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**NAVIGATE IN A CHALLENGING ERA FOR THE
DEVELOPMENT FPSO PROJECT IN PRE-SALT OILFIELDS**

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RIO DE JANEIRO, OCTOBER 2020



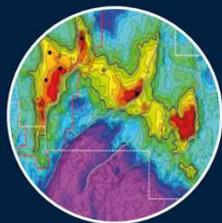
Pré-sal
Petróleo

Agenda

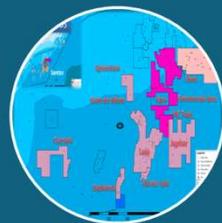
- Pré-Sal Petróleo S.A. PPSA
- Brazilian Pre-Salt
- Production Sharing Contracts
- Development of FPSO Project in Pre-Salt Oilfields

Pré-Sal Petróleo S.A. PPSA

Roles & Responsibilities



Production Sharing Agreement (PSA) management



Unitization on behalf of the Government



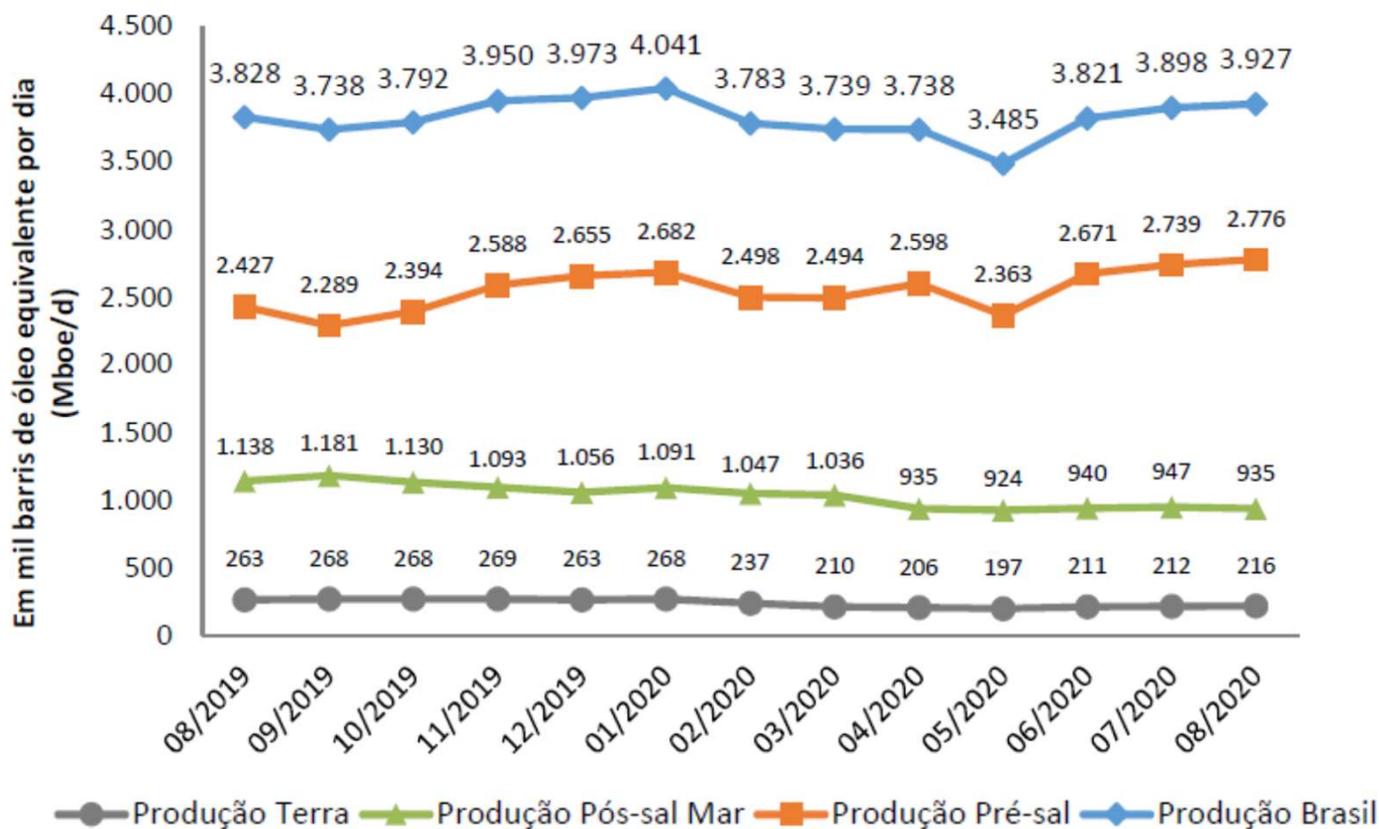
Commercialization of Oil & Gas Government share

← Maximize pre-salt economic results for the Brazilian Government share →

Our Goal

Maximizing economic results for Brazil

Brazilian oil production (BOE)



Brazilian oil production (BOE)
3,92 millions barrel/day (AGO/20)

Pre-Sal oil production (BOE)
2,77 millions barrel/day (AGO/20)

Pre-Sal - 117 wells
(average- 20.000 barrel/day)

Pós-Sal oil production (BOE)
0,93 millions barrel/day (AGO/20)

Fonte: ANP/SDP/SIGEP
Agosto/2020



MINISTÉRIO DE
MINAS E ENERGIA

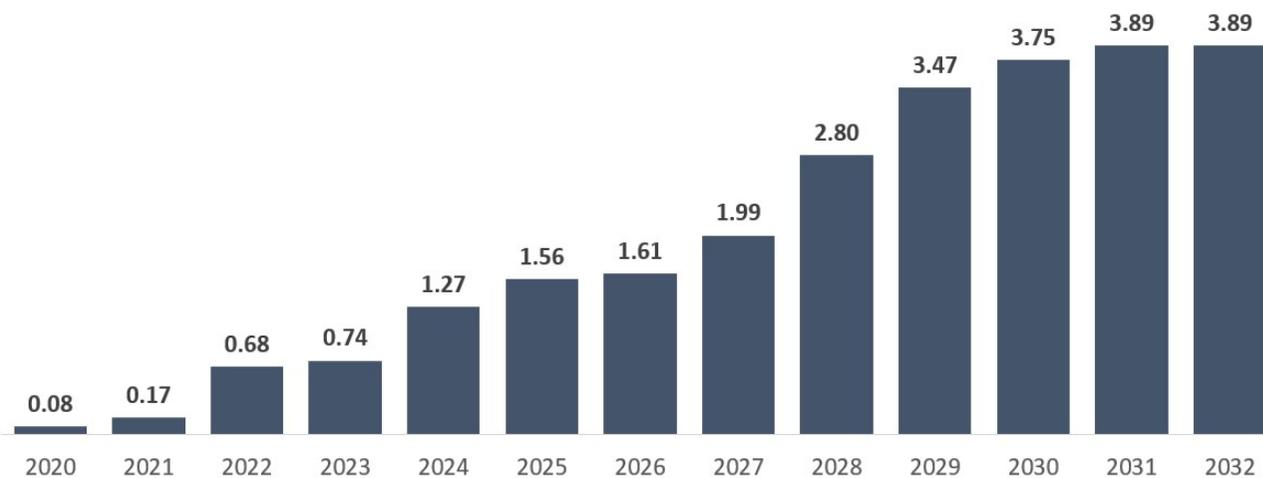


Oil Production estimated in the 17 PSCs

Government Expected Volume to be commercialized in 2032
1,22 Millions barrels/day

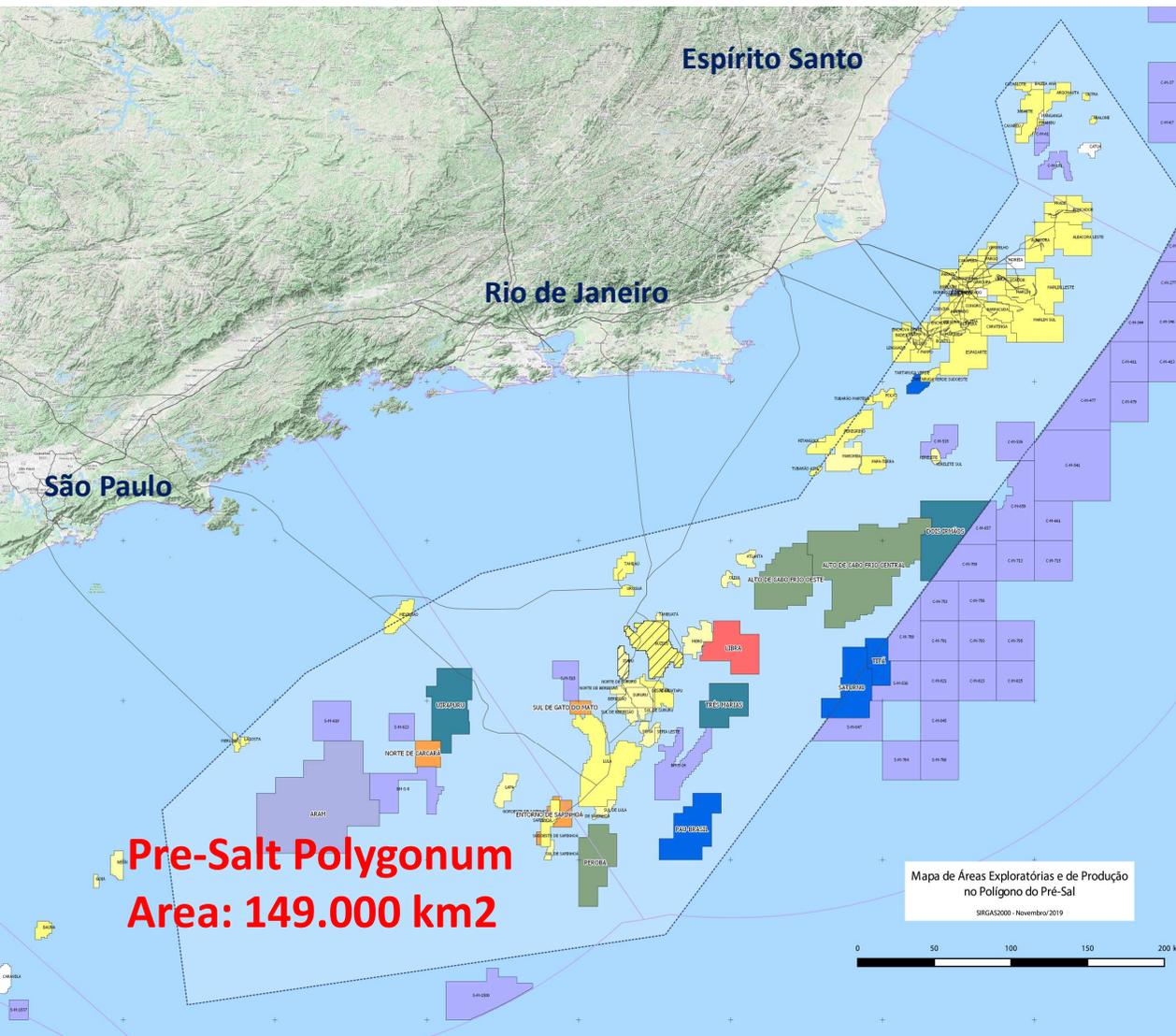
Million barrel/day

3,9 Millions barrels/day in 2032



PRODUCTION SHARING CONTRACTS MANAGEMENT





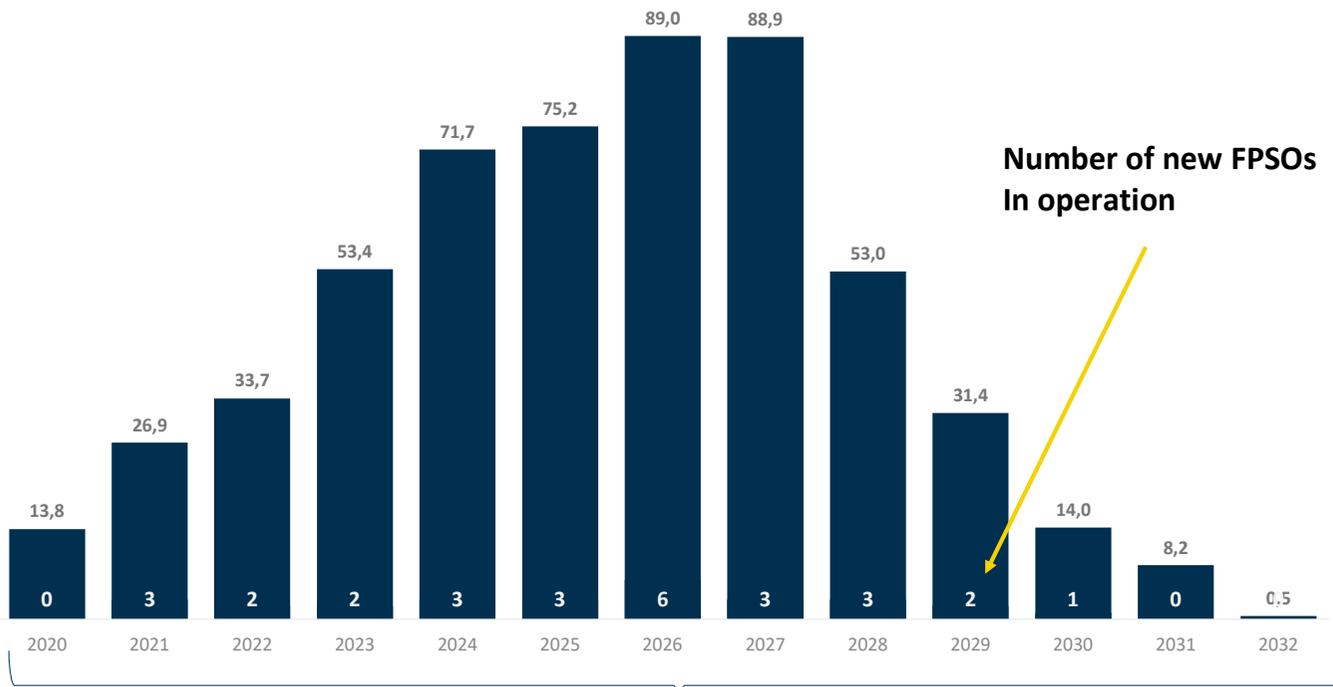
17 Production Sharing Contracts (PSC)

14 Companies



CAPEX Distribution

(Billions R\$)



R\$ 560 billions ≈ US\$ 100 billions



474 Wells ≈ R\$ 196 Bi



**28 FPSOs ≈ R\$ 196 Bi
(US\$ 35 billions)**



2500 km Subsea lines ≈ R\$ 168 Bi

An aerial photograph of a large FPSO (Floating Production Storage and Offloading) vessel at sea. The vessel is a complex of white metal structures, including a helipad on the left side with a large 'H' on it, various processing units, and a tall crane-like structure on the right. The water is dark and choppy. The text 'NAVIGATE IN A CHALLENGING ERA FOR THE DEVELOPMENT FPSO PROJECT IN PRE-SALT OILFIELDS' is overlaid in the center in a bold, dark blue font.

**NAVIGATE IN A CHALLENGING ERA FOR THE DEVELOPMENT
FPSO PROJECT IN PRE-SALT OILFIELDS**

1- Gas Management

- Characteristics

- . High GOR, high amount of produced gas
- . High pressure (650 bars)
- . Contaminants, high content (CO₂ and H₂S)
- . Gas treatment (exportation, injection and fuel gas)
- . Gas compression (exportation and injection)
- . Impact: Large and complex gas processing plants, lay out and topsides weight (approx. 40 %)

- Challenges

- . Gas treatment system optimization (process and compression systems)
- . Weight reduction (engineering, procurement and schedule)
- . Gas Hub (exportation platform)
- . Subsea gas separation (R&D project)

2- Oil Treatment

- Characteristics

- . High productivity of the wells
- . Contaminants (CO₂ and H₂S)
- . High pressure and temperature
- . Produced water (salinity)
- . Impact: Large processing oil plants, piping diameter, corrosion and topsides weight

- Challenges

- . Exotic materials
- . Cladding
- . Chemical injection system topsides
- . Appropriate chemical (corrosion inhibitor)

3- Scaling:

- Characteristics

- . Carbonate reservoir
- . Produced water with high temperature and salinity
- . Contaminants (calcium, strontium, barium)
- . Impact: Scaling in wells, subsea system and topsides facilities

- Challenges

- . Appropriate chemicals (performance)
- . Chemical injection system for subsea and topsides

4- Digitalization

- Characteristics

- . Reduce cost
- . Increase production
- . Improve operational efficiency (oil production, power generation, emissions)
- . Integration from development to abandon (reservoir, wells, subsea and topsides)

- Challenges

- . Evaluate digital solutions and new technologies
- . Improve FPSOs projects
- . Ensure telecommunication infrastructure (optical fiber network)

5- COVID-19 Impact

- Operation

- . Testing, quarantine, changes of work shifts, logistics, PPE and training
- . Impact: No significant production losses (pre-salt), POB, impact on operations, maintenance and logistics procedures

- Projects (Engineering, Procurement and Construction)

- . Different countries, different procedures
- . Communication, coordination and interfaces
- . Supply chain- Fabrication, inspection, tests, vendors technical assistance and supervision
- . Impact: Different impacts depending on the phase of the project (4 to 8 months delays)

- Challenges

- . Project recovery plans (operation and projects)
- . New normal (procedures)

Thank you!
Obrigado!



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