



BRAZIL:
Opportunities in the O&G business

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About IBP:

Founded in 1957
Non-profit Institution

VISION:

Advocacy

**Knowledge
Management**

200 corporate members

◆ E&P *Upstream*

◆ *Downstream*

◆ Petrochemical

◆ Products and Services

120 individual members

21 institutional
partners

41 technical
committees

+1.200 participants

Unibp



IBP's Value Proposition

Main Activities:



Networking & Stakeholders



Training



Conferences and Exhibitions



Regulatory and Technical
Committees



Standardization and
Certificate Authority

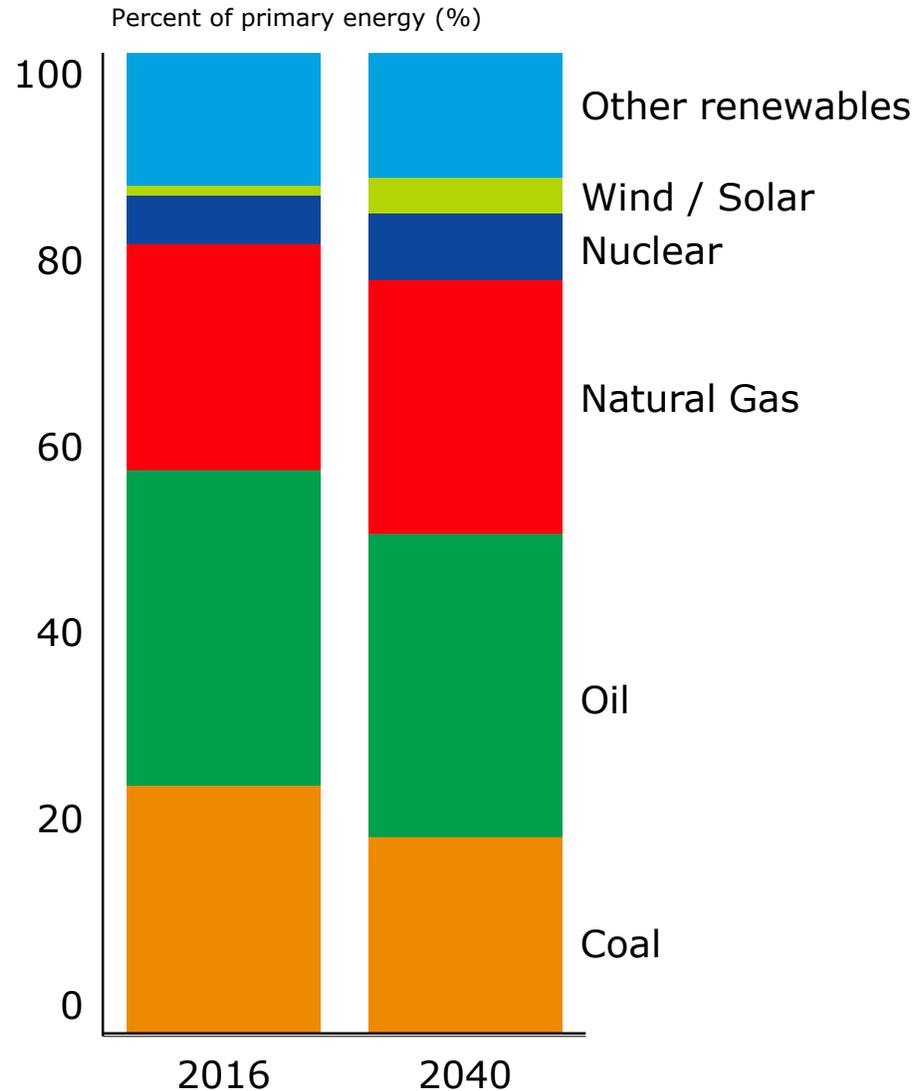


Young professionals



Compliance

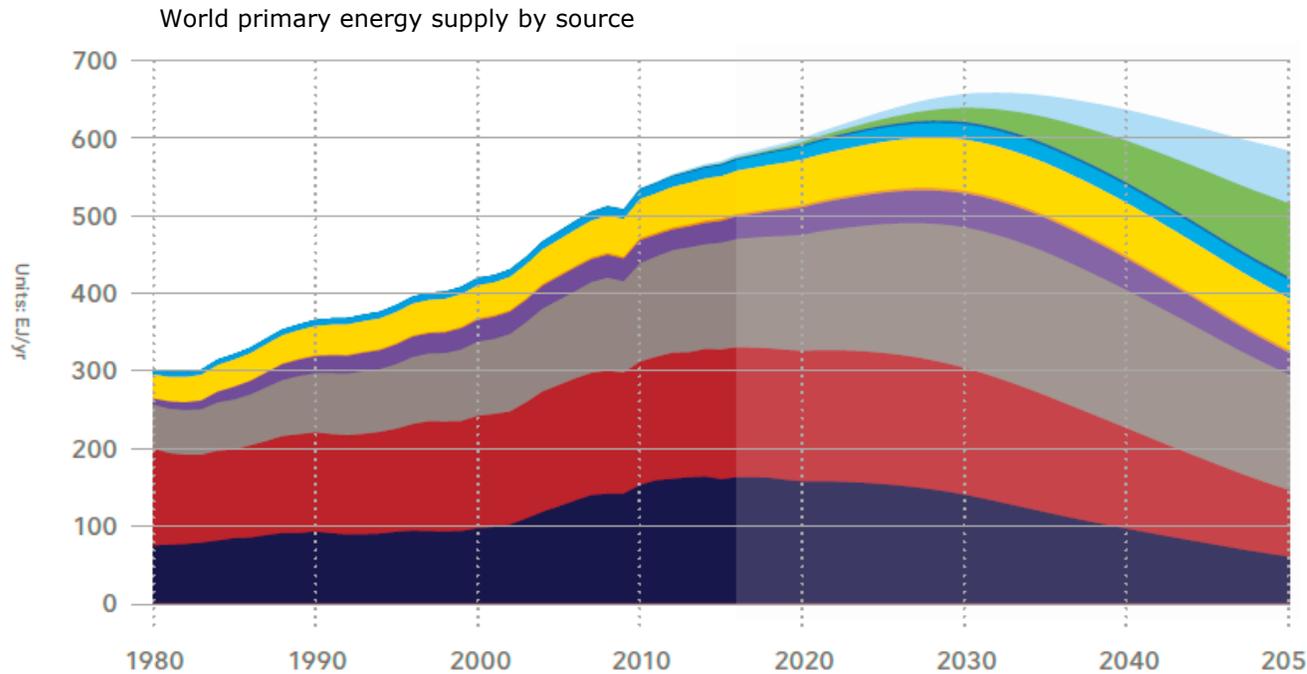
Energy matrix projections



In **2016**, **coal, oil** and **natural gas** were responsible for **80%** of the **energy supply**.

By **2040**, ExxonMobil's projection shows that they'll be **responsible** for around **76%** of the offer.

Energy matrix projections



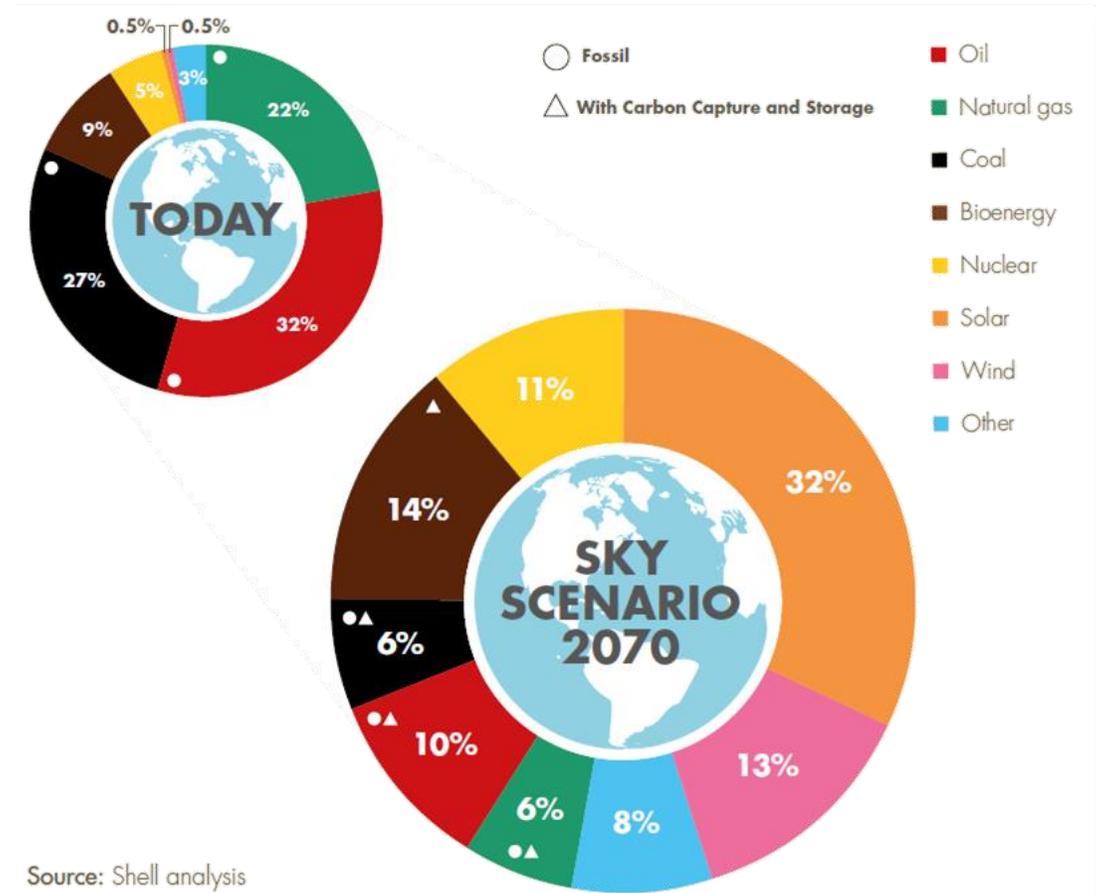
ENERGY SOURCE	2016 (EJ)	2030 (EJ)	2050 (EJ)	2050 (%)
Wind	3	18	68	12%
Solar PV	1	19	96	16%
Solar thermal	2	3	4	1%
Hydropower	14	20	24	4%
Biomass	56	66	67	11%
Geothermal	3	4	4	1%
Nuclear fuels	30	44	28	5%
Natural gas	140	182	149	25%
Oil	168	164	86	15%
Coal	163	140	60	10%
Total	581	660	586	100%

According to DNV GL, by **2050**, **coal**, **oil** and **natural gas** will be responsible for around **50%** of the offer.

Energy matrix projections

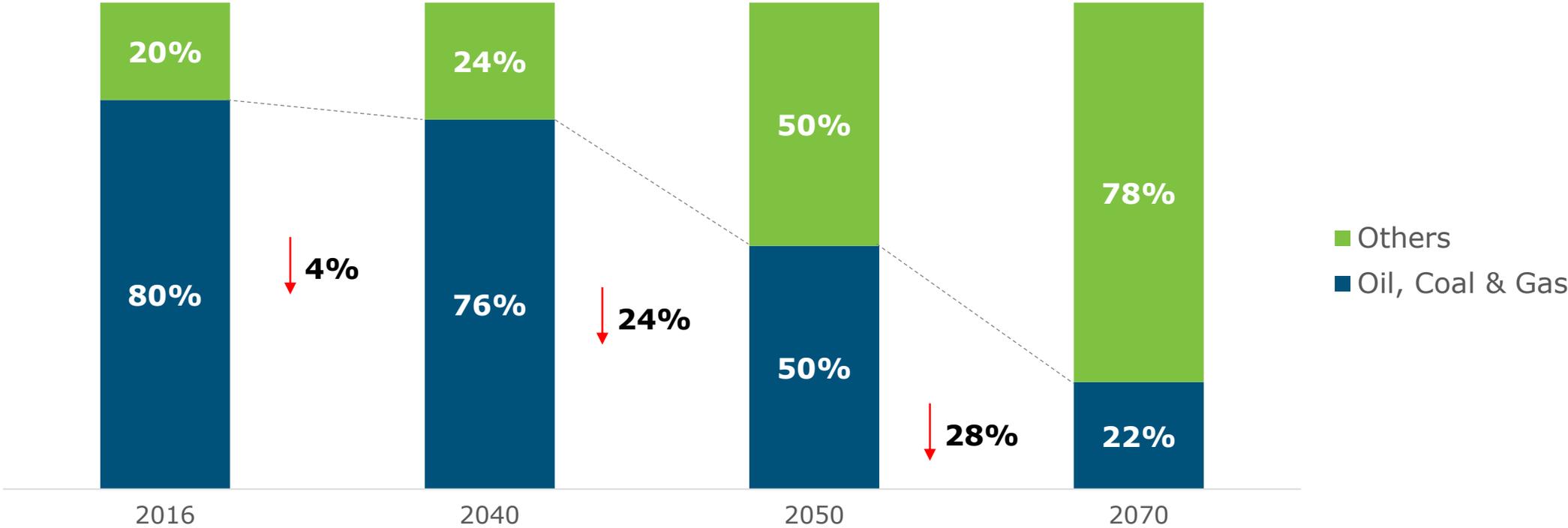
IN A **NET-ZERO EMISSIONS** WORLD IN **2070**, **SOLAR**, **BIOENERGY** AND **WIND** DOMINATE RENEWABLES SUPPLY WHILST OIL REMAINS THE LARGEST FOSSIL ENERGY SOURCE

Shell analysis' indicates that by **2070**, only **22%** of the **energy matrix** will be formed by **coal**, **oil** and **natural gas**.



Source: Shell analysis

Energy matrix projections



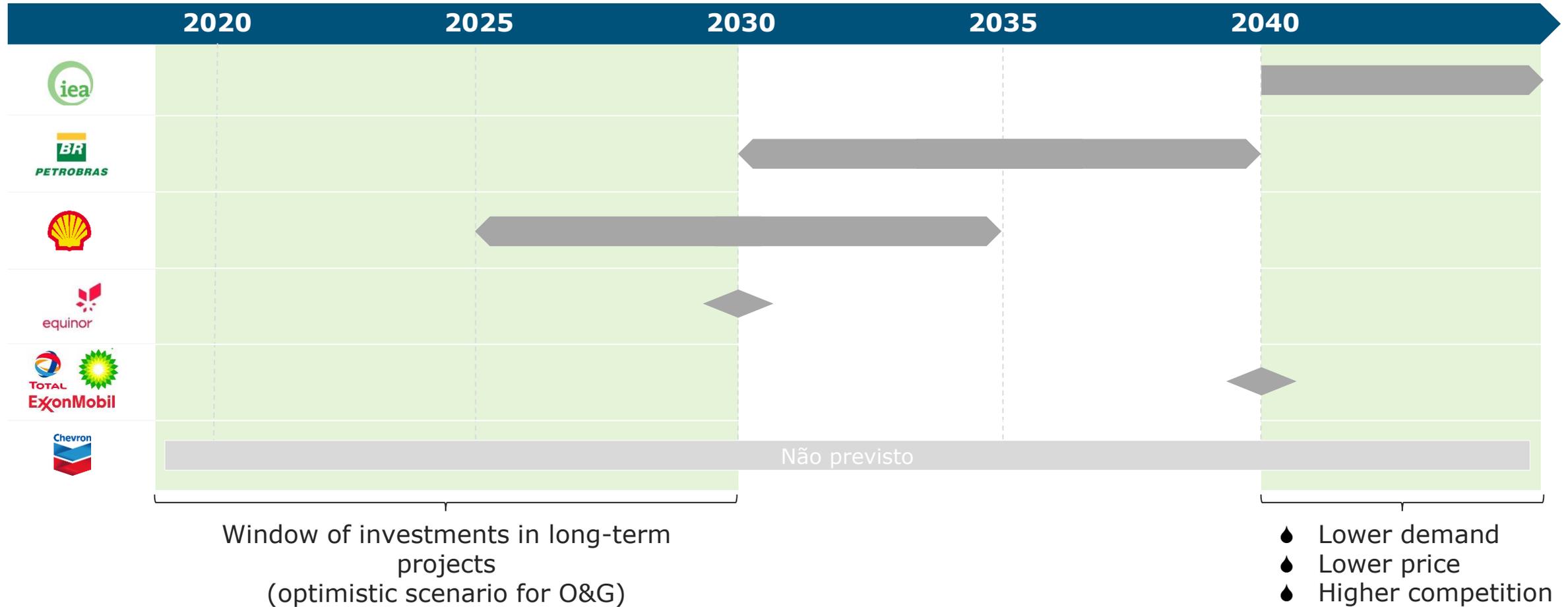
Oil and Gas consumption is expected to decline in a few decades to come

Source: 2016 and 2040: ExxonMobil; 2050: DNV GL; 2070: Shell



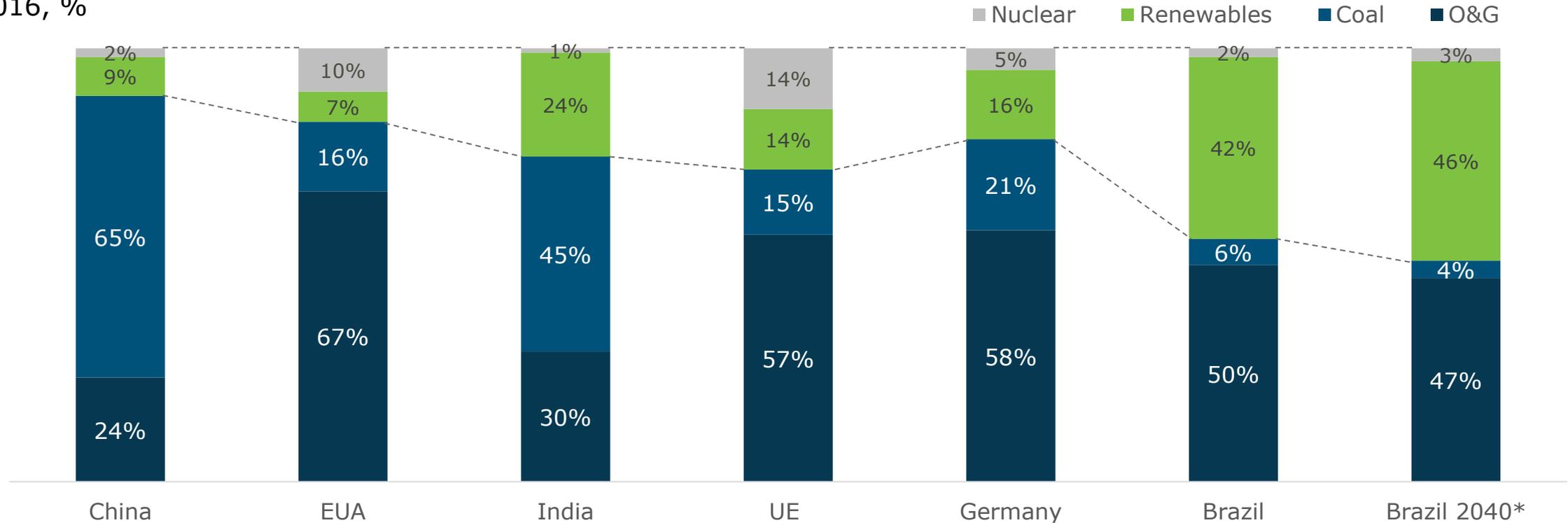
The next decade can represent O&G's industry last window of opportunities

Forecast peak in oil global demand according to major industry players



Brazil's energy mix is among the cleanest in the world

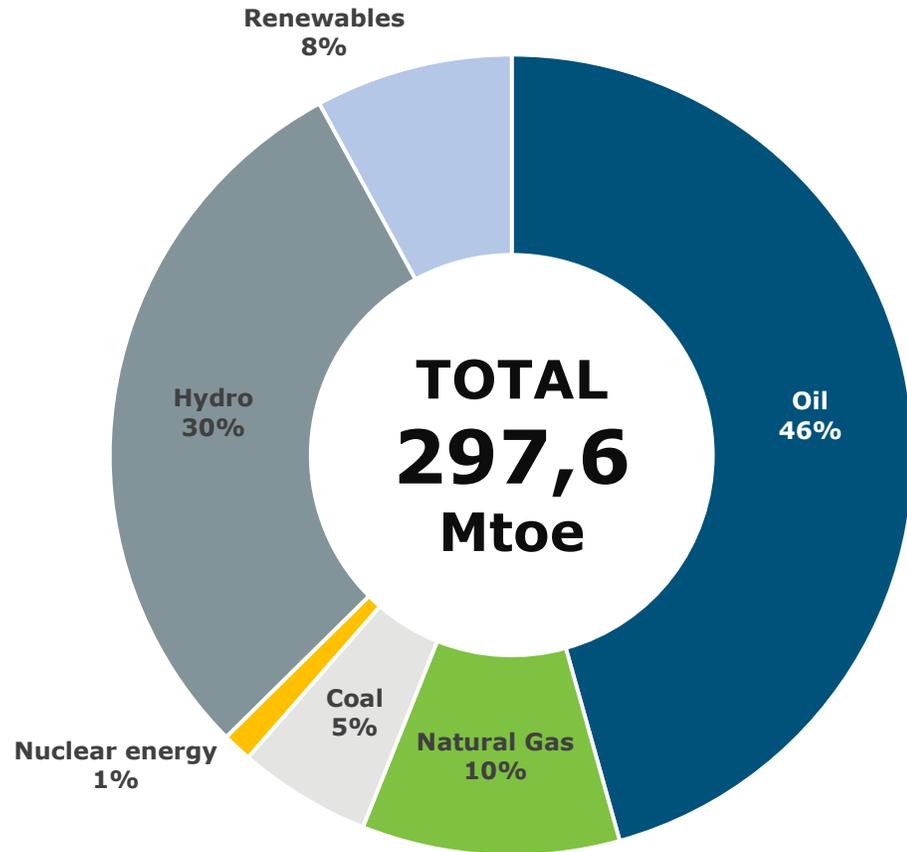
Energy Mix by country
2016, %



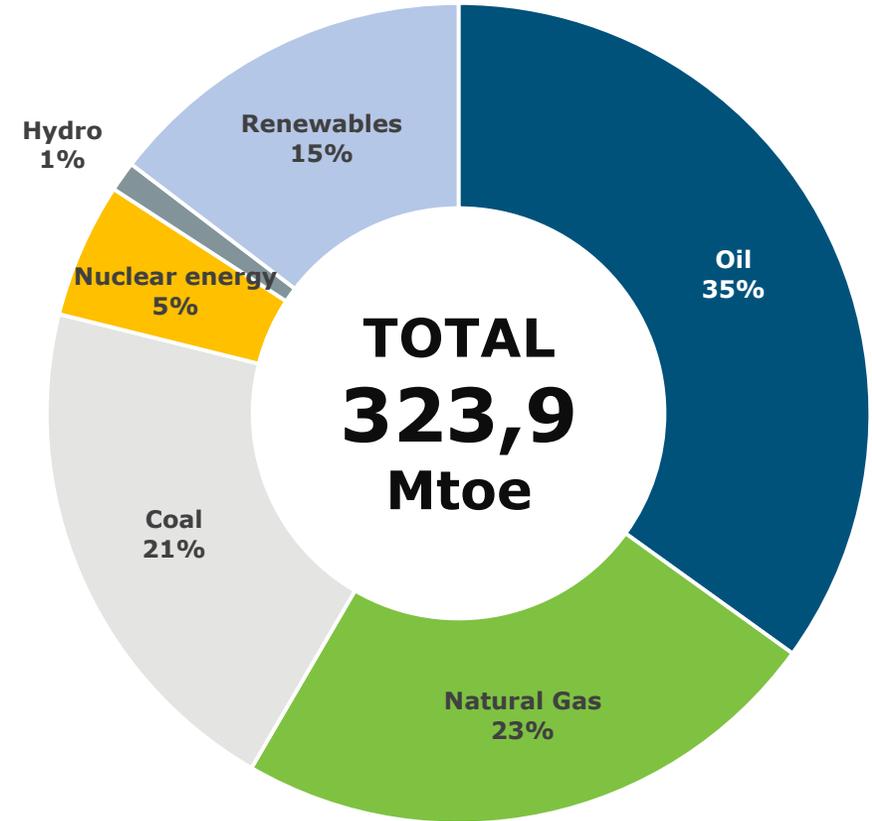
Despite the projected reduction from 50% in 2016 to 47% in 2040, O&G will continue to be an important source to Brazilian energy mix in the future.

*Projection for Brazil 2040 supposes the New Policies Scenario (NPS)
Source: IBP with data retrieved from IEA.

Brazil's Energy Matrix

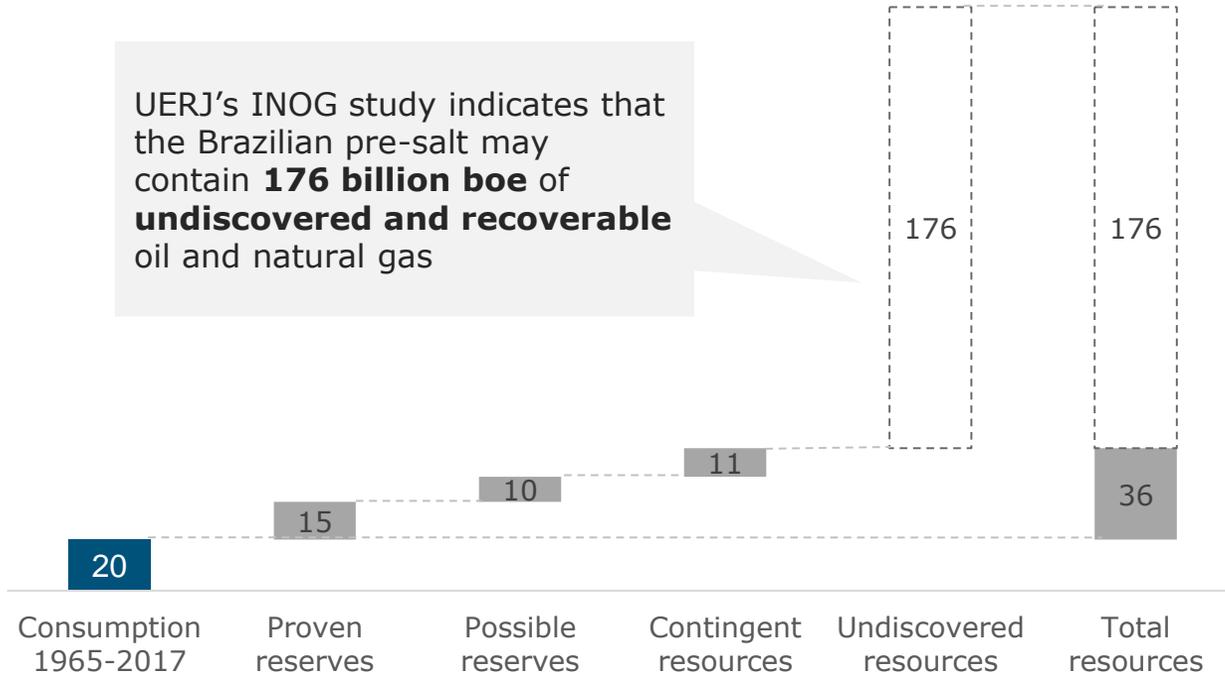


Germany's Energy Matrix



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:

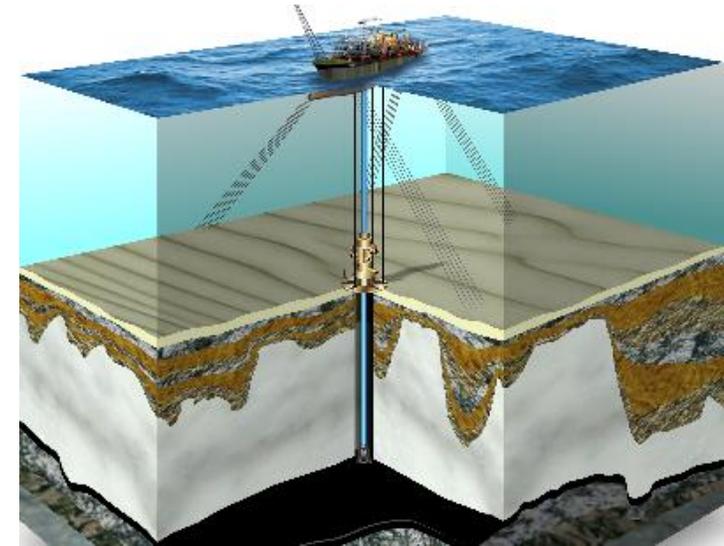
- 1) Boe refers to barrel of oil equivalent
- 2) Instituto Nacional de Óleo e Gás da Universidade Estadual do Rio de Janeiro

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

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*



16.691 bpd
85 wells



1.702 bpd
627 wells



16 bpd
6,744 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

The numbers don't reflect the country's potential

TOTAL PRODUCTION (April 2019)

3.314 Mboe/d

Oil production

2.6

Million bpd
(April 2019)

Natural Gas production

113

Million m³/d
(April 2019)

Cumulative production

~21

Billion boe
(31/12/17)

Proven Reserves

~15

Billion boe
(March 2018)



Future E&P in Brazil

Brazil can double its production in the coming years

TOTAL PRODUCTION (in 2027)

~6.400 mil boe/d

Oil production

5,1

Million bpd
(in 2027)

Natural Gas production

217

Million m³/d
(in 2027)

Cumulative production

~39

Billion boe
(by 2027)

Proven reserves

~45

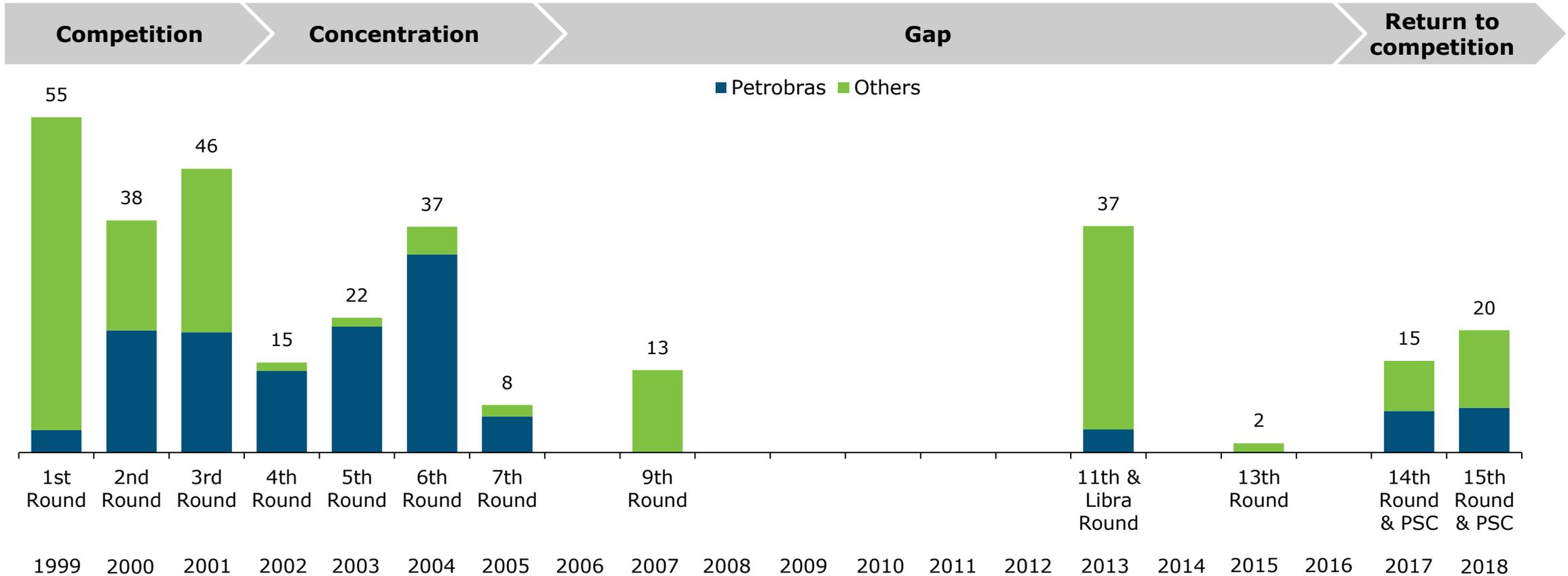
Billion boe
(by 2027)



A brief history of O&G sector in Brazil

Acquired offshore areas in bidding rounds by operator

Thousand km²



Note: 8th Bidding Round was called off and there were no offshore areas offered in the 10th e 12th Bidding Rounds

Source: IBP with data retrieved from ANP

Bidding Rounds Results

Bidding Round	Acquired blocks	Signature bonuses (R\$ bilhão)	Registered companies	Winners companies	Premium
 Brasil 14 th Round <small>Oil & Gas Bidding Rounds</small>	37 (24 onshore and 13 offshore)	3,84	32	17	1.556%
 ROUND Brazil 15 <small>OIL AND GAS CONCESSIONS</small>	22	8,01	17	12	622%
 PRE-SALT Brazil 2 <small>PRODUCTION SHARE</small>	3	3,3	10	7	261%
 PRE-SALT Brazil 3 <small>PRODUCTION SHARE</small>	3	2,85	14	6	202%
 PRE-SALT Brazil 4 <small>PRODUCTION SHARE</small>	3	3,15	16	7	202%
 PRE-SALT Brazil 5 <small>PRODUCTION SHARE</small>	4	6,82	12	8	170%
Total	72	~ R\$ 28	High competition and record results!		

DIVERSITY
- Multiplicity of Operators -



Bidding Rounds

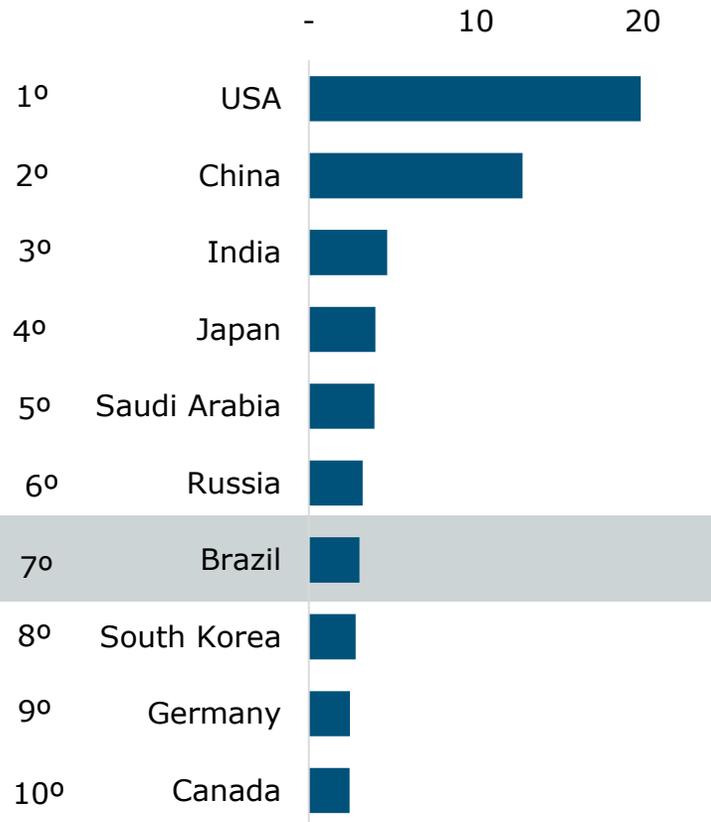


Source: ANP

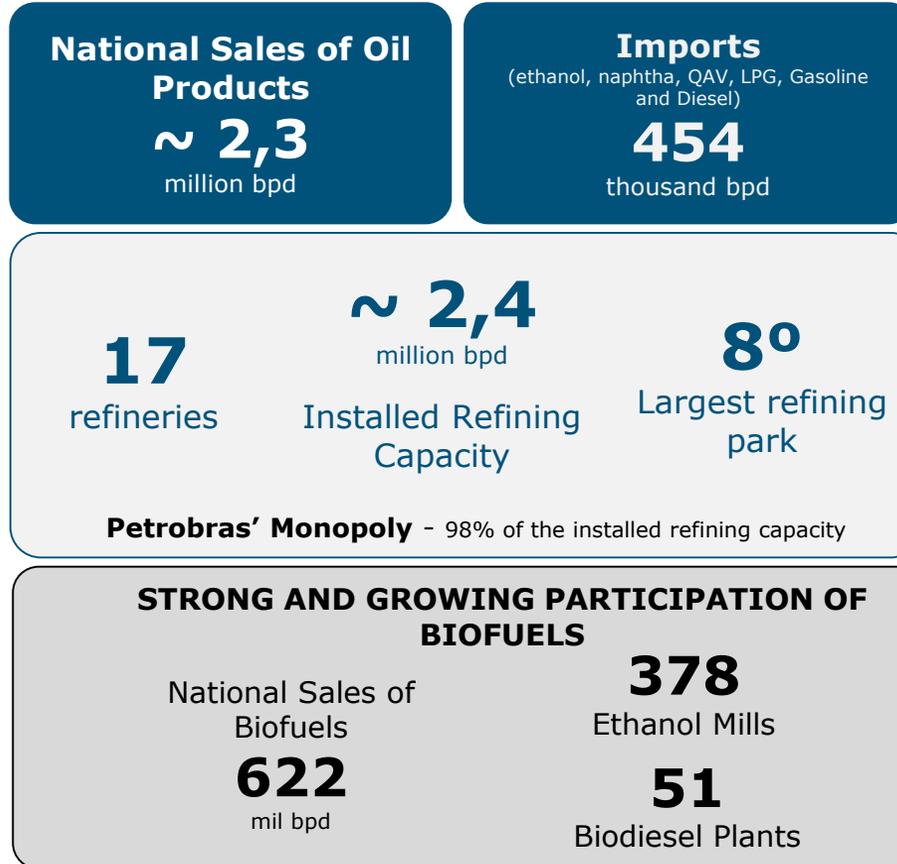


Brazil is the world's 7th largest consumer of oil products

WORLD'S OIL CONSUMPTION* 2017, Million bpd



NATIONAL MID-DOWNSTREAM MARKET*



OPPORTUNITIES



Mid-Downstream

Current **infrastructure** is **insufficient** for such a large country.

A number of **opportunities** to invest in:

- 💧 Refineries
- 💧 Biofuels plants (RENOVABIO)
- 💧 Fuels terminals
- 💧 Pipelines

*Considers the domestic demand plus international aviation and shipping fuel, refining consumption and losses, biofuels, coal and natural gas derivatives

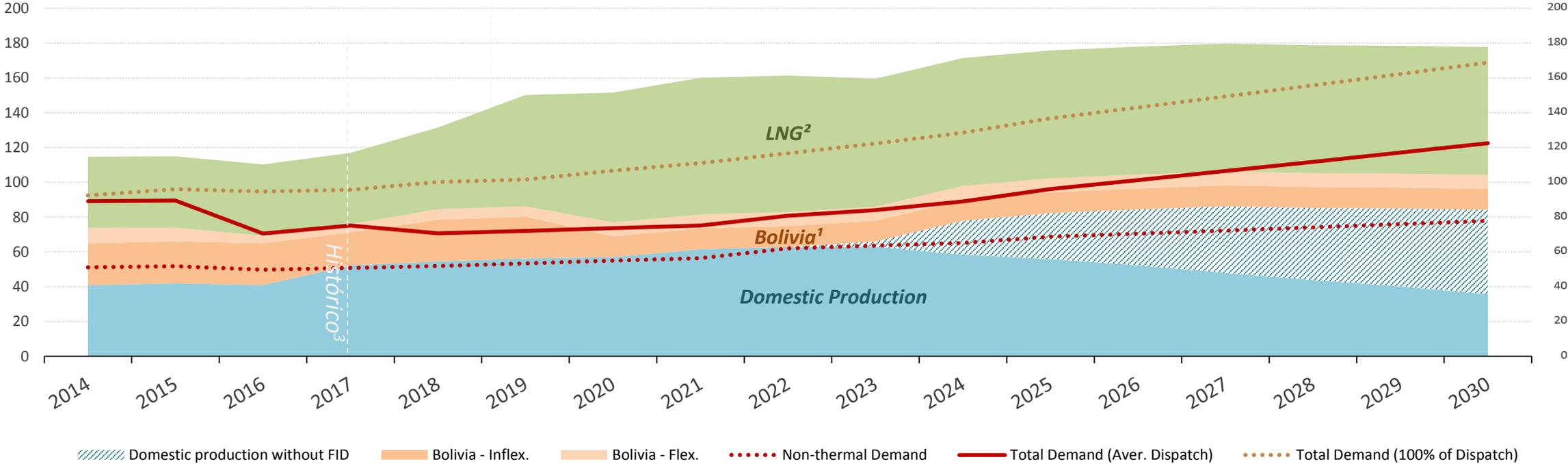
** QAV refers to aviation kerosene

Source: IBP with data retrieved from EPE, ANP, BP Statistical Review

Natural Gas perspectives for Brazilian market

Supply and Demand Balance for Natural Gas

Millions of cubic feet per day (MMm³/d), Base case (without isolated systems)



¹ Until 2019, the Bolivian import projection reflects the current contract with Petrobras, 30 MMm³/day. After this, occurs a reduction of the imported volume to 20 MMm³/day (60% ToP).

² The LNG data reflect the total regasification capacity (subtracted from the thermal consumption of projects linked to LNG terminals, which are considered as independent systems), with connection of the terminals with the transport network. Currently there are two regasification terminals installed, totaling 34 MMm³ / d capacity.

³ Historical values of supply and demand (with the exception of LNG, where regasification capacity is shown)



Potential investment for the next 10 years

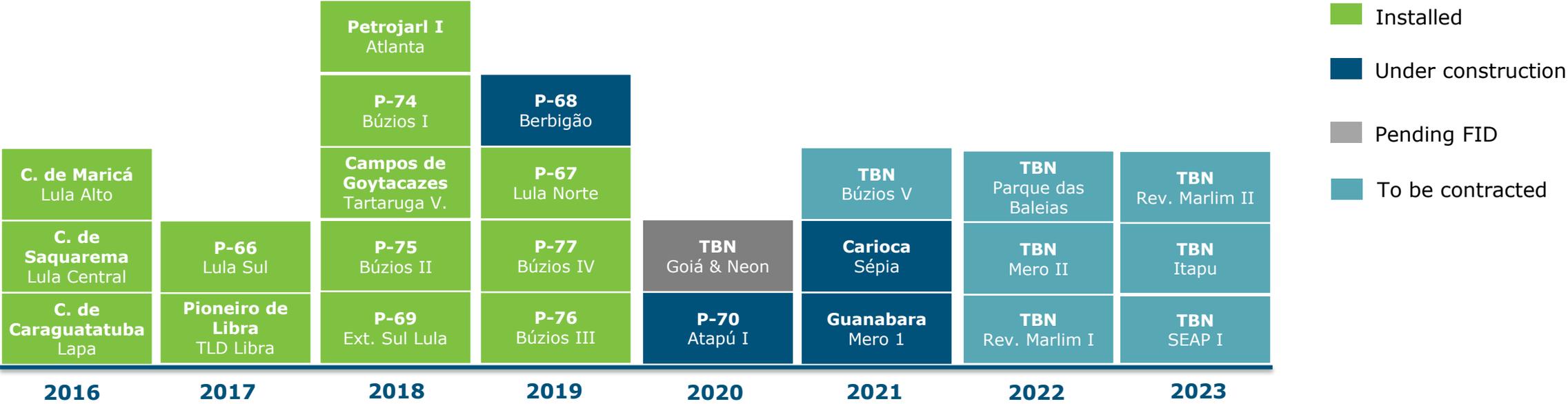
How much investments on the Oil, Gas & Biofuels Industry would be necessary to develop all the Brazilian potential in the next 10 years?

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

- Investments far above the capacity of one company
- Need to attract many companies to invest in the country

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

Committed Demand (FPSO) 2016-2023

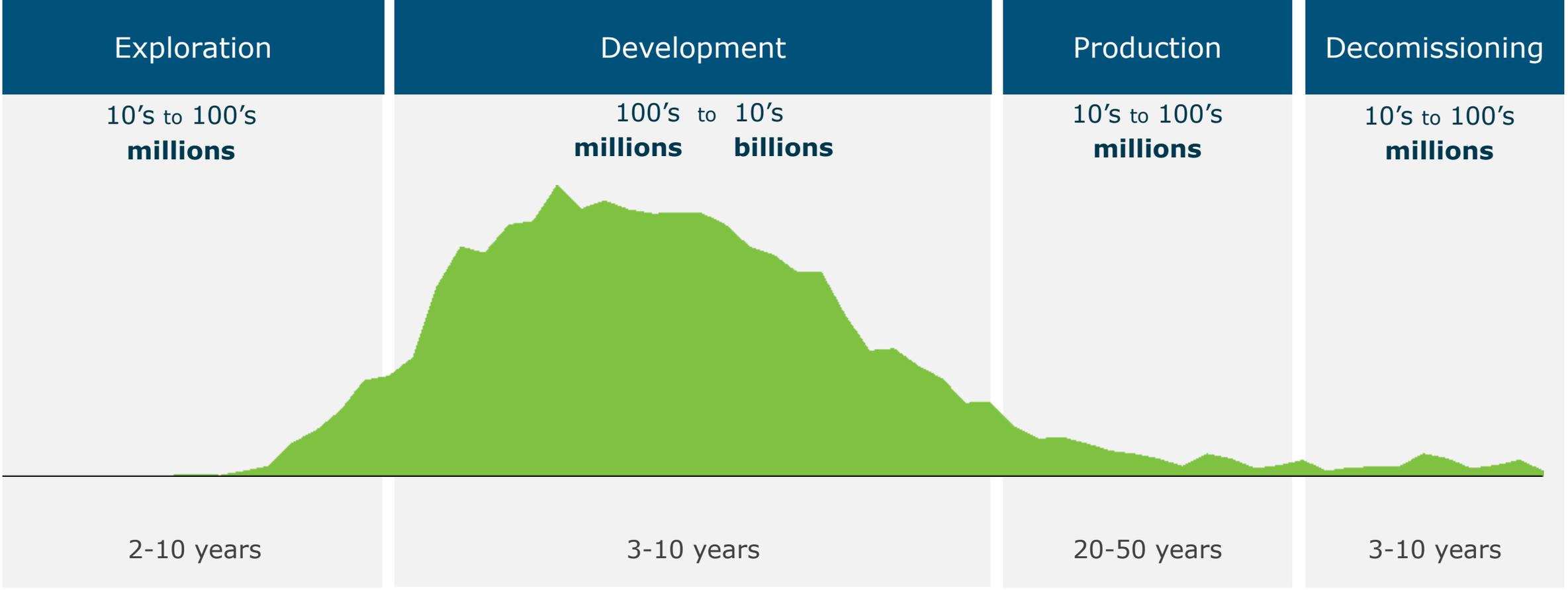


Update: March 2019
 Note: TBN means To Be Named
 Source: IBP with data retrieved from E&P Brasil and ANP



Phasing investments opportunity

Investments on the O&G sector involve long terms, occurring mostly on the development phase



Source: Accenture Strategy Energy



Challenges still present for the Brazilian O&G resumption



Environmental Licensing



Tax simplification and project risk adjustment



Supply chain



Natural gas and refining markets opening



Geopolitics



Human Resources

THANK YOU!

