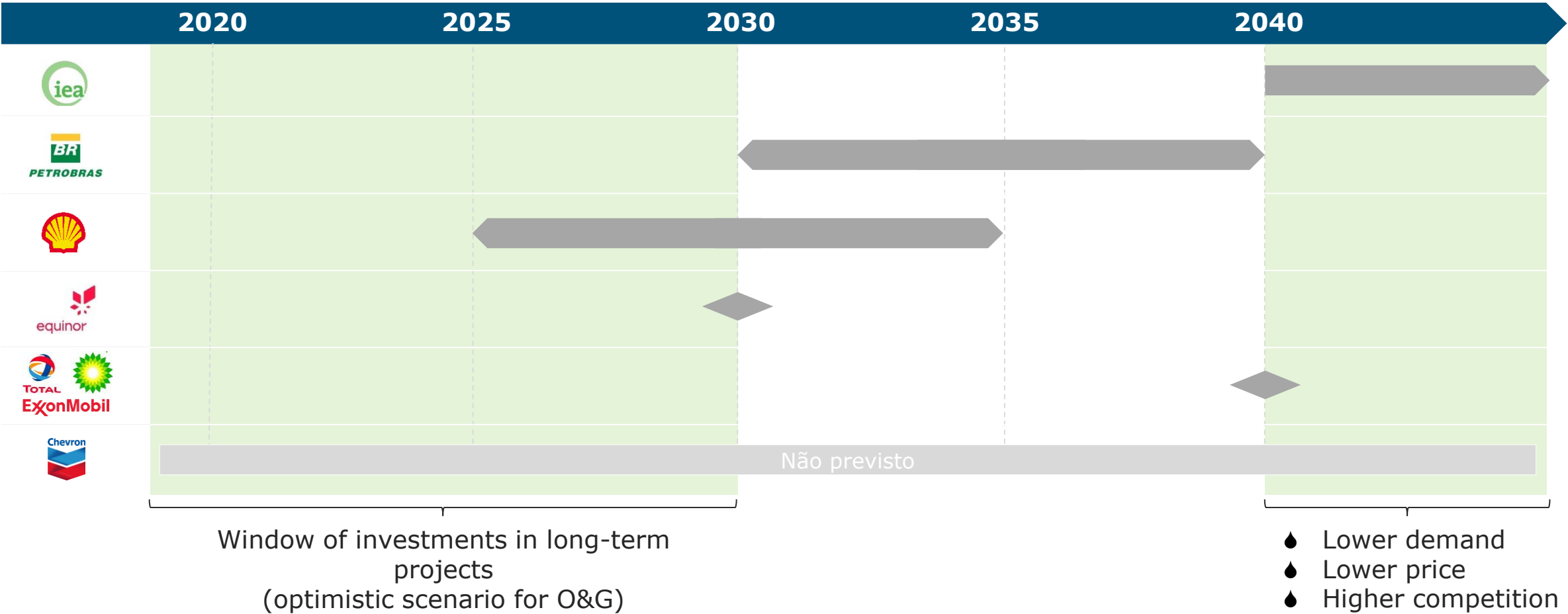
Source: Elaborated by IBP with data retrieved from BP 2019





The next decade can represent O&G's industry last window of opportunities

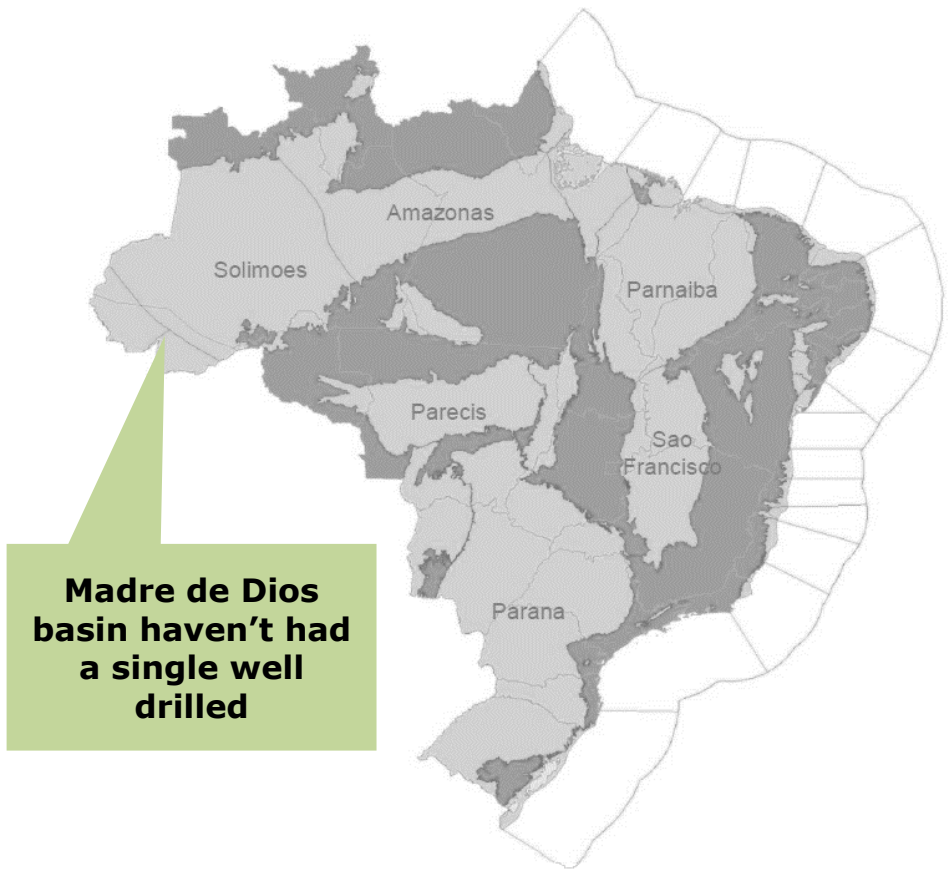
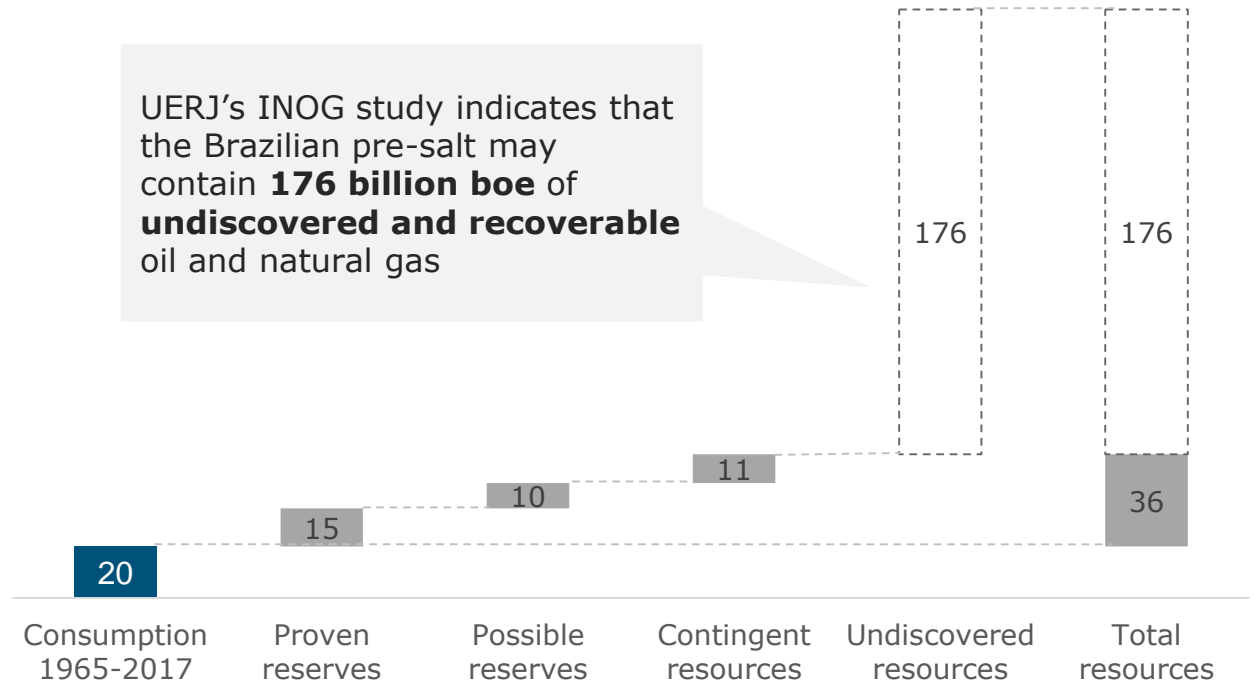
Forecast peak in oil global demand according to major industry players



Source: Elaborated by IBP with data retrieved from companies outlooks

Brazil´s great reserves and an industry with high growth potential

Current reserves and potential O&G resources in Brazil
2018, Billions of boe

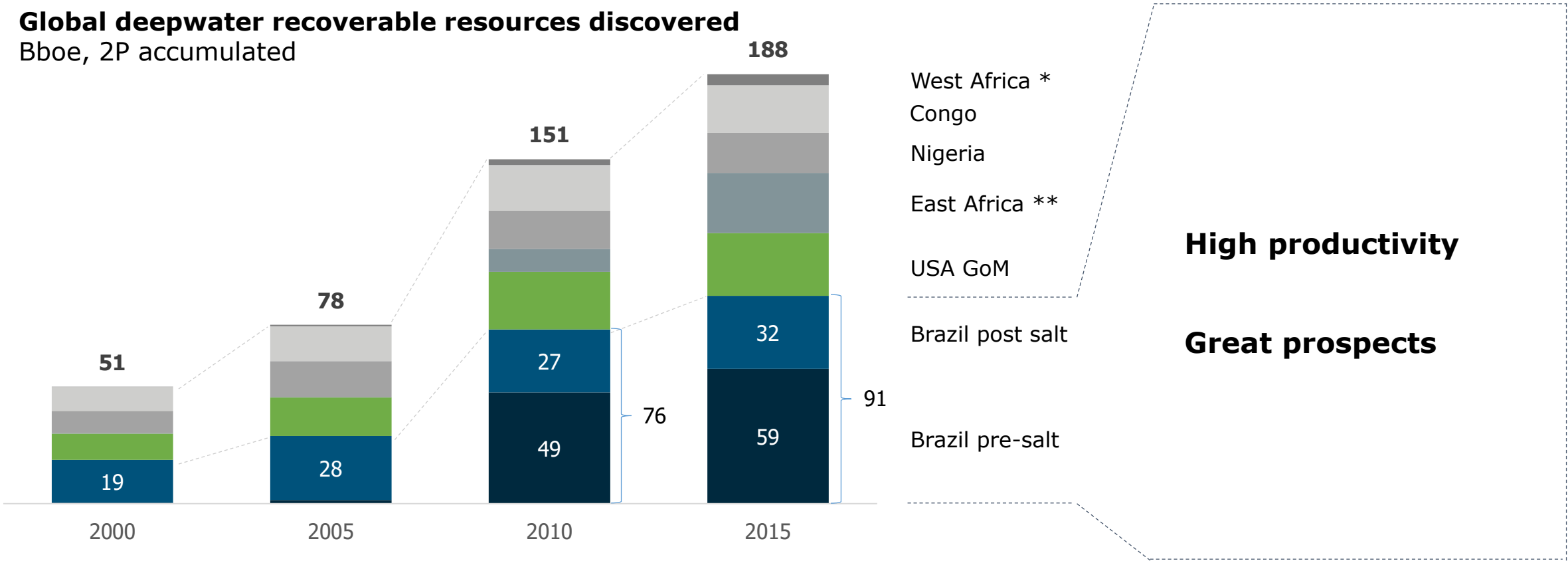


Less than 7% of the areas of Brazil's sedimentary basins are under contract.

Observations:
1) Boe refers to barrel of oil equivalent
2) Instituto Nacional de Óleo e Gás da Universidade Estadual do Rio de Janeiro
Source: IBP with data retrieved from ANP, BP and UERJ



Brazil has the largest recent offshore discoveries, especially in the Pre-salt area



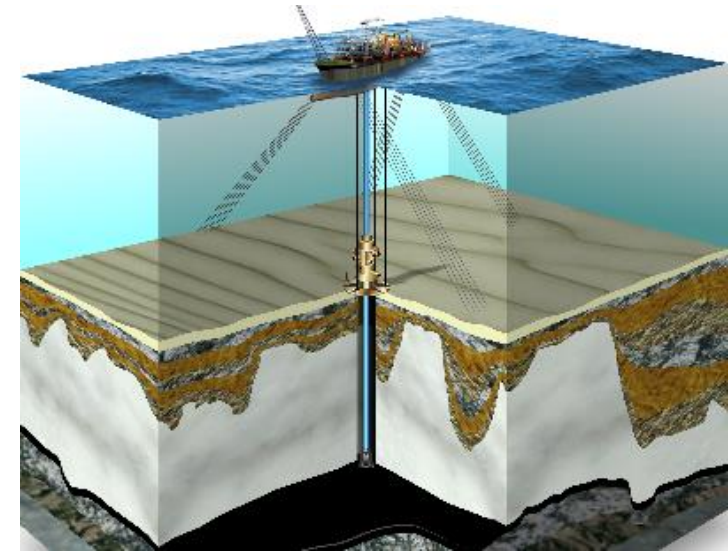
* Ex: Ghana, Senegal, Angola
** Ex: Somalia, Kenya
Source: Elaborated by IBP with data retrieved from IHS Global Deepwater and Growth Play Service



The Pre-Salt

The pre-salt discoveries are among the most important made in the world over the last decade.

- Large accumulations of excellent quality
- High commercial value light oil
- Close to the consumers centers



Average oil production per well*



8.640 bpd
224 wells



1.405 bpd
676 wells



15 bpd
6,559 wells

Mean construction time for offshore wells

2010	2015	2016
310 DAYS	128 DAYS	89 DAYS

Cumulative production (time to reach the production of 1 billion barrels)

Pre-Salt	GoM	Campos Basin
6yr	14yr	15yr

Today's E&P in Brazil

TOTAL PRODUCTION (August 2019)

3.828 Million boe/d

Oil production

2.99

Million bpd
(August 2019)

Natural Gas production

133

Million m³/d
(August 2019)

Cumulative production

~21

Billion boe
(31/12/17)

Proven reserves

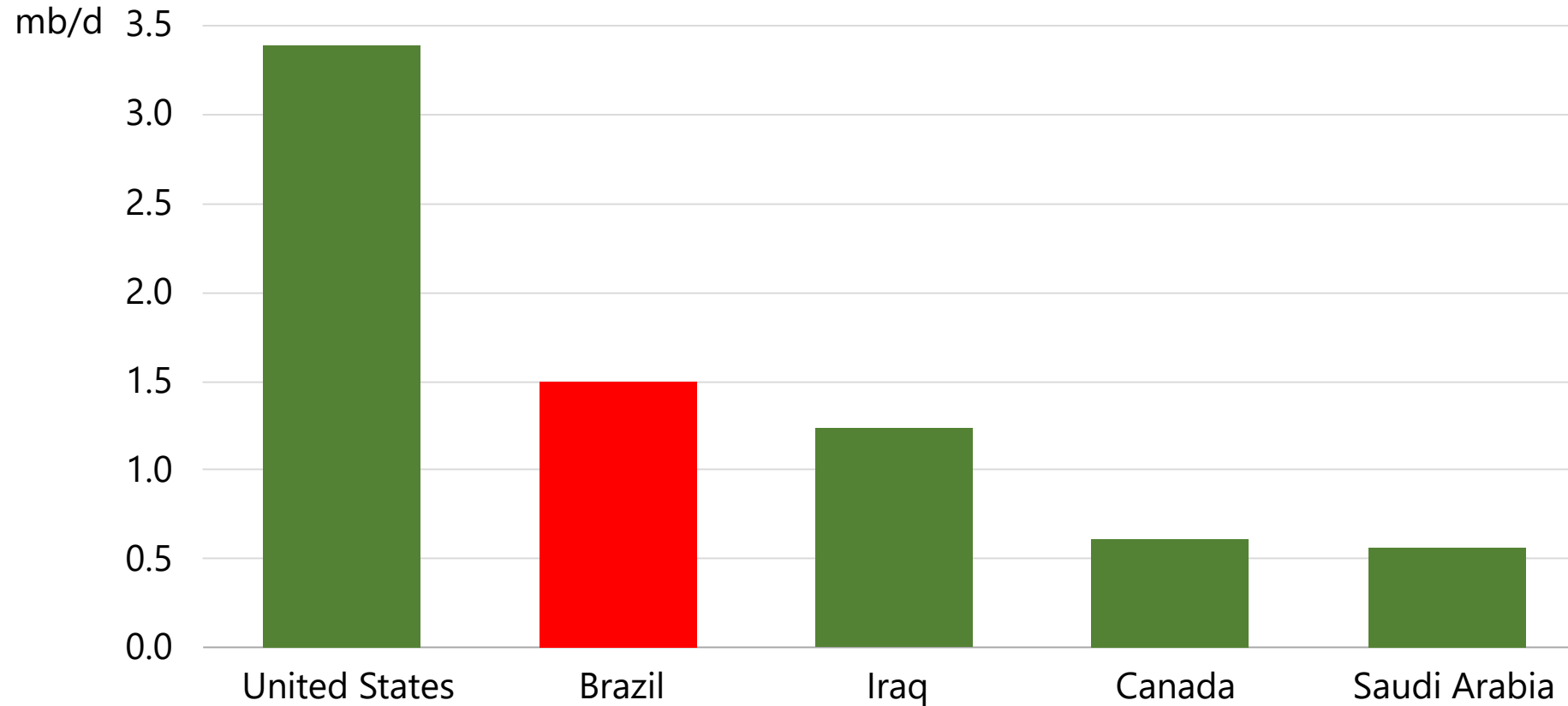
15

Billion boe
(December 2018)



Brazil emerges as a key source of global oil production growth

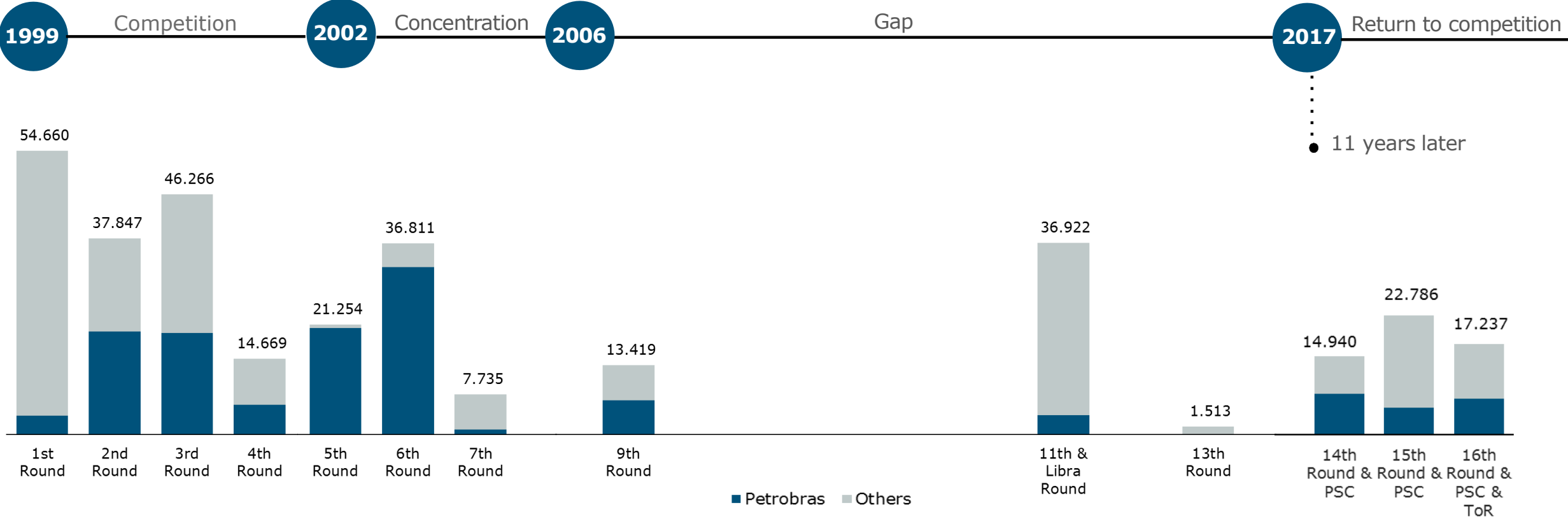
Top 5 contributors to world oil production growth, 2018-30



Brazil's oil production to grow strongly, supported by changes to the regulatory framework which attract capital to develop its abundant resources. If conditions are right, there is even further upside potential.

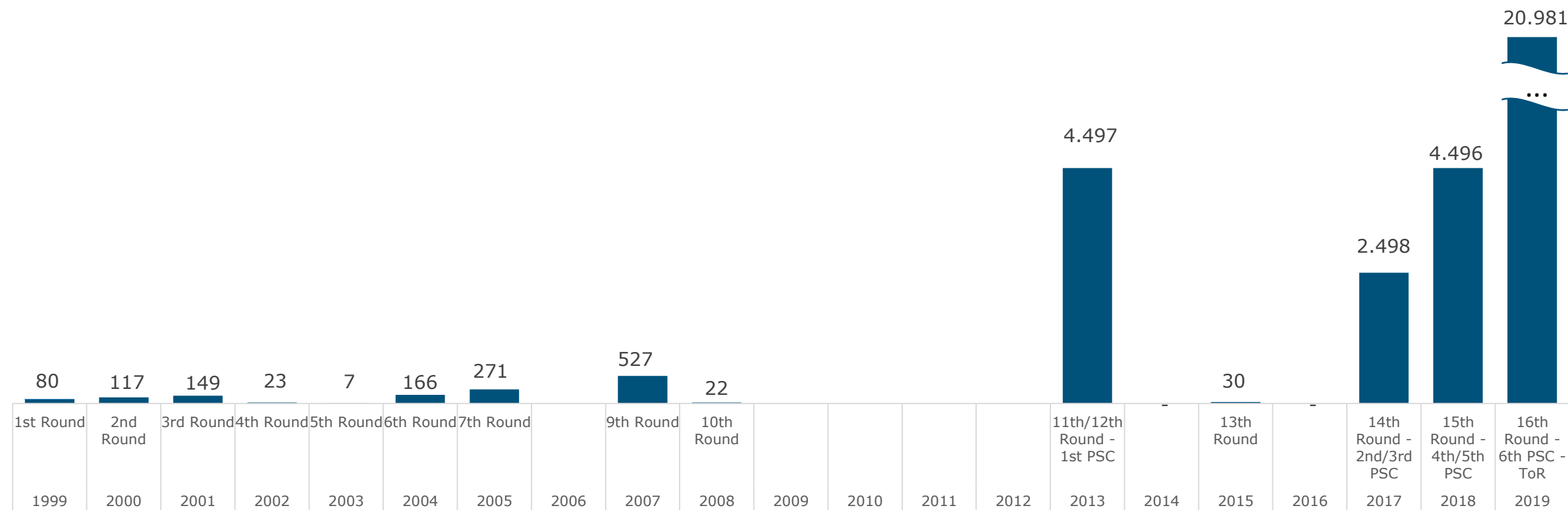
Offshore acquired area

km², 1999-2019



Signature bonuses paid

Signature bonuses paid per year – Concession and Production Sharing (US\$ Million)

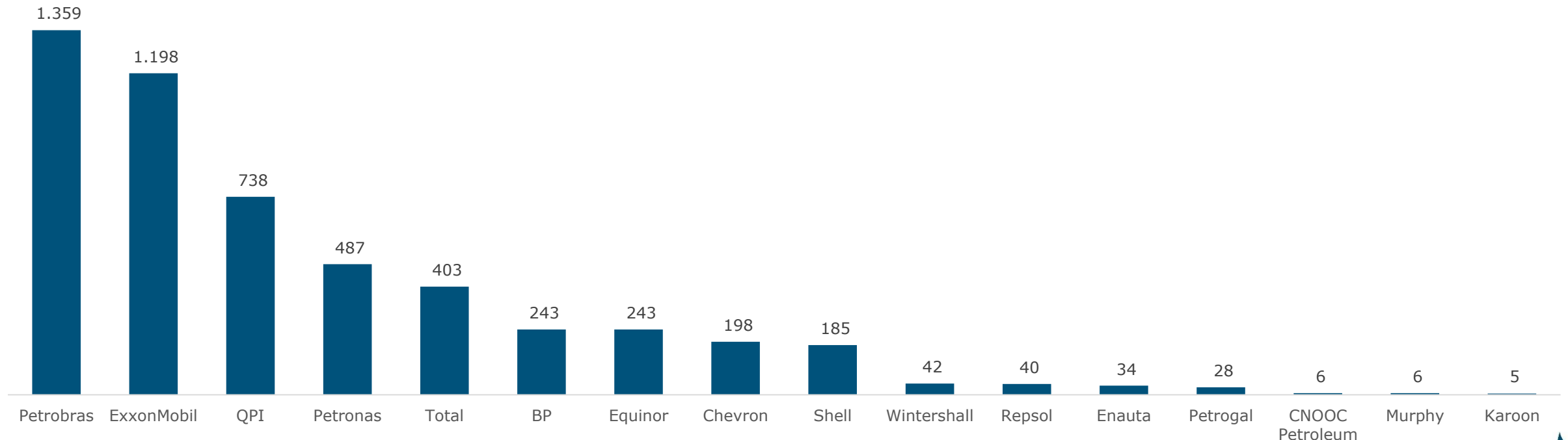


1) 8th Bidding Round was cancelled
2) Open Acreage Round not included
3) US\$ 1 = R\$ 4
Source: IBP with data retrieved from ANP



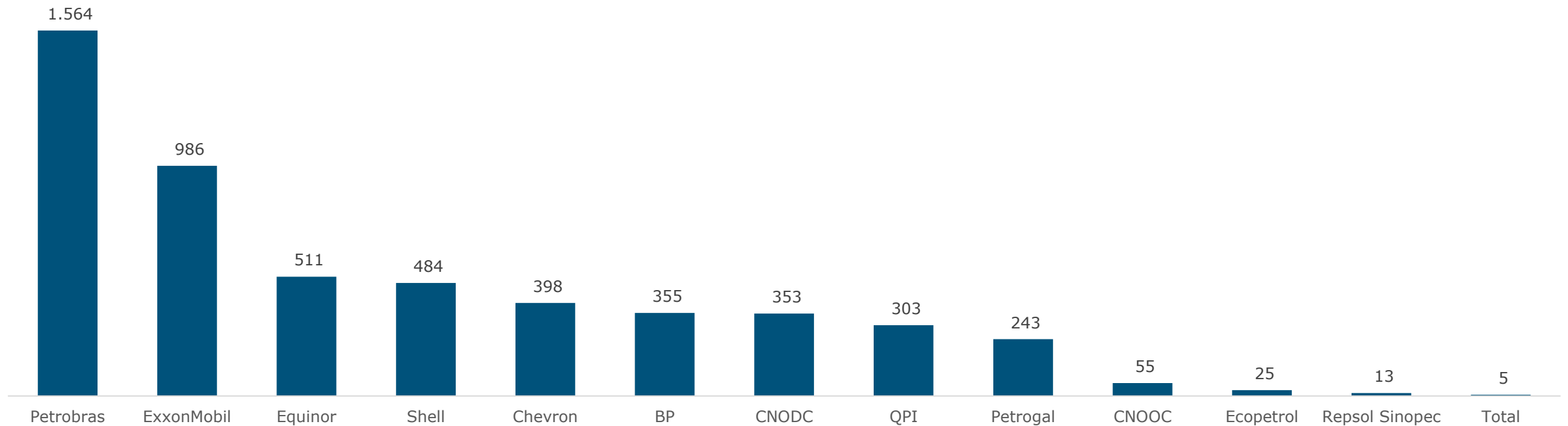
The amount bonuses payed has grown greatly in recent years

**Cumulative signature bonuses paid by concessionary –
13th to 16th concession rounds – offshore (US\$ Million)**



The amount bonuses payed has grown greatly in recent years

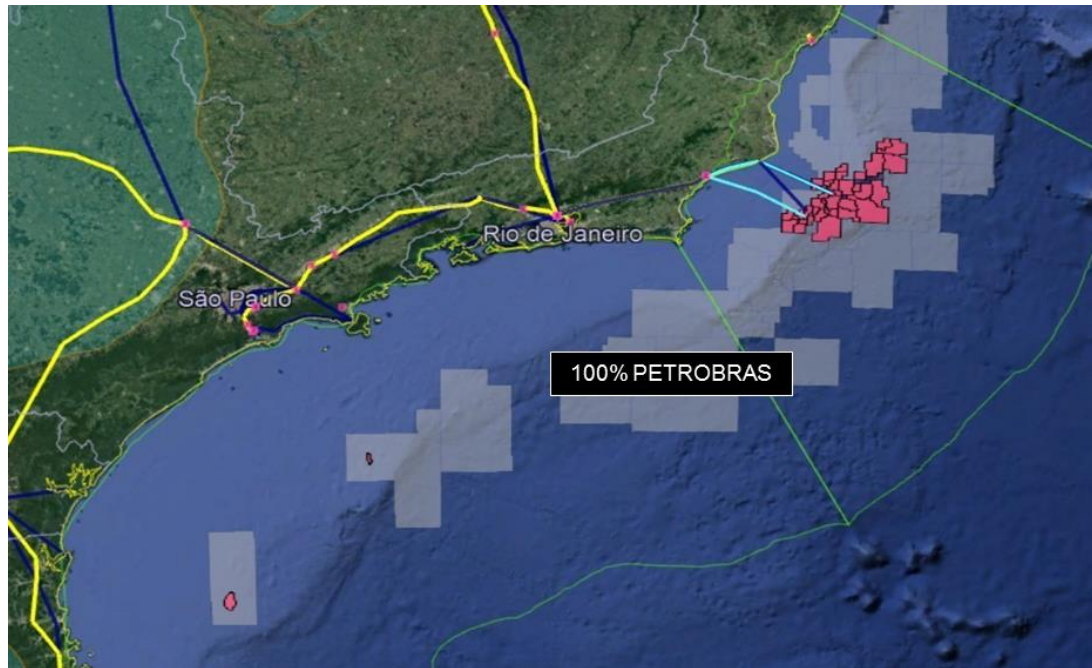
**Cumulative signature bonuses paid by concessionary
– Production sharing rounds (US\$ Million)**



Note: First round (Libra) not included
US\$ 1 = R\$ 4
Source: IBP with data retrieved from ANP

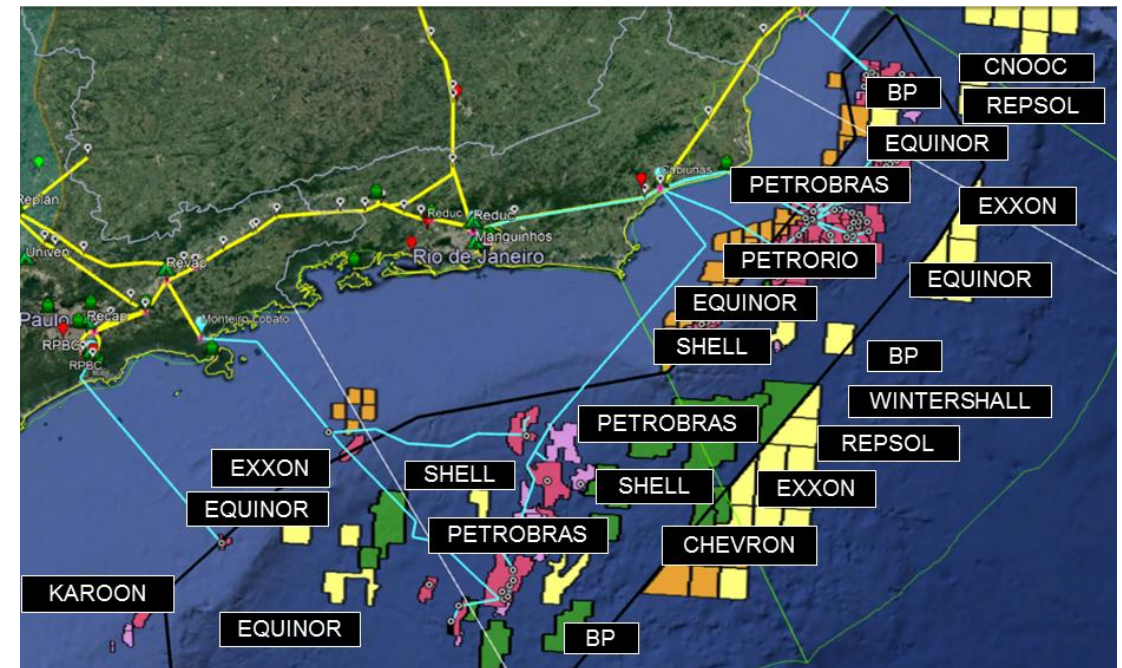
Market opening also increased the number of players

**Campos and Santos basins: Bidding Round Zero
1998**



1 million bbl/day

**Campos and Santos basins: after the return of bidding rounds
2018**



2,6 millions bbl/day

More than 20 years after the Oil Act, it's evident **the players diversification in upstream and the expansion of offshore infrastructure**

Bidding Rounds



Future E&P in Brazil

TOTAL PRODUCTION (in 2030)

~7,50 Million boe/d

Oil production

6,0

Million bpd
(in 2027)

Natural Gas production

217

Million m³/d
(in 2027)

Cumulative production

~39

Billion boe
(by 2027)

Proven reserves

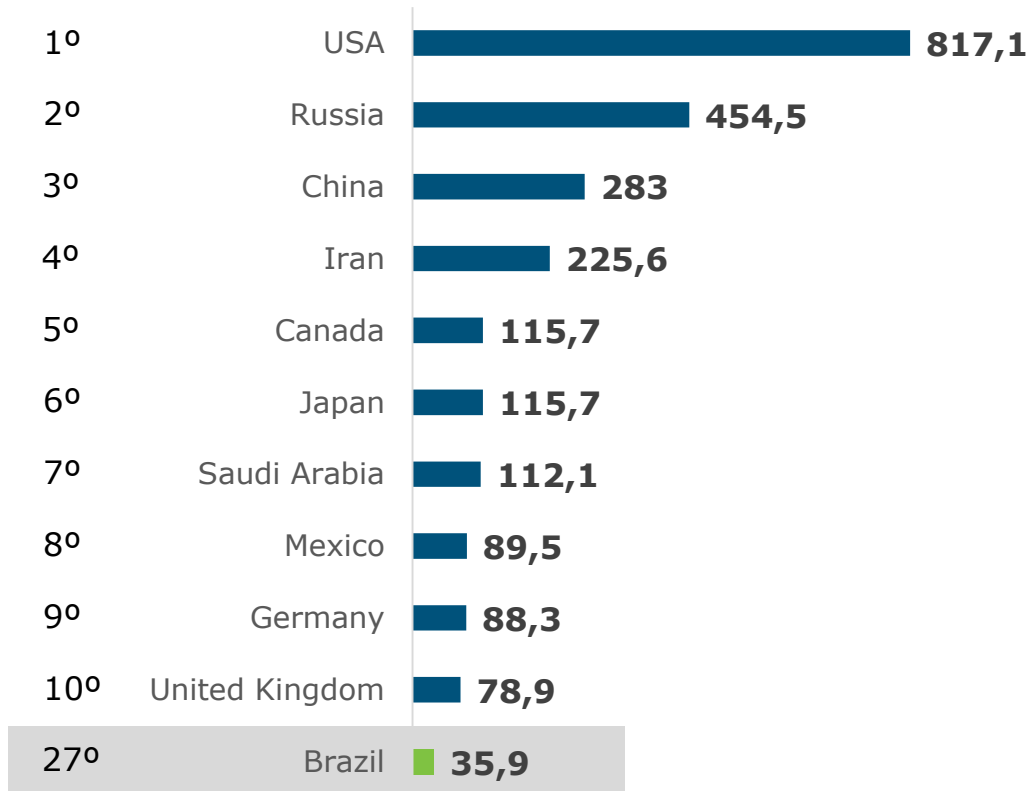
~45

Billion boe
(in 2027)

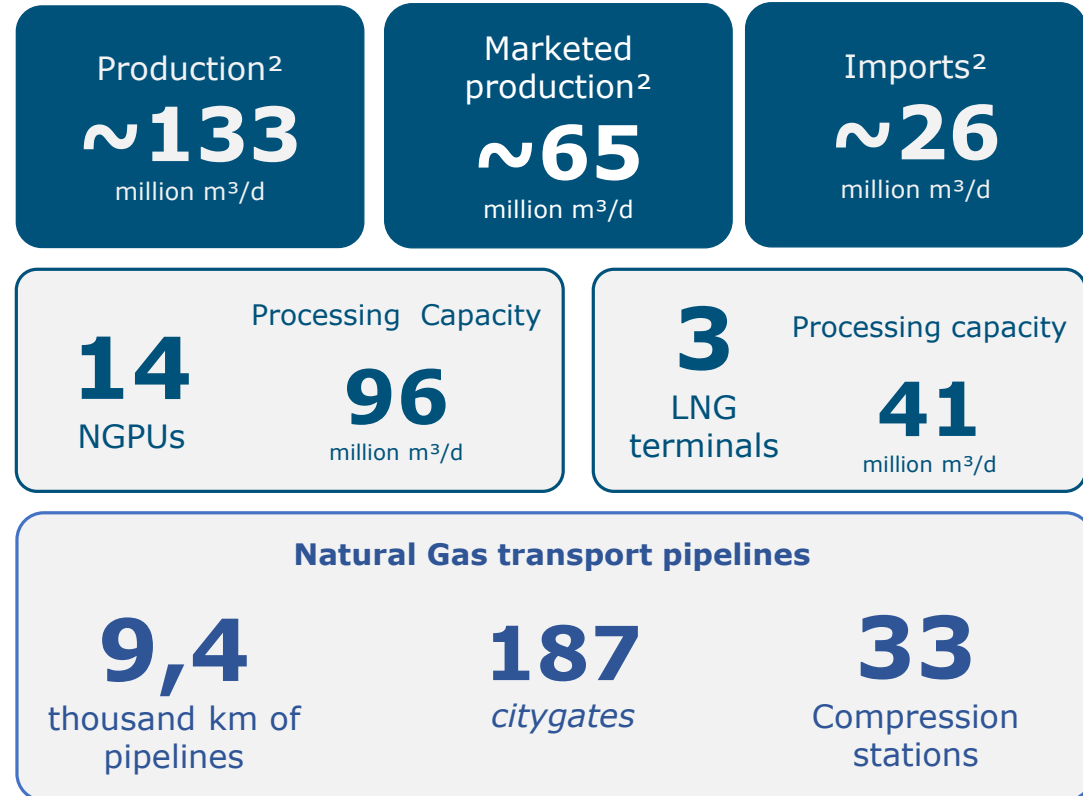


The Brazilian Natural Gas market

World's Natural Gas consumption¹ 2018, Billion m³



National Natural Gas market



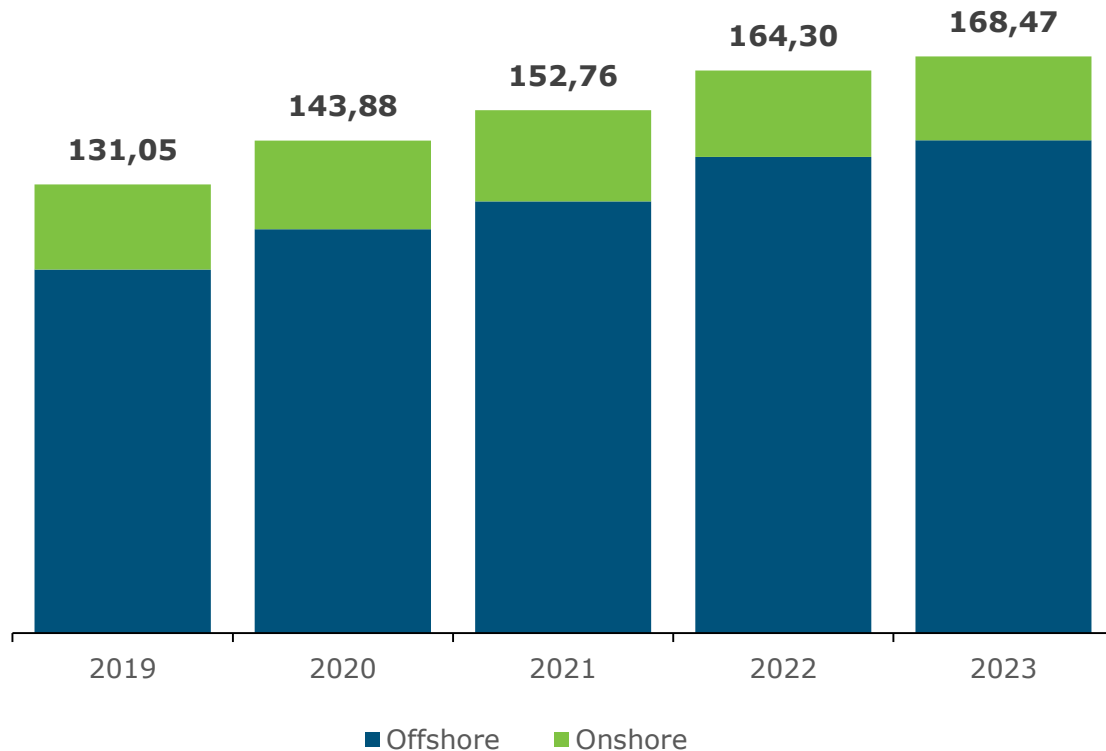
Note: 1) Excludes natural gas converted to liquid fuels but includes derivatives of coal as well as natural gas consumed in Gas-to-Liquids transformation.

2) Data from August 2019

Source: IBP with data retrieved from EPE, ANP and BP

New design for Brazilian gas market foresees competition and new investment opportunities

Brazilian natural gas production forecast
MMm³/d, 2019-2023



NATURAL GAS 2019-2023 Outlook

+ 29%
Production
Natural gas
(2019 - 2023)

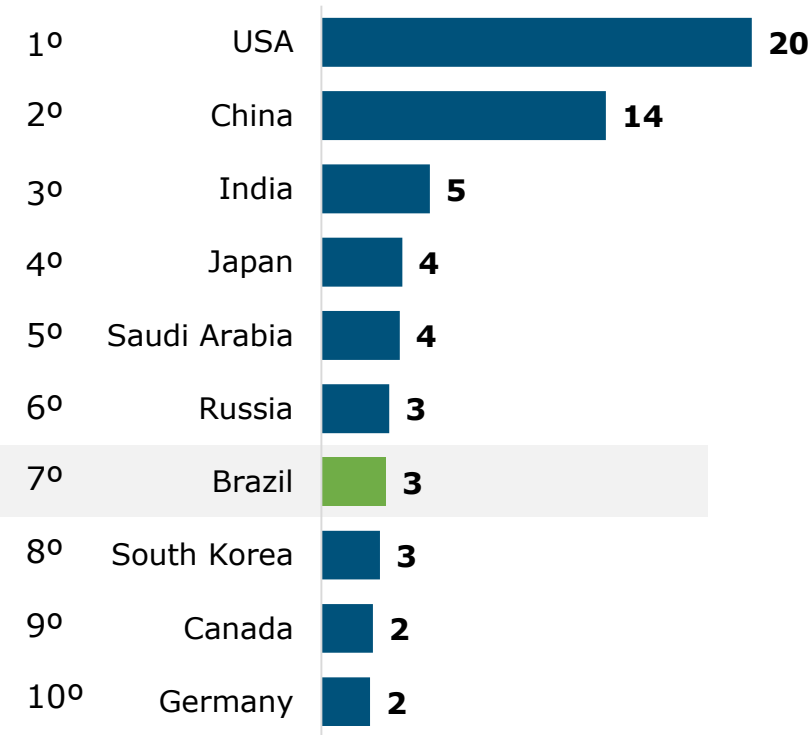
NOVO MERCADO DE GÁS MARKET OPENING

+ Competitiveness
+ Investment

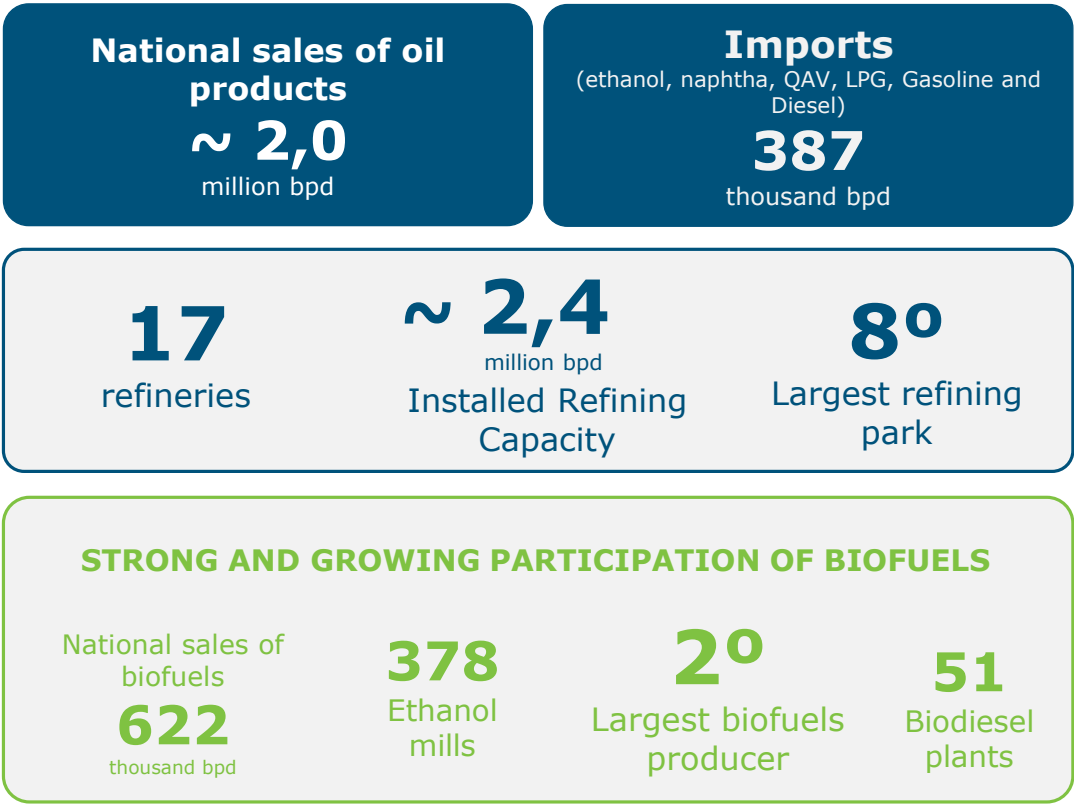
+ Employment
+ Income

Brazil is the world's 7th largest consumer of oil products

World's oil consumption¹
2018, Million bpd



National mid-downstream market²

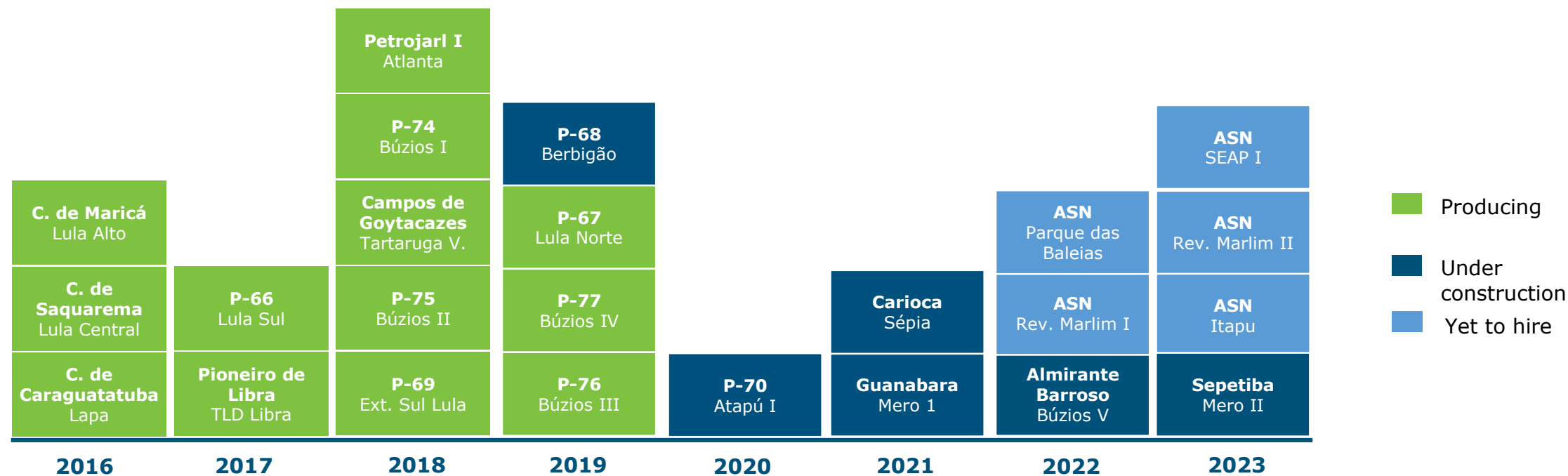


Note: 1) Considers the domestic demand plus international aviation and shipping fuel, refining consumption and losses, biofuels, coal and natural gas derivatives

2) QAV refers to aviation kerosene
Source: IBP with data retrieved from EPE, ANP, BP Statistical Review



11 FPSOs are expected to go online in the next 5 years



Around 50 new FPSOs are expected to be in operation until 2030!

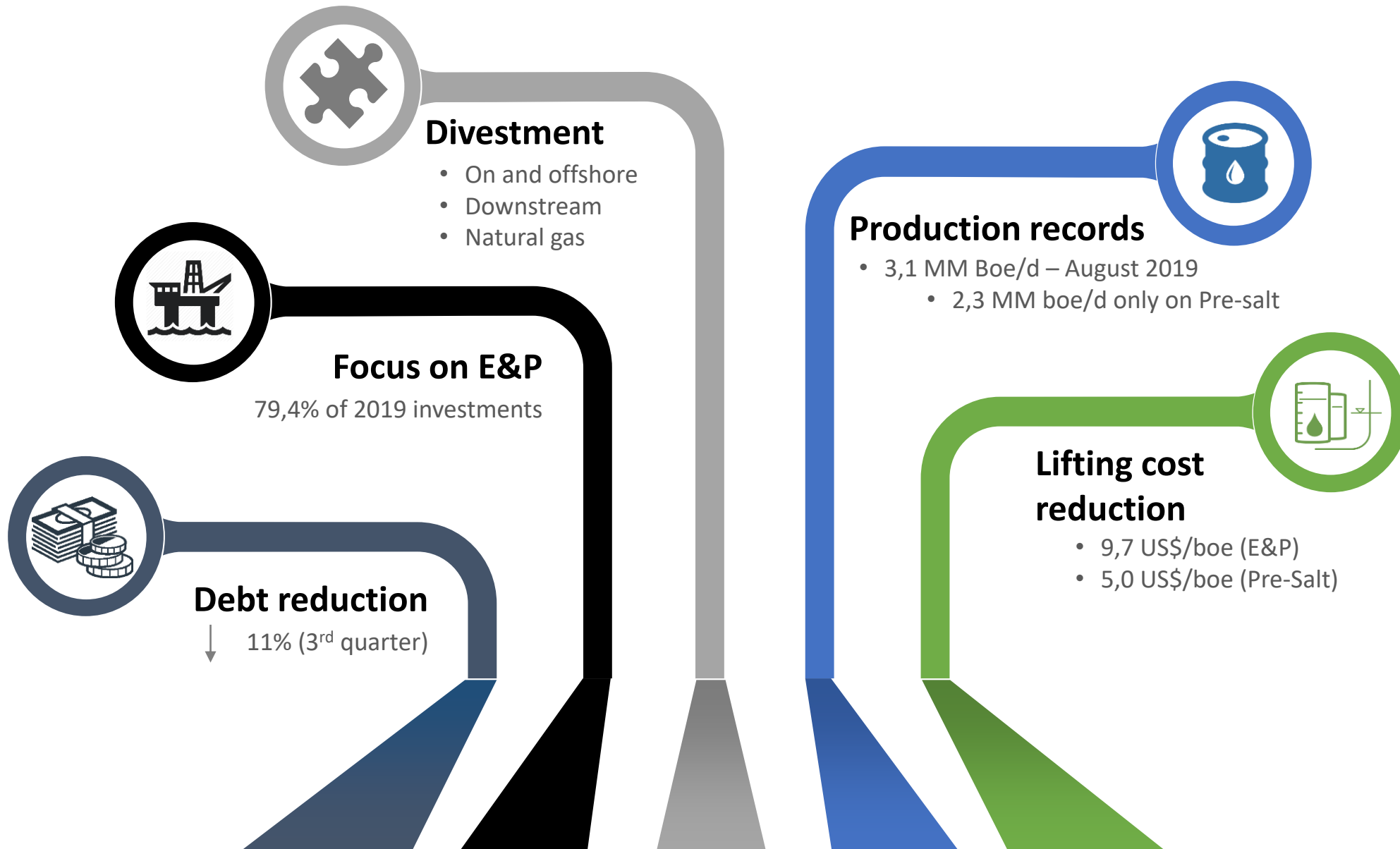
Potential investment for the next 10 years

How much investments on the Oil, Gas & Biofuels Industry would be necessary to develop all the Brazilian potential in the next 10 years?

Sector	Investments (US\$ billion)	Investments (R\$ billion)
E&P	568	2.102
Refining, Processing and Petrochemical Plants	58	216
Biofuels	28	105
Pipelines	10	35
Logistics Supply	8	31
TOTAL	672	~2.500

- Transfer of Rights Surplus + 6th PSC: ~ **400 billions** in investments

Petrobras: new business plan



Challenges and opportunities for the O&G sector



Opening of the natural gas market



Downstream market opening



Environmental Licensing



Tax simplification



Competitive supply chain



Geopolitical context



Technology, Innovation and Digital Transformation



Communication



Human Resources



Energy Transition



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RIO OIL & GAS CONFERENCE – THEMATIC BLOCKS



BLOCK 1

**Exploration &
Production**

BLOCK 2

Offshore

BLOCK 3

Downstream

BLOCK 4

Natural Gas

BLOCK 5

**Leadership &
Management**

BLOCK 6

**Digital
Technology**

BLOCK 7

**Energy
Transition**

Brazil in global energy markets

Global energy demand to continue to increase, driven by economic & population growth in the emerging economies

- **Brazil became a net energy exporter in 2018 – the turnaround from decades of dependence on imports is a rare & historic achievement**

Brazil is set to enter the global league of top oil exporters, reaping the benefits of its long pursuit of deepwater oil

Brazil can play a role in global energy transitions, thanks to its leadership in hydropower & bioenergy

Ongoing energy sector reforms are critical for Brazil to mobilize the annual 70 billion USD investment it needs in its energy sector

THANK YOU!

