

CURRENT STATUS AND STRATEGIES FOR DEEP SEA OIL AND NATURAL GAS PRODUCTION IN BRAZIL

—
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Seminar on Offshore Oil & Gas Development
Tokyo, Japan

“Disclaimer”

The presentation may contain forecasts about future events. Such forecasts merely reflect the expectations of the Company's management. Such terms as "anticipate", "believe", "expect", "forecast", "intend", "plan", "project", "seek", "should", along with similar or analogous expressions, are used to identify such forecasts. These predictions evidently involve risks and uncertainties, whether foreseen or not by the Company. Therefore, the future results of operations may differ from current expectations, and readers must not base their expectations exclusively on the information presented herein. The Company is not obliged to update the presentation/such forecasts in light of new information or future developments. All projects forecasted herein are subject to approval by the appropriate stakeholders.

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Profile

We are driven by the challenge of supplying the energy that can propel development and ensure the future of the society with competency, ethics, cordiality, and respect for diversity.

We are a publicly traded corporation, the majority stockholder of which is the Federal Government (represented by the National Treasury), and we perform as an integrated energy company in the following sectors: exploration and production, refining, marketing, transportation, petrochemicals, oil product distribution, natural gas, electricity, chemical gas, and biofuels.

A leader in the Brazilian oil industry, we have expanded our operations aiming to be among the top five integrated energy companies in the world by 2030. We have a presence in 17 countries.



Investments

R\$ 104.41 billion

Net Revenue

R\$ 304.89 billion

Net Profit

R\$ 23.57 billion

Shareholders

798.596

Global Presence

17 countries*

Number of Employees

86,111



Daily Output

2,539,000 barrels of oil equivalent a day.

Proved Reserves

16.57 billion barrels** of oil equivalent (boe)

Production Platforms

134 (77 Fixed; 57 floating)



Refineries

15

Oil product production

2,124,000 barrels per day

Profile

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Vessel Fleet

326 (57 belonging to Petrobras)

Pipelines

34,639 km



Biofuels

5 biodiesel plants (3 owned and 2 in partnerships);
10 ethanol plants in Partnerships

Thermoelectric Plants

21 plants ***

Wind Energy

4 plants



Service Stations

7,710

Fertilizers

3 plants

GLOBAL PRESENCE



We have increasing participation in the global energy sector. Through our units, subsidiaries, and trade and financial representation offices, we have operations in 24 countries.

2,86 MILLION
BARRELS OF OIL EQUIVALENT
PER DAY

*The best result
in our history*



AVERAGE TOTAL PRODUCTION IN DECEMBER 2014

BACKGROUND



HOW PETROBRAS HAS EVOLVED

from Post-Salt to Pre-Salt

1st oil field found in Campos Basin

OTC Award 1992



1st FPSO Production System

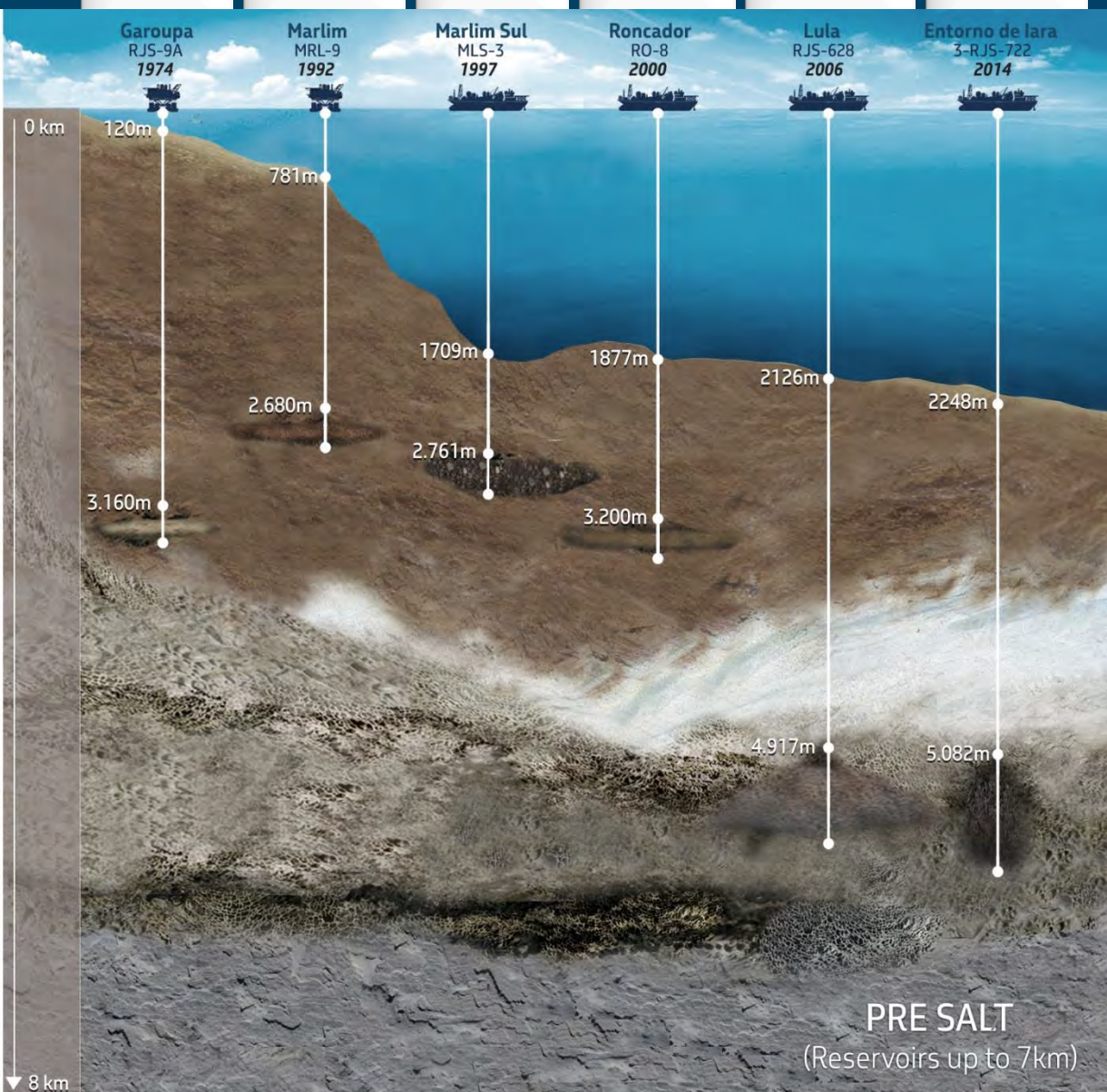
OTC Award 2001



1st commercial discovery from Pre-Salt

Well with thickest oil column (563m)

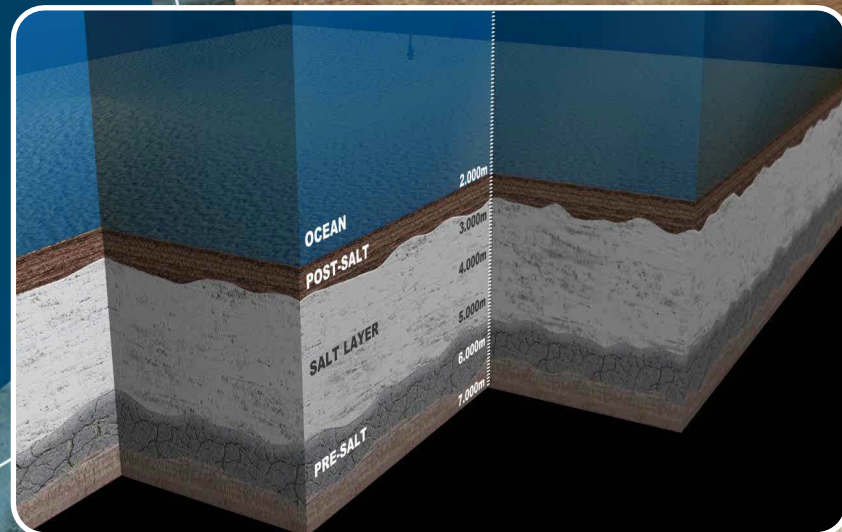
MOUNT EVEREST
(8,8km)



PRE SALT
(Reservoirs up to 7km)

PRE-SALT

- Large reservoirs of oil and natural gas
- Located between 5,000 and 7,000 meters below sea level and 300 km from the coast
- Water depths that can exceed 2000 meters from the water line
- Under a layer of salt that is more than 2 thousand meters deep, in some areas
- Characteristics of the oil: light (API-30) and CO2 content between 1 and 20%
- Almost 80,000 passengers transported in 2014 - more than 40 helicopters contracted



BRAZILIAN PRE-SALT PROVINCE

CONCESSION (SANTOS BASIN)

BMS-8 (Carcará)	(66%)	(10%)	(10%)	(14%)
BMS-9 (Sapinhoá / Lapa)	(45%)	(30%)	(25%)	
BMS-11 (Lula-Iracema/ Iara)	(65%)	(25%)	(10%)	
BMS-21 (Caramba)	(80%)	(20%)		
BMS-24 (Júpiter)	(80%)	(20%)		
BMS-50 (Sagitário)	(60%)	(20%)	(20%)	

CONCESSION
(CAMPOS BASIN)

(100%)
 PETROBRAS

TRANSFER OF RIGHTS

(100%)
 PETROBRAS

PRODUCTION SHARING

- (40%)
- (20%)
- (20%)
- (10%)
- (10%)

ES NORTE PARQUE DAS BALEIAS

BALEIA FRANCA

BALEIA AZUL

TRACAJÁ

MARLIM LESTE

CARIMBÉ

PR

ITAPU
SAGITÁRIO
SÉPIA
CARCARÁ
LAPA
SAPINHOÁ
SUL DE SAPINHOÁ
CARAMBA

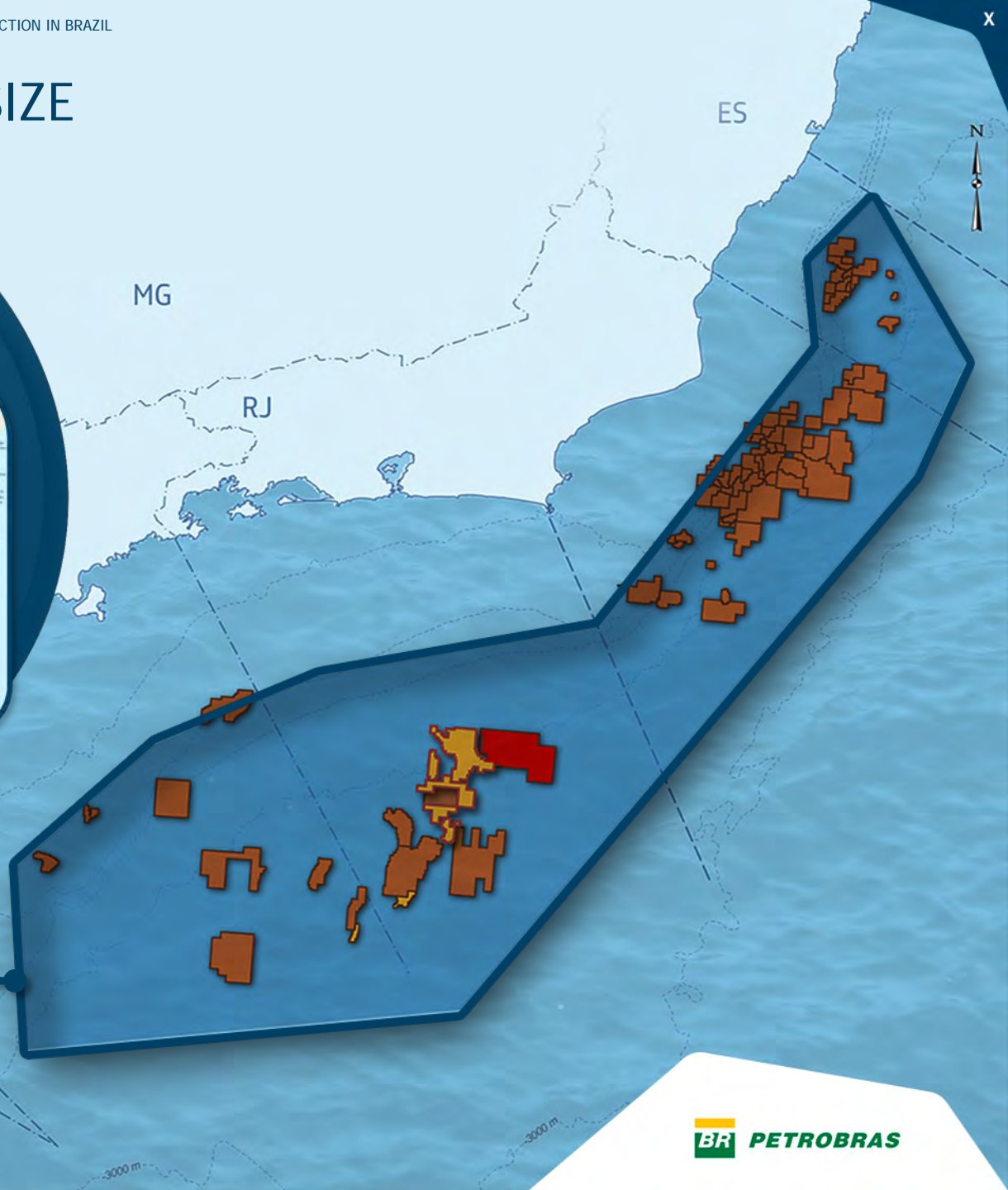
LIBRA
BUZIOS
ENTORNO DE IARA
IARA
JÚPITER
LULA / IRACEMA
SUL DE LULA

- Concession
- Transfer of Rights
- Production Sharing
- Surplus Volumes of Transfer of Rights

Santos Basin Pre-Salt Cluster

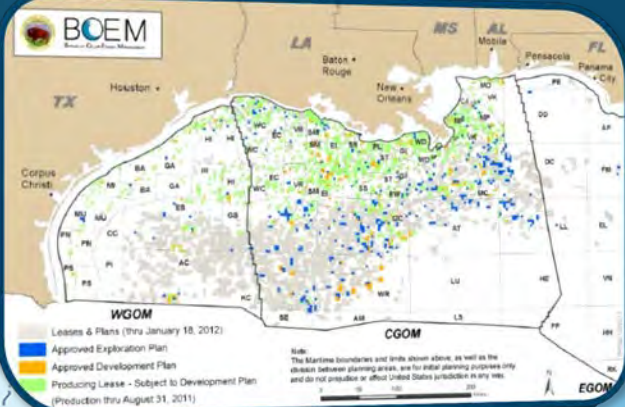
PRE-SALT PROVINCE - SIZE

3,4 x
State of Rio de Janeiro



PRE-SALT PROVINCE - SIZE

650
US GoM Blocks



PR

SC

ES

MG

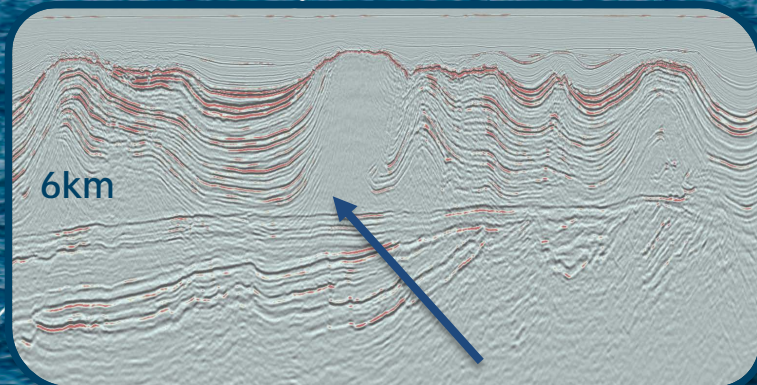
RJ

PRE-SALT TIMELINE



2000-2001: BIDs 2 and 3:
Blocks acquisition of
Santos Basin Pre-Salt

2001-2004:
Seismic acquisition
and interpretation



3D Seismic

Pre-salt reservoir



2005 2006 2007 2008 2009 2010 2011

PRE-SALT
TIMELINE

EWT Lula

FPSO BW Cidade de São Vicente



P-34 - Jubarte

2005-2006: 1st wildcat well Santos Basin- Parati

2008: Campos Basin 1st oil (Jubarte EWT)

2009: Santos Basin 1st oil - Lula EWT

Main Discoveries

2006: Lula (Tupi)

2007: Caxaréu and Carioca

2008: Baleia Franca, Baleia Azul, Iara, Sapinhoá and Júpiter

2009: Iracema and Nautilus

PRE-SALT TIMELINE



2010: Transfer of Rights
Main Discoveries
2010: 1st oil of Lula Pilot

December 2010: Declaration of Commerciality - Lula Field
2010: Brava, Tracala and Carimbo

December 2011: Declaration of Commerciality Sapinhoá Field



Piloto de Lula
FPSO Cidade de Angra dos Reis



2012 2013 2014 2015 2016 2017

PRE-SALT
TIMELINE

Piloto de Sapinhoá
FPSO Cidade de São Paulo

September 2012: Baleia Azul 1st Oil

January 2013: Sapinhoá Pilot 1st Oil

June 2013: Lula NE Pilot 1st Oil

2013: Declaration of Commerciality - Búzios, Sul de Lula and Lapa

2014: First well to start production with Buoy Supporting Risers (BSR)

September 2014: Declaration of Commerciality - Itapu, Sépia, Sul de Sapinhoá

October 2014: Iracema Sul Pilot 1st Oil

November 2014: Sapinhoá Norte Pilot 1st Oil

December 2014: Declaration of Commerciality - Iara and Entorno de Iara

Main Discoveries

2012: Franco NW, Tupi NE, Carcará and Sul de Guará

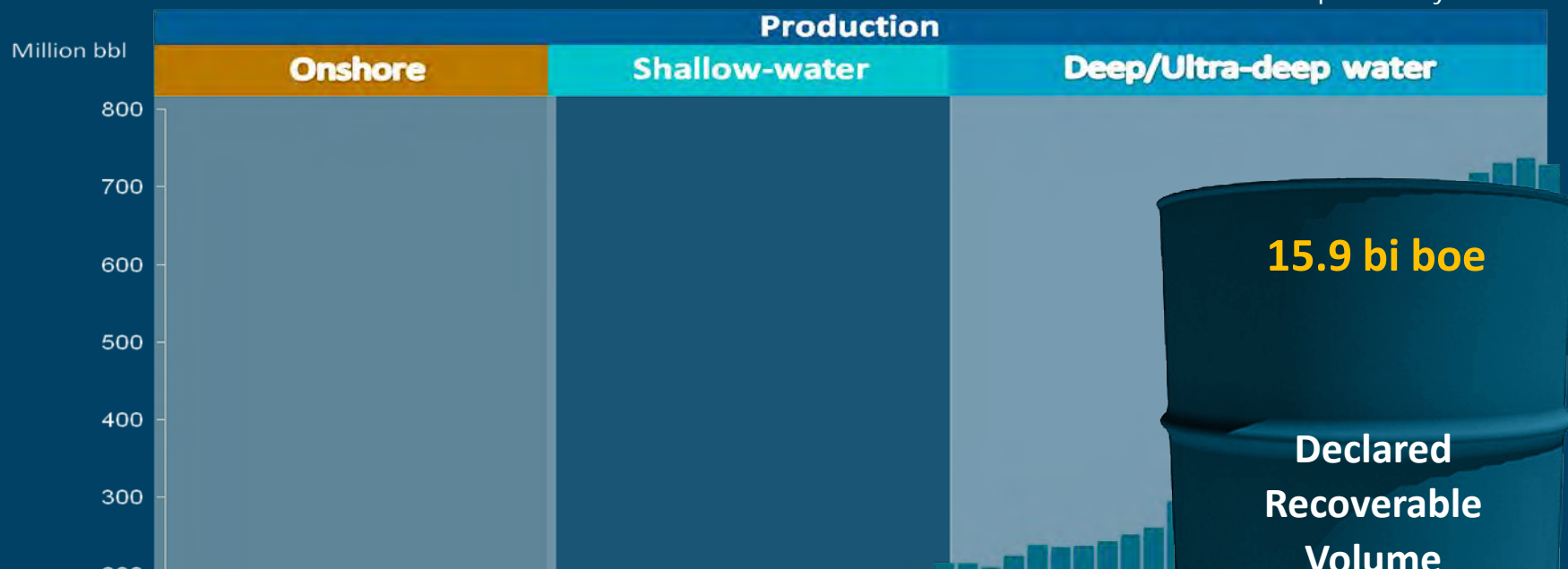
2013: Entorno de Iara, Sagitário, Florim and Sul de Tupi

2014: Florim 2 and Júpiter Apollonia



PRE-SALT POTENTIAL

* Declared volume operated by Petrobras



Declared Recoverable Volumes

- Lula: 8.3 billion boe
- Sapinhoá: 2.1 billion boe
- Lapa: 459 million boe
- Transfer of Rights: 5.0 billion boe*

Total: 15.9 billion boe

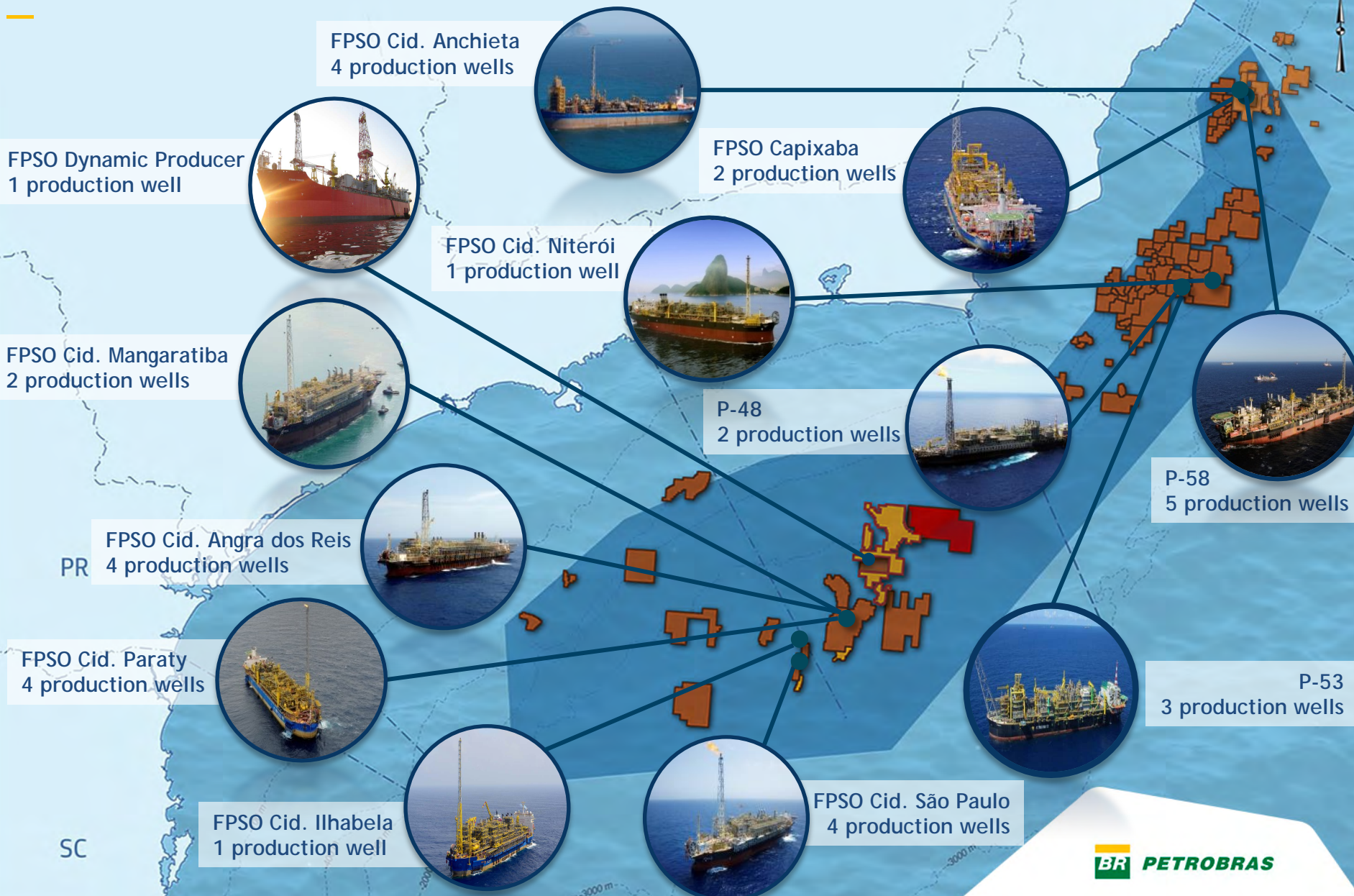
* Búzios, Sul de Lula, Sul de Sapinhoá, Sépia and Itapu: 4.4 billion boe of recoverable volume estimated after declaration of commerciality

STRATEGY

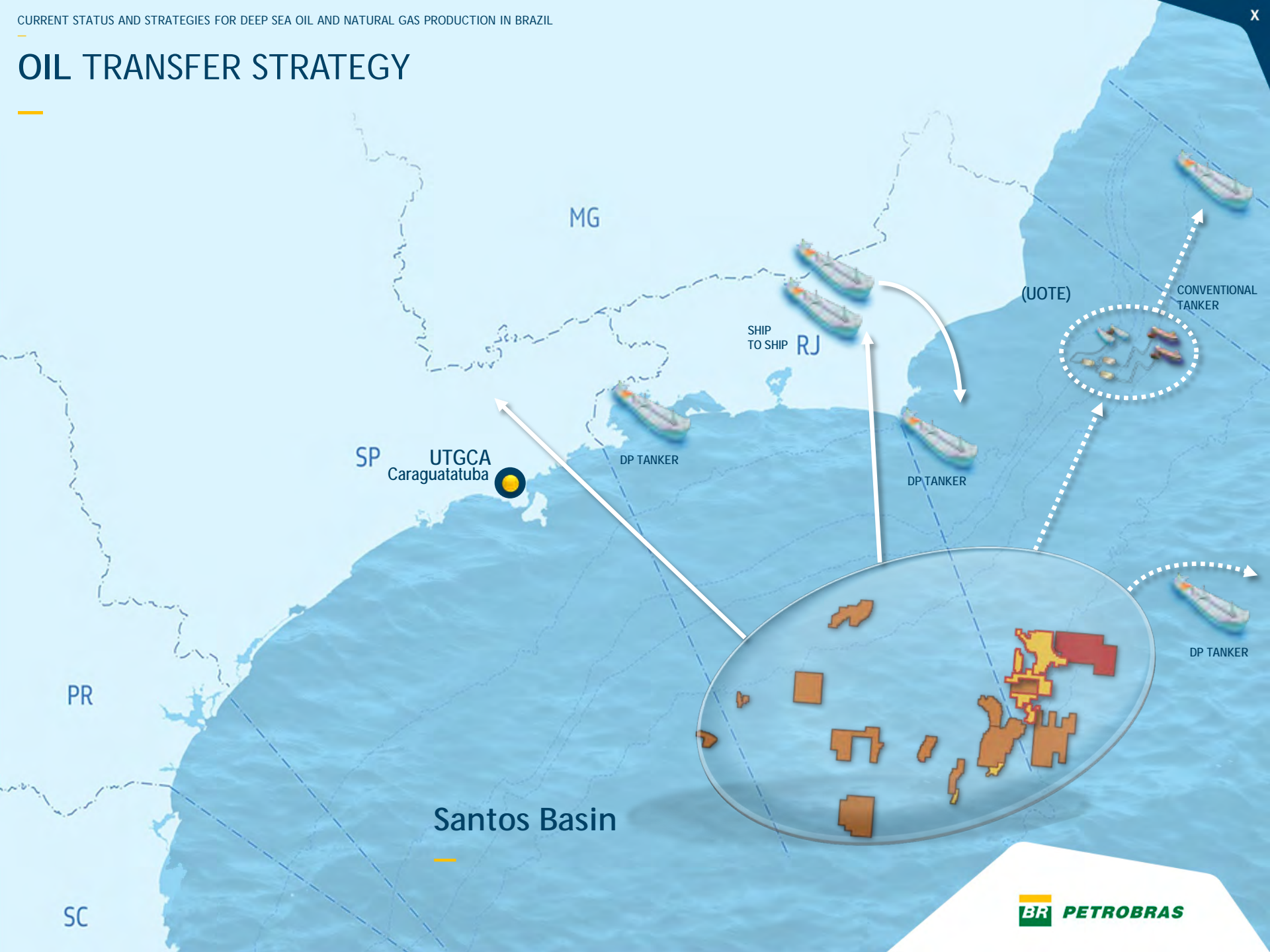


PRE-SALT ACTUAL PRODUCTION CAPACITY

33 Production wells (January 2015)

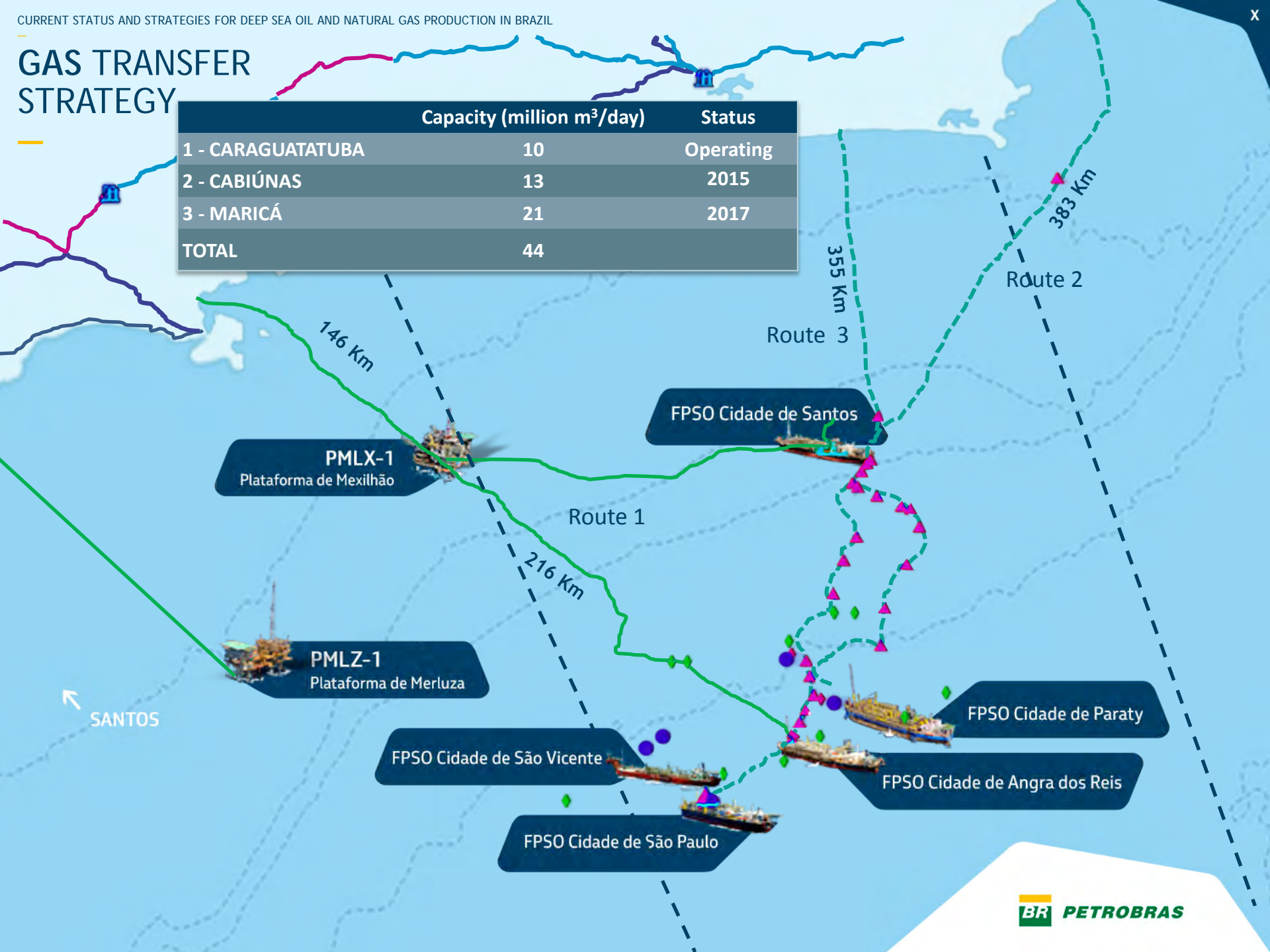


OIL TRANSFER STRATEGY



GAS TRANSFER STRATEGY

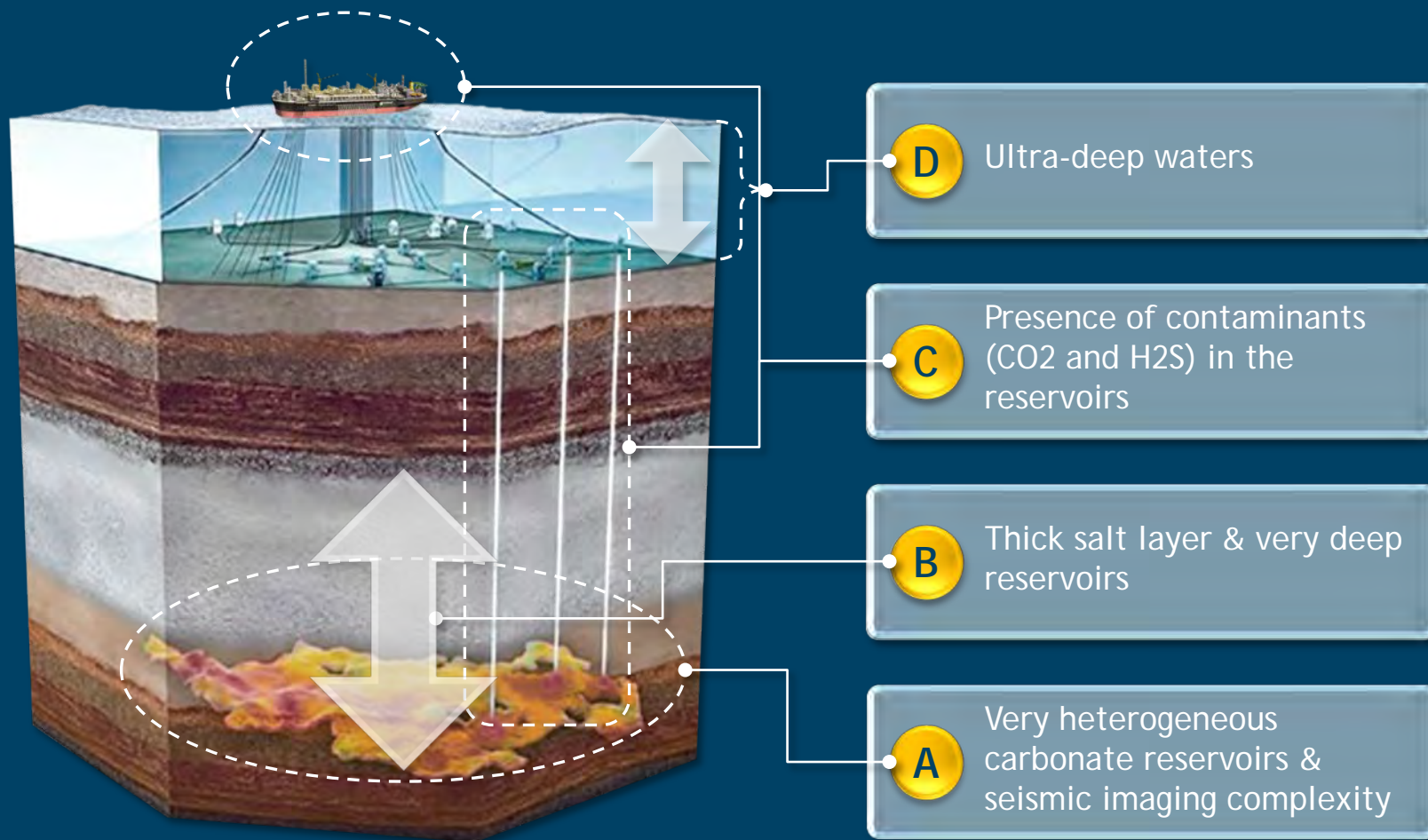
	Capacity (million m ³ /day)	Status
1 - CARAGUATATUBA	10	Operating
2 - CABIÚNAS	13	2015
3 - MARICÁ	21	2017
TOTAL	44	



FIRST WAVE OF TECHNOLOGY APPLICATION



Production from the Pre-Salt area required the overcoming of four main technological challenges



G&G technologies were key to see below the salt and increase recovery factor

MAIN TECHNOLOGIES APPLIED

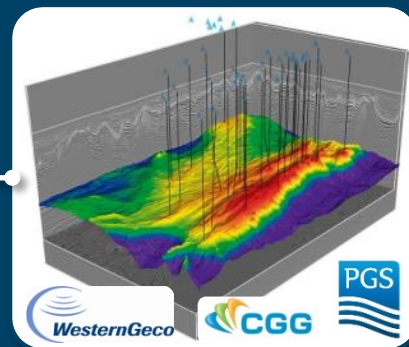
1

Characterization of poorly-known microbial carbonate reservoirs



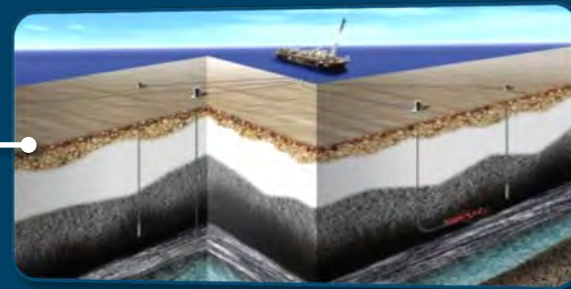
2

World record of high-density seismic technology: 21,700 km²

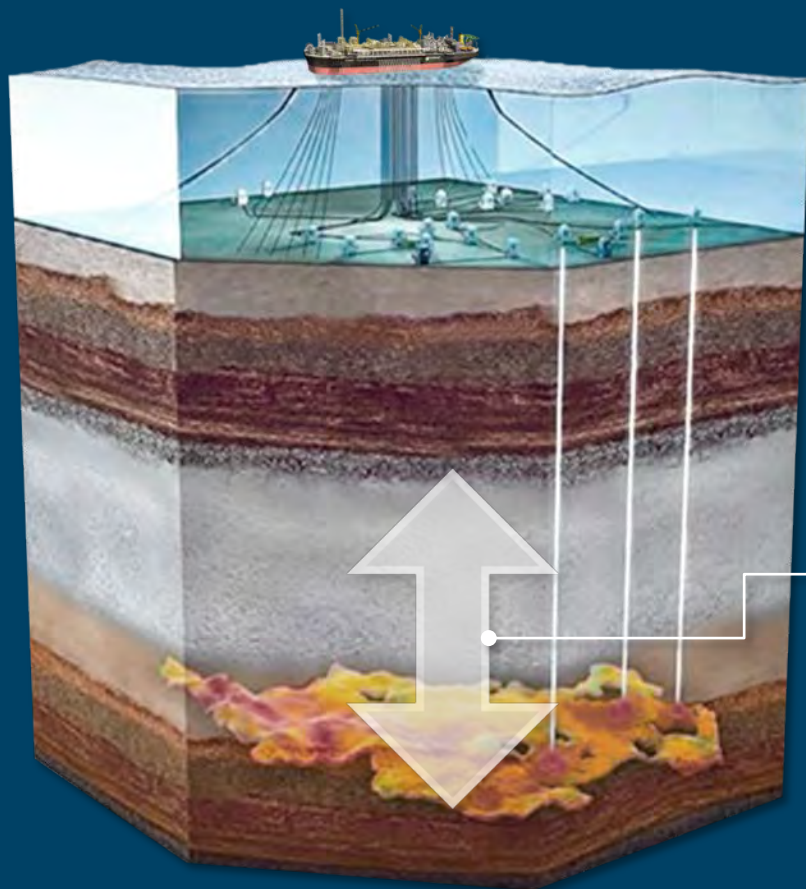


3

First use of alternated water-gas injection (WAG) in ultra-deep waters (2,200 m)



Production from the Pre-Salt area required the overcoming of four main technological challenges



D Ultra-deep waters

C Presence of contaminants (CO₂ and H₂S) in the reservoirs

B Thick salt layer & very deep reservoirs

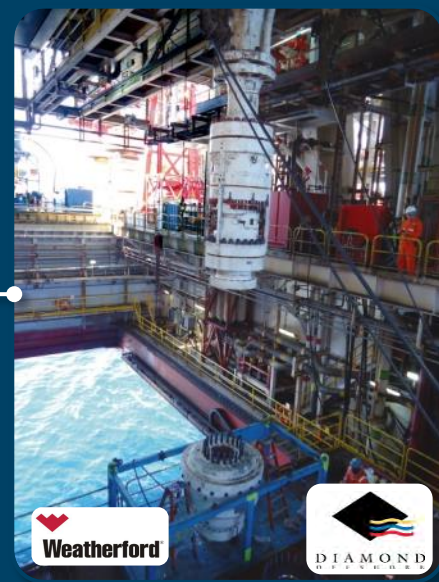
A Very heterogeneous carbonate reservoirs & seismic imaging complexity

Important well innovations to deal with a thick salt layer and unique reservoir characteristics

MAIN TECHNOLOGIES APPLIED

4

Water depth record (2,249 m) for a subsea well drilled with Pressured Mud-Cap Drilling (PMCD)

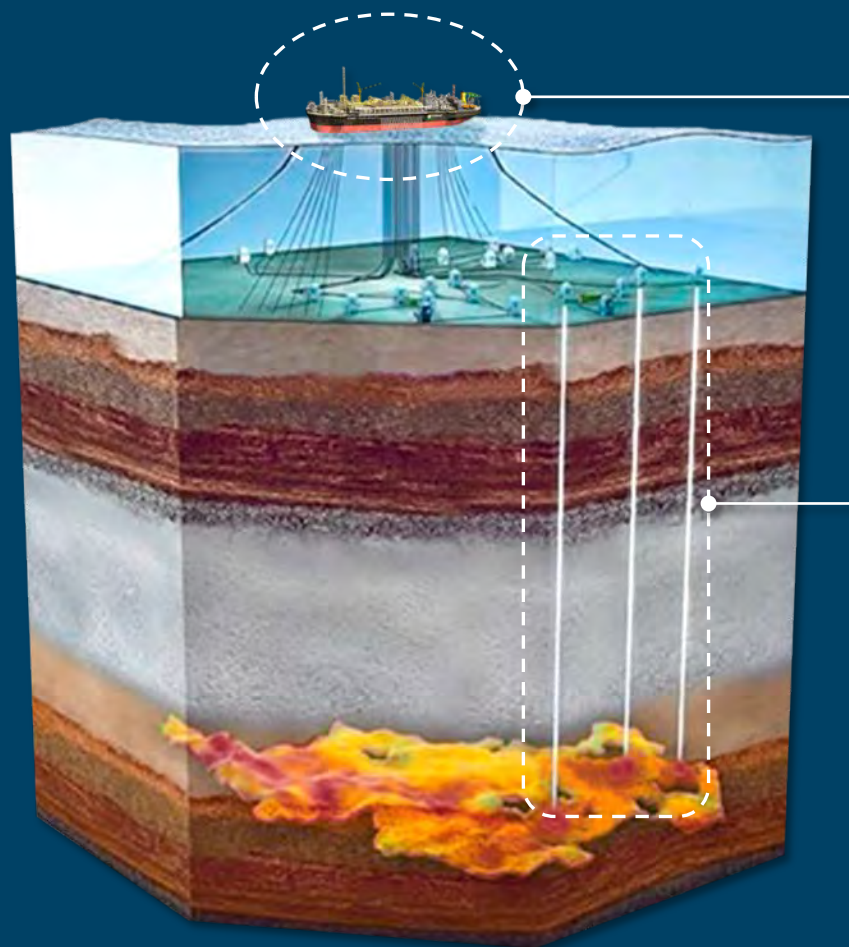


5

First intensive use of intelligent completion in ultra-deep water satellite wells in a scenario with high potential carbonate (CaCO_3) scaling - 12 wells with this system installed



Production from the Pre-Salt area required the overcoming of four main technological challenges



D Ultra-deep waters

C Presence of contaminants (CO₂ and H₂S) in the reservoirs

B Thick salt layer & very deep reservoirs

A Very heterogeneous carbonate reservoirs & seismic imaging complexity

New technologies were required to deal with the presence of contaminants (CO₂ and H₂S) in the reservoirs

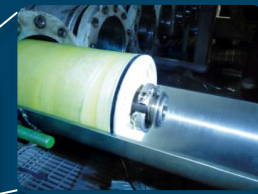
MAIN TECHNOLOGIES APPLIED

6

First CO₂ separation from associated natural gas in ultra-deep water (2,220 m) associated with CO₂ re-injection into producing reservoirs



1st Unit: FPSO Cidade de Angra dos Reis
3rd Unit: FPSO Cidade de São Paulo



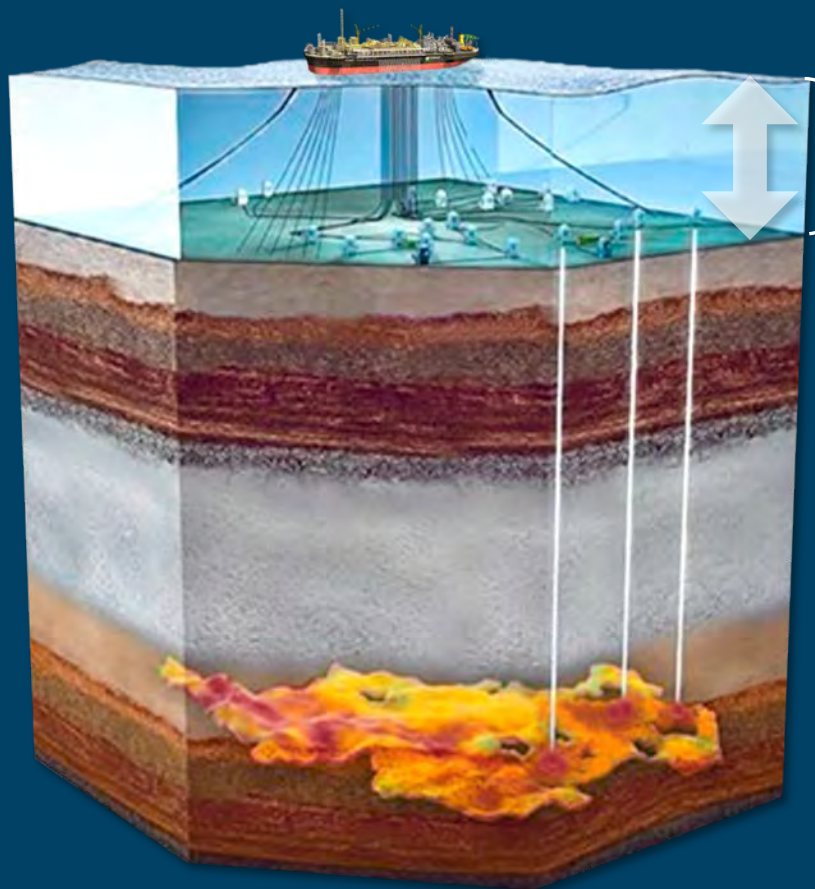
2nd Unit: FPSO Cidade de Paraty

7

Deepest offshore well (2,220 m) injecting gas with CO₂ - CO₂ injected gas content can reach 85%



Production from the Pre-Salt area required the overcoming of four main technological challenges



D Ultra-deep waters

C Presence of contaminants (CO₂ and H₂S) in the reservoirs

B Thick salt layer & very deep reservoirs

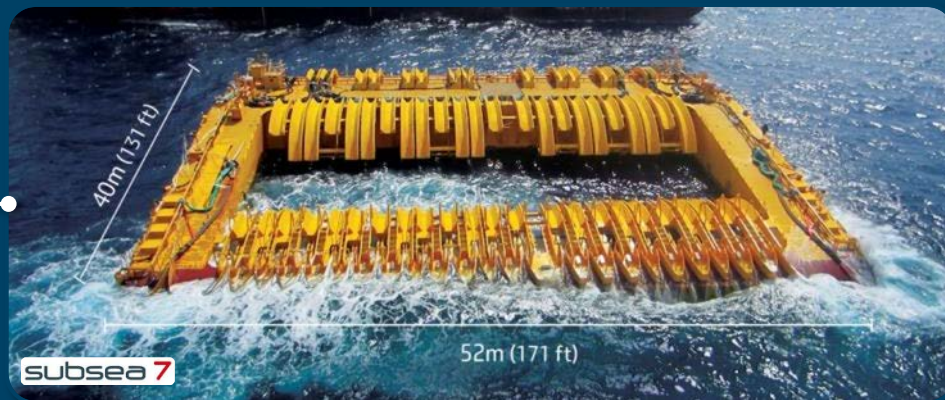
A Very heterogeneous carbonate reservoirs & seismic imaging complexity

Ultra-deep waters required the development of new and relevant technologies for subsea systems

MAIN TECHNOLOGIES APPLIED

8

First Buoy Supporting Risers (BSR) (2,100 m) – 4 BRSs are already installed, with six wells in production up to July 2014



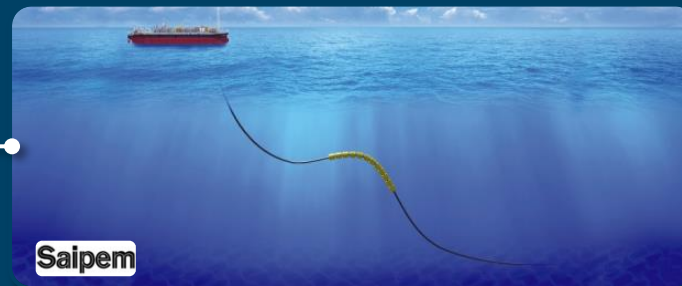
9

First Steel Catenary Risers (SCR) with Lined Pipes installed by reel lay method



10

Deepest Steel Lazy Wave Riser (SLWR) totally composed of lined pipes and metallurgically clad pipes (to be installed in 2015)



Ultra-deep waters required the development of new and relevant technologies for subsea systems

MAIN TECHNOLOGIES APPLIED

11

Deepest flexible riser installed in Lula field (2,220 m)



12

First application of flexible risers with integrated tensile armor wire-monitoring system



13

Subsea trees with standard mechanical interfaces

PRE-SALT SUBSEA SYSTEMS

OFFLOADING

Subsea System
Buoy + flexible lines

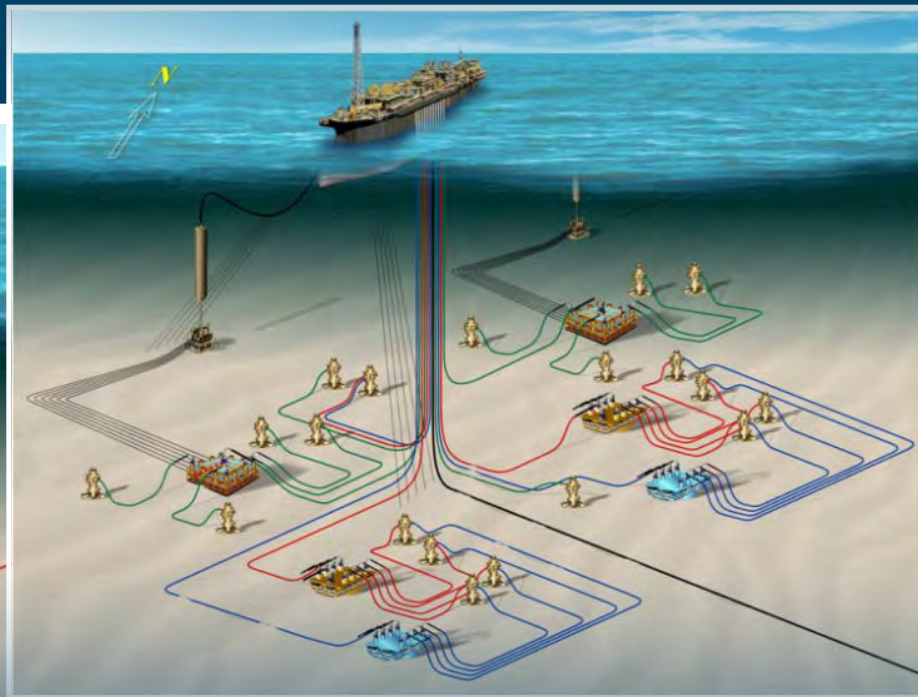
FPSO Cidade de São Paulo
Oil processing: 120,000 bbl/d
Water injection: 150,000 bbl/d
Gas Compression: 5 million m³/d

Gas Export
Flexible Riser → 54 km
Pipeline SPH-LL → Route 1 →
UTGCA

Wells
08 Producers (1 EXP & 1 RDA)
05 Injector (1 WAG, 1 GI, 3 WI)

Reservoir
API: 29°
GOR: 215 m³/m³
CO₂: 18%
VOIP = 1620 MM bbl

TECHNOLOGICAL HIGHLIGHTS - SUBSEA



Safety and
reliable subsea systems

Cost-effective for
ultra deep water projects

PRE-SALT SUBSEA SYSTEMS



TECHNOLOGICAL HIGHLIGHTS - FPSOs

Suitable for pre-salt fluids and contaminants



MAIN RESULTS

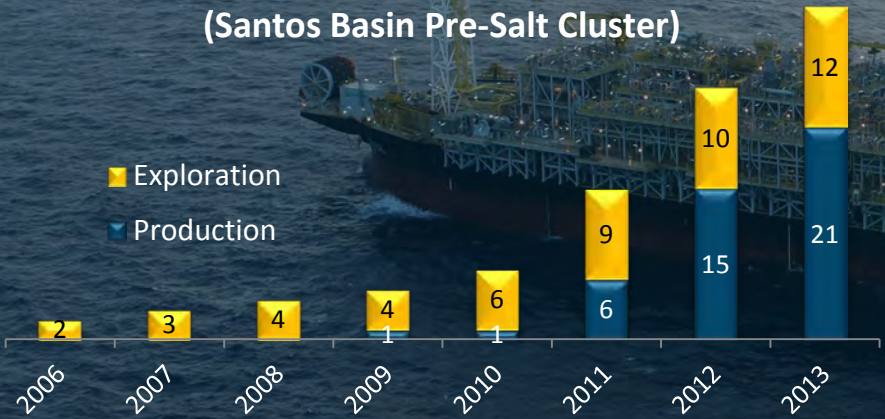


MAIN RESULTS

SANTOS BASIN PRE-SALT CLUSTER

Drilled Wells (Santos Basin Pre-Salt Cluster)

- Exploration
- Production



Operating Rigs (Santos Basin Pre-Salt Cluster)



100%

Exploratory success in 2013

Reference: Dez/2013 *Only operated wells

Time to reach a production of 500,000 bopd

PETROBRAS

Onshore / Shallow Water



1953
1984

31 years

4,108 wells

120 bopd/well

CAMPOS BASIN

Deep Water



1974
1995

21 years

411 wells

1,200 bopd/well

PRE-SALT

Ultra-Deep Water



2006
2014

8 years

25 wells

20,000 bopd/well

MAIN RESULTS - EWTs

FPSO Dinaide Produção

EWTs	Period	Block
Lula	Apr/09 - Dec/10	BM-S-11
Lula NE	Apr/11 - Nov/11	BM-S-11
Iracema S	Feb/12 - Oct/12	BM-S-11
Sapinhoá N	Jan/13 - May/13	BM-S-9
Lula Sul	Nov/13 - Apr/14	BM-S-11



MAIN RESULTS - PILOTS


- Sizeable hydrocarbon discoveries
- Very high productivity (25+ kbpd per well)
- Successful fast track projects (4-6 years after discovery)
- Successful pioneering technologies



MOST RECENT PRODUCTION SYSTEM ON STREAM

FPSO Cidade de Mangaratiba (Santos Basin)

On stream since October 14th



150 kppd oil
8 MM m³/d gas
8p + 8i wells




Iracema South

MOST RECENT PRODUCTION SYSTEM ON STREAM

FPSO Cidade de Ilhabela (Santos Basin)

On stream since
October 20th



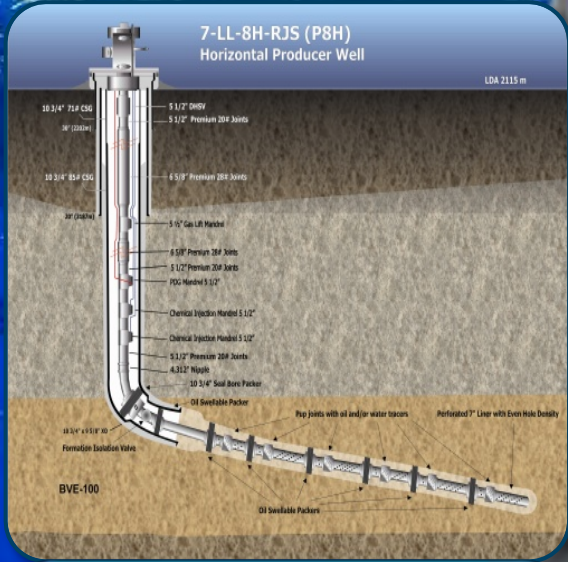
150 kppd oil
6 MM m³ gas
8p + 7i wells



Sapinhoá North

TECHNOLOGICAL HIGHLIGHTS - WELLS

92 days:
drilling + completion record
(Aug/2014)



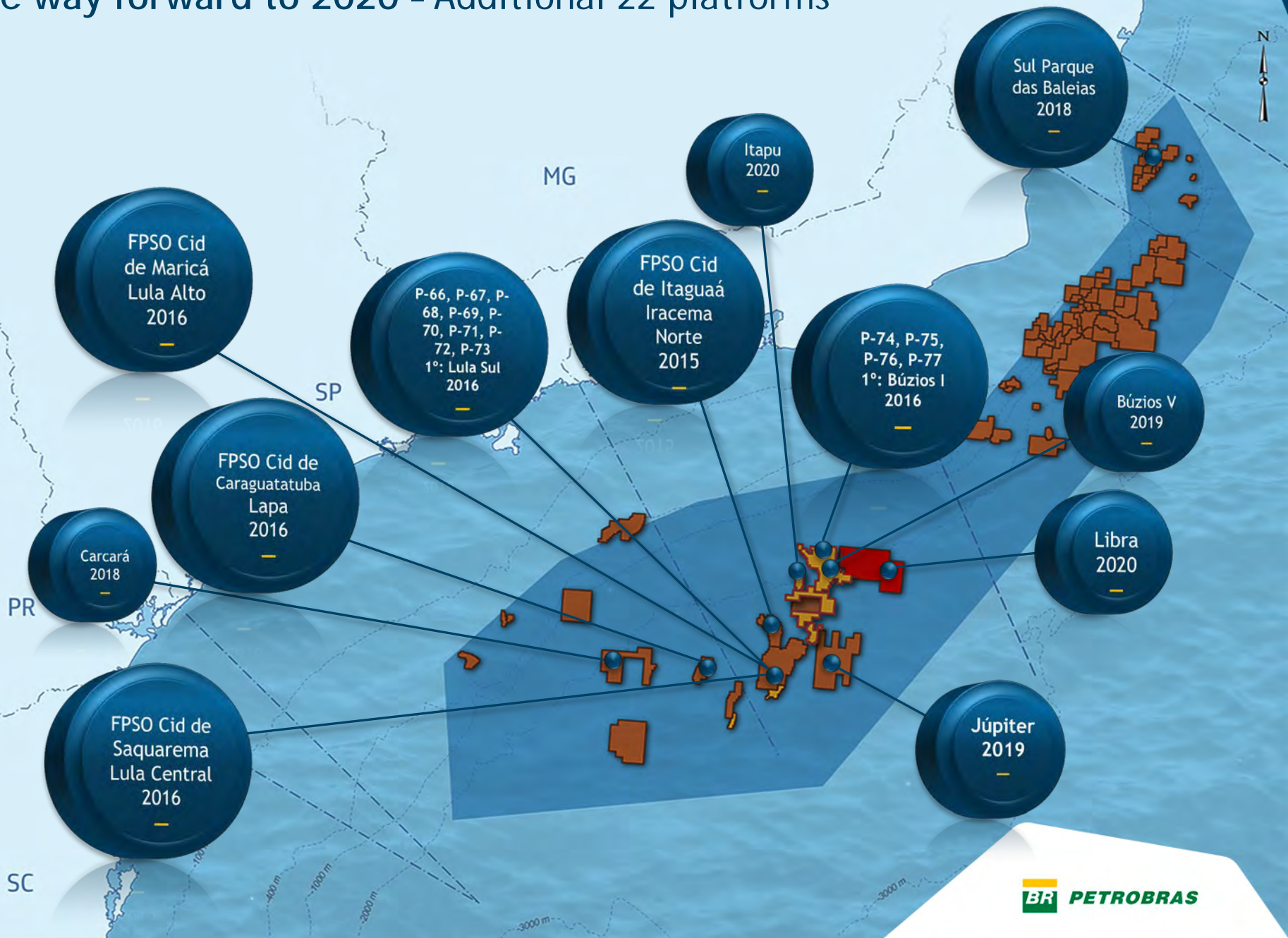
First Pre-salt Horizontal Well
LL-8H - Lula Pilot

Safe and reliable wells
Cost-effective and high productivity wells for pre-salt conditions

PERSPECTIVES




The way forward to 2020 - Additional 22 platforms



2014-2018 PROJECTS PERSPECTIVES

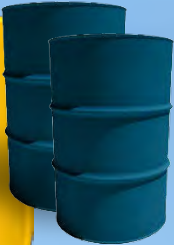
Iracema Norte (Santos Basin) 1st oil: Q4, 2015



150 kppd oil
8 MM m³/d gas
8p + 9i wells

2014-2018 PROJECTS PERSPECTIVES


Lula Alto (Santos Basin) 1st oil: 2016



150 kppd oil
6 MM m³/d gas
10p + 8i wells

2014-2018 PROJECTS PERSPECTIVES

Lula Central (Santos Basin) 1st oil: 2016



150 kppd oil
6 MM m³/d gas
10p + 9i wells

2014-2018 PROJECTS PERSPECTIVES

8 New build FPSOs Replicants

First: P-66 (Lula Sul)

1st oil: 2016



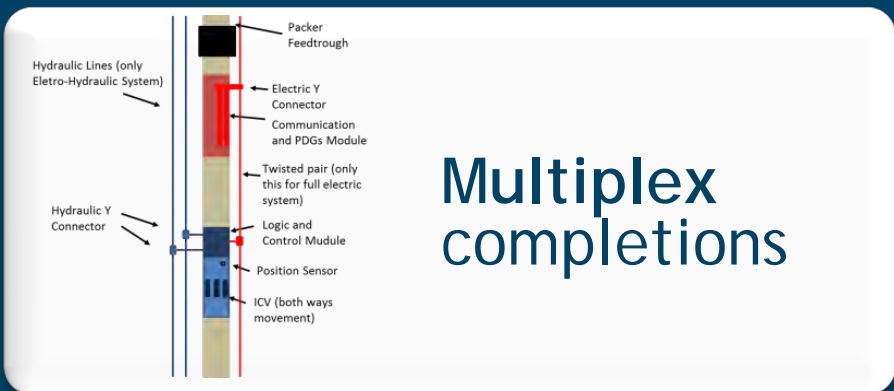
150 kppd oil
6 - 7 MM
m³/d gas



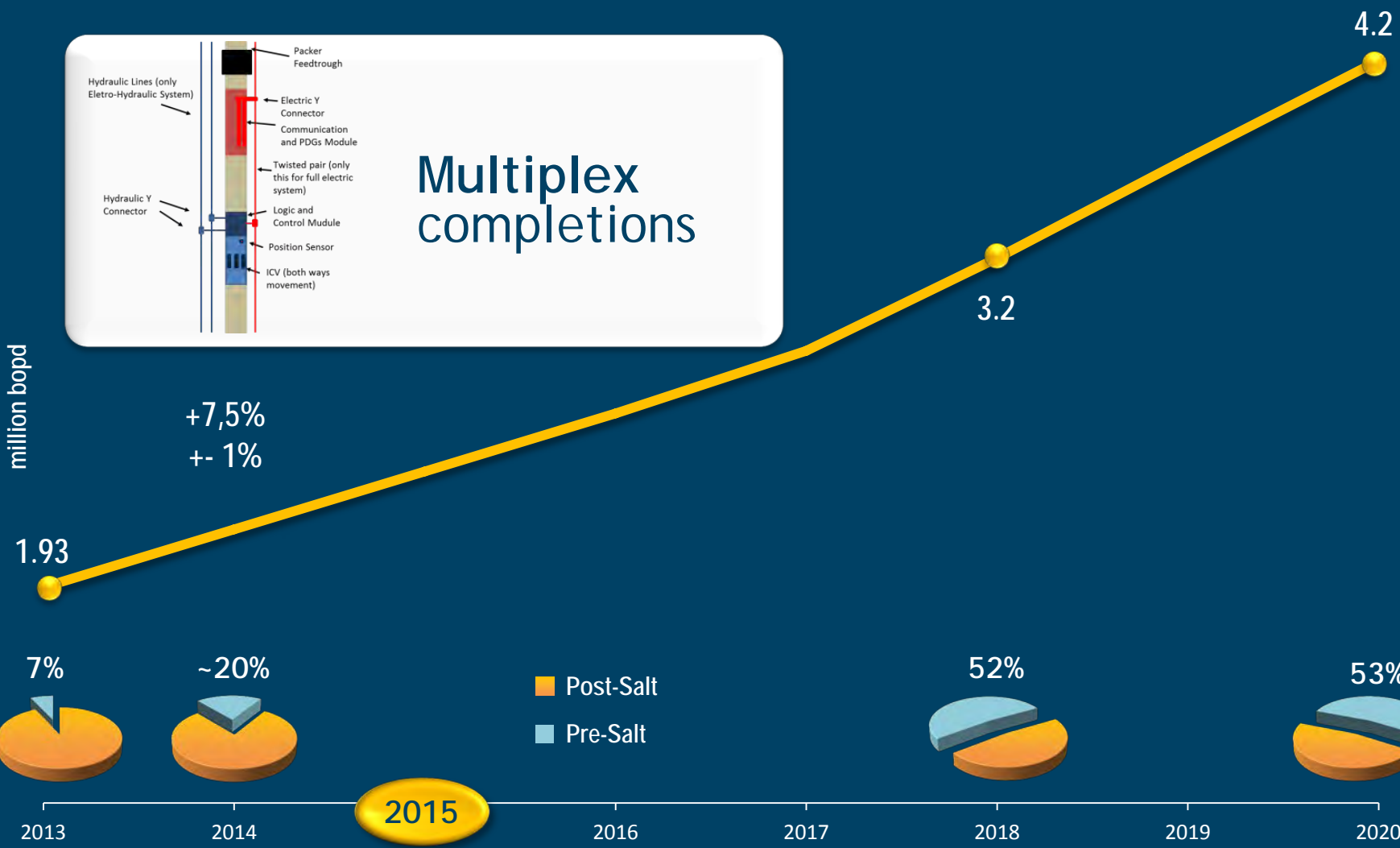
NEXT TECHNOLOGICAL WAVE



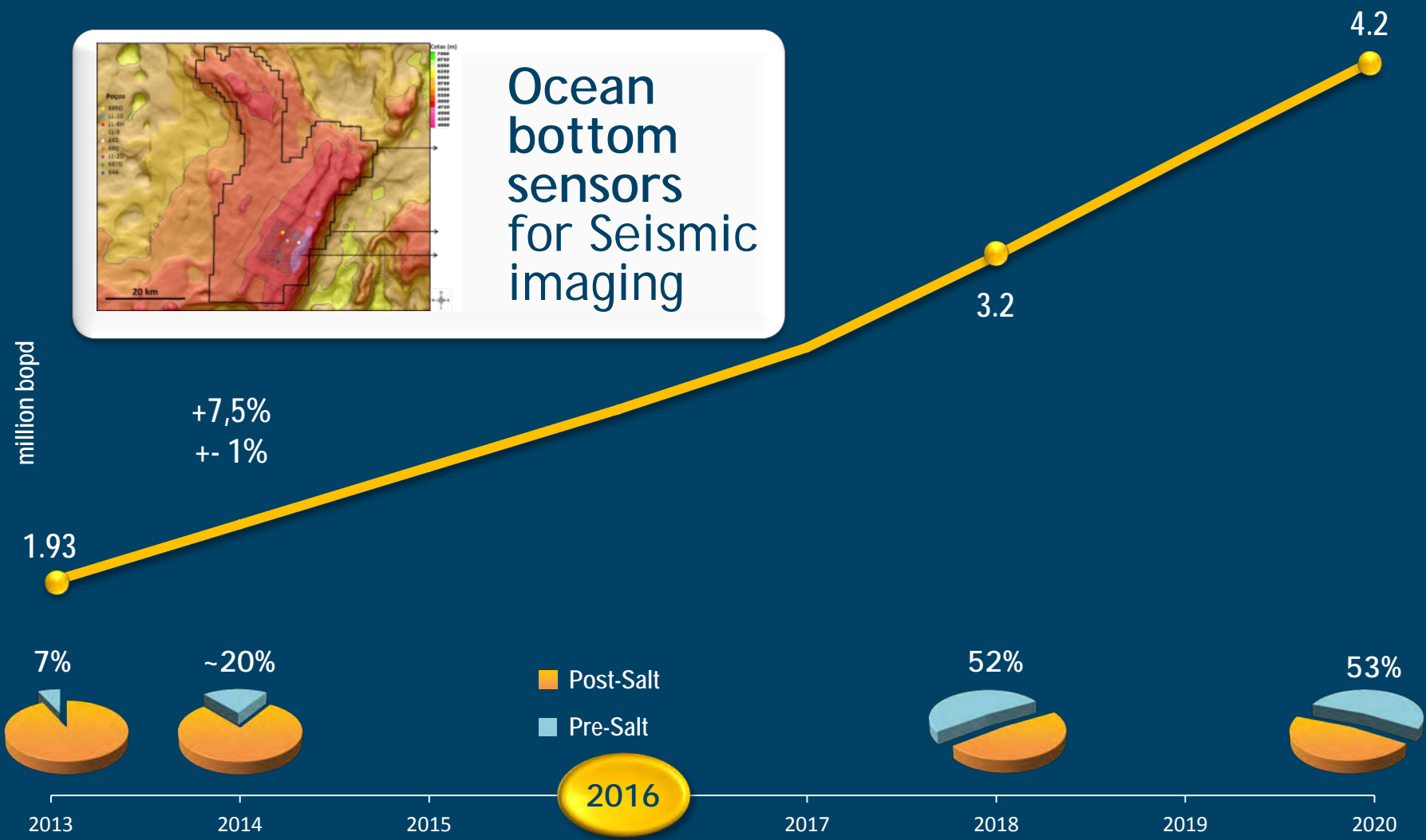
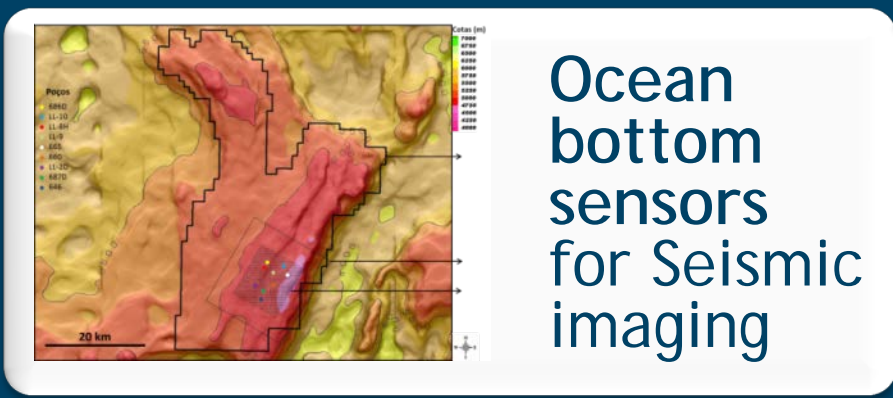
The way forward to 2020 - Petrobras Oil Production



Multiplex completions



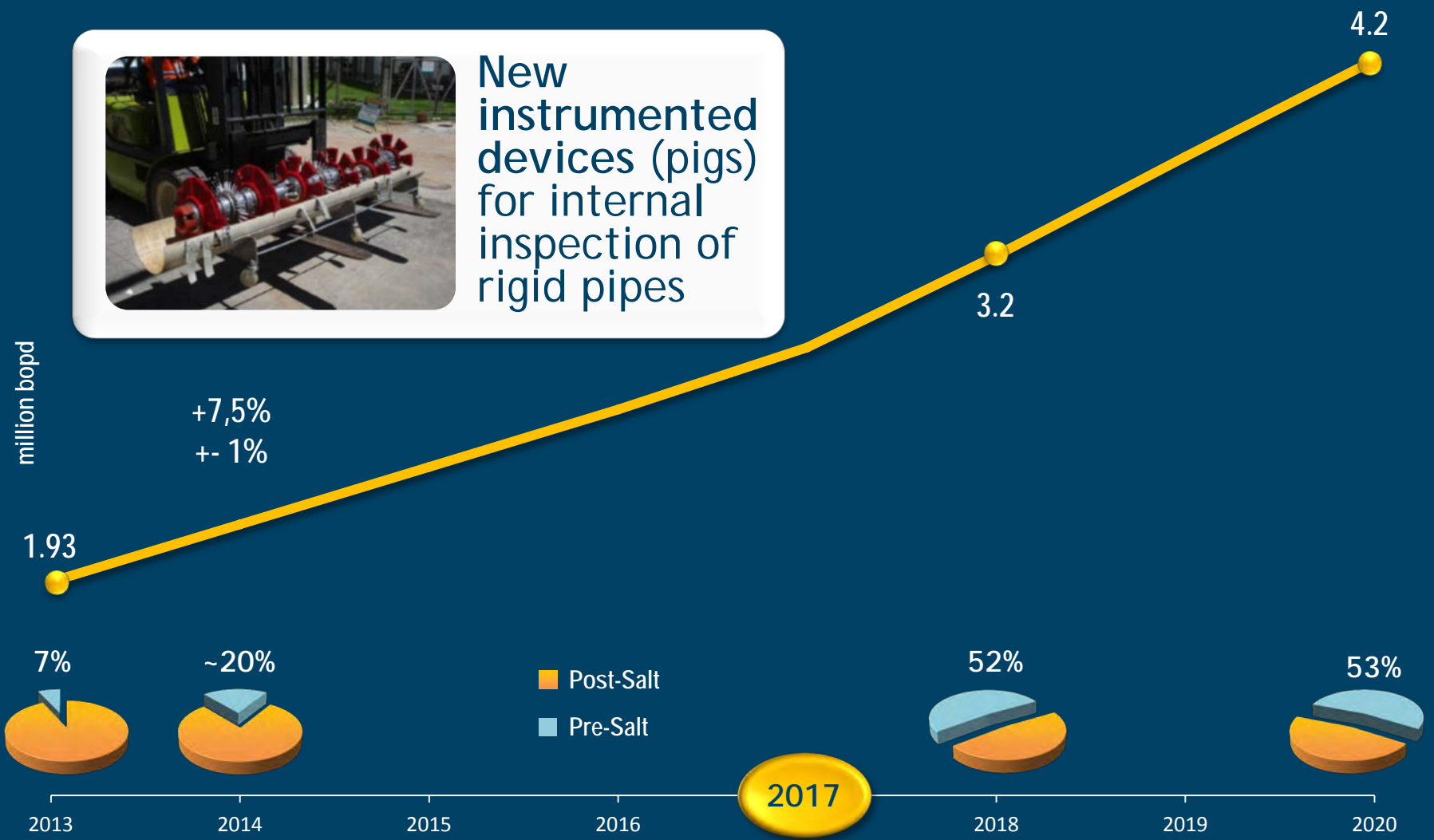
The way forward to 2020 - Petrobras Oil Production



The way forward to 2020 - Petrobras Oil Production



New instrumented devices (pigs) for internal inspection of rigid pipes



The way forward to 2030 - Petrobras Oil Production

4.2 million bopd

Petrobras Production in Brazil

3.7 million bopd



million bopd



BMSHA



SSGL

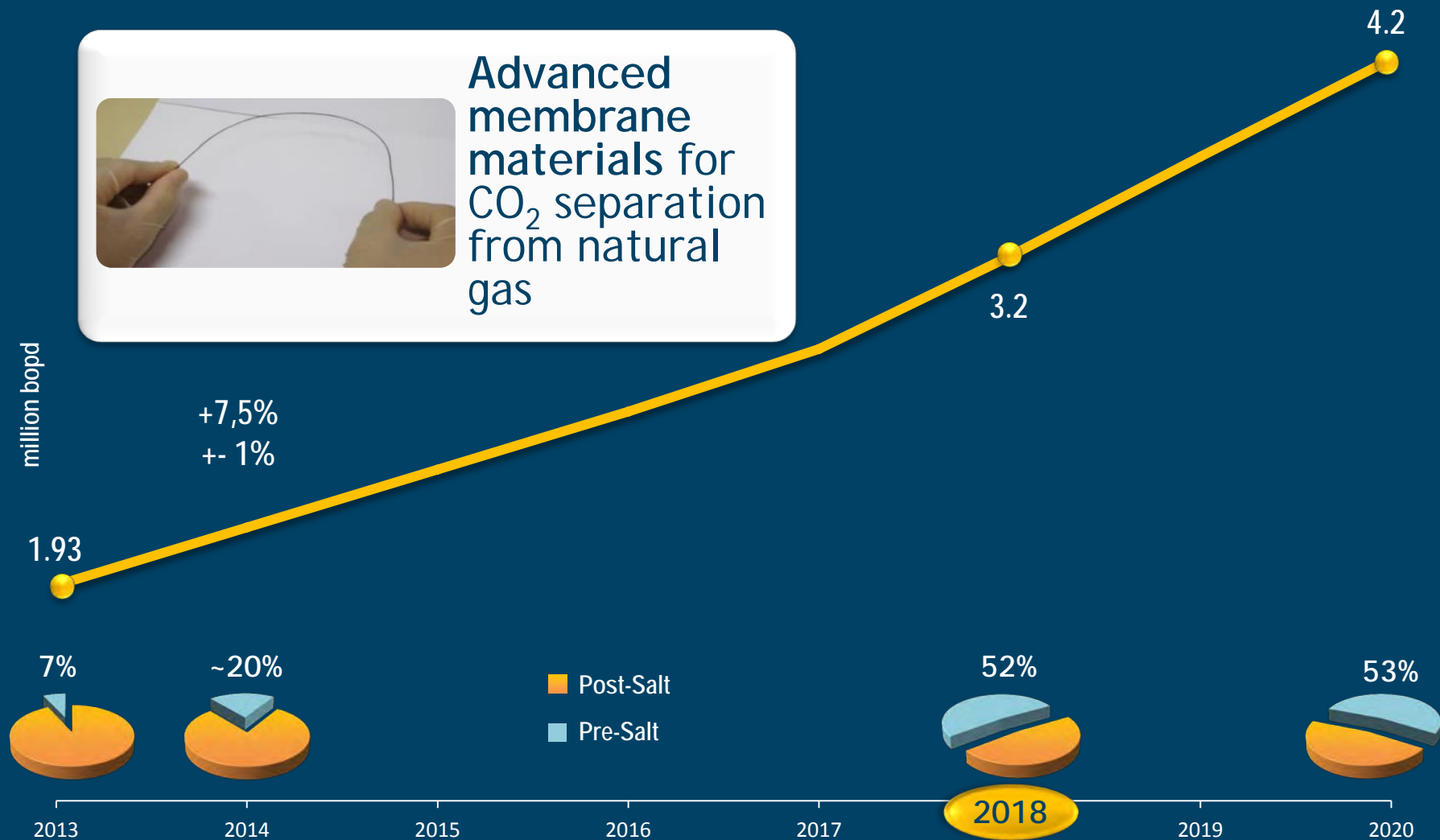
Subsea processing:
Subsea Separation and Pumping

2020-2030

2020

2030

The way forward to 2030 - Petrobras Oil Production



The way forward to 2030 - Petrobras Oil Production

4.2 million bopd

Petrobras Production in Brazil

3.7 million bopd



million bopd



BMSHA



SSGL

Subsea processing:
Subsea Separation and Pumping

2020

2020-2030

2030

The way forward to 2030 - Petrobras Oil Production



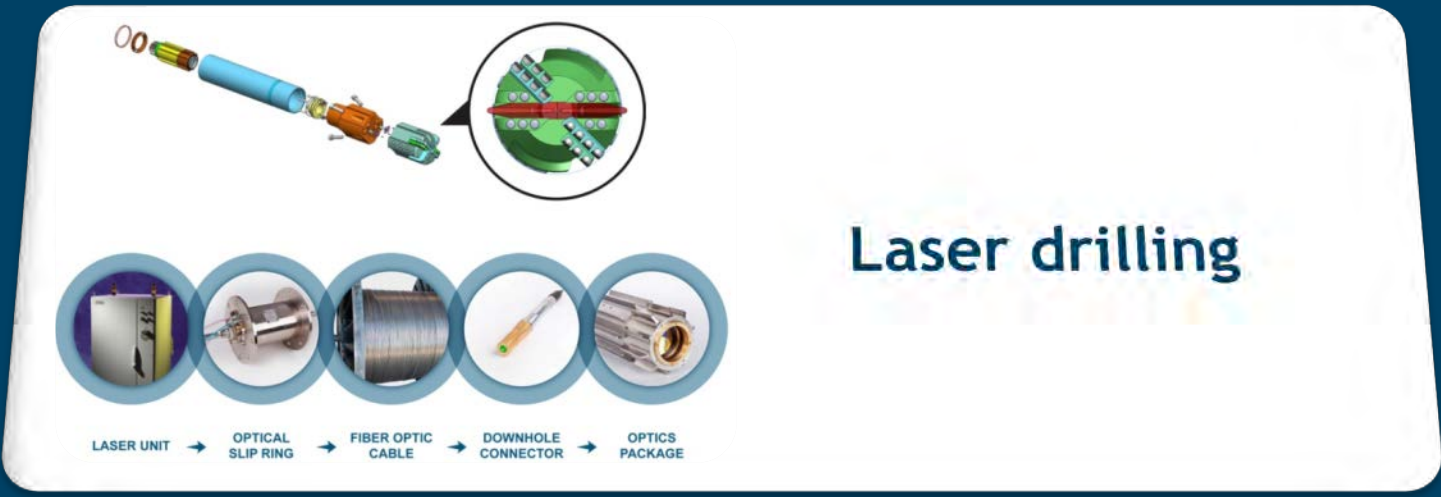
Nanotechnology applied for increasing reservoir recovery and materials



The way forward to 2030 - Petrobras Oil Production



million bopd

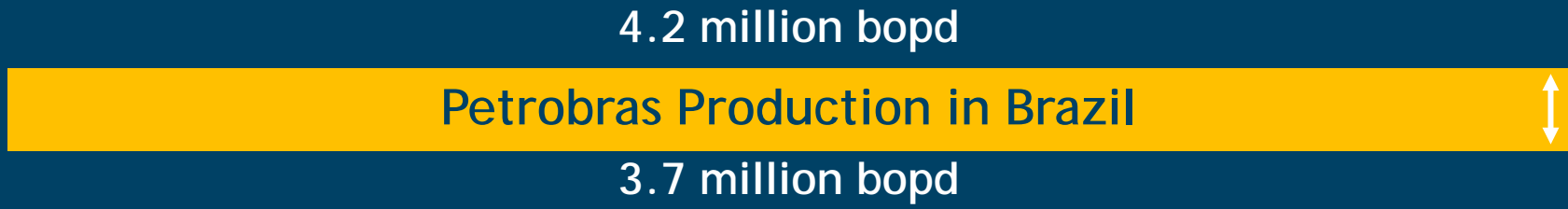


2020

2020-2030

2030

The way forward to 2030 - Petrobras Oil Production



million bopd



**Potential PRM
(Permanent Reservoirs
Monitoring) Multiphysics
for Pre-Salt Reservoirs**



The way forward to 2030 - Petrobras Oil Production

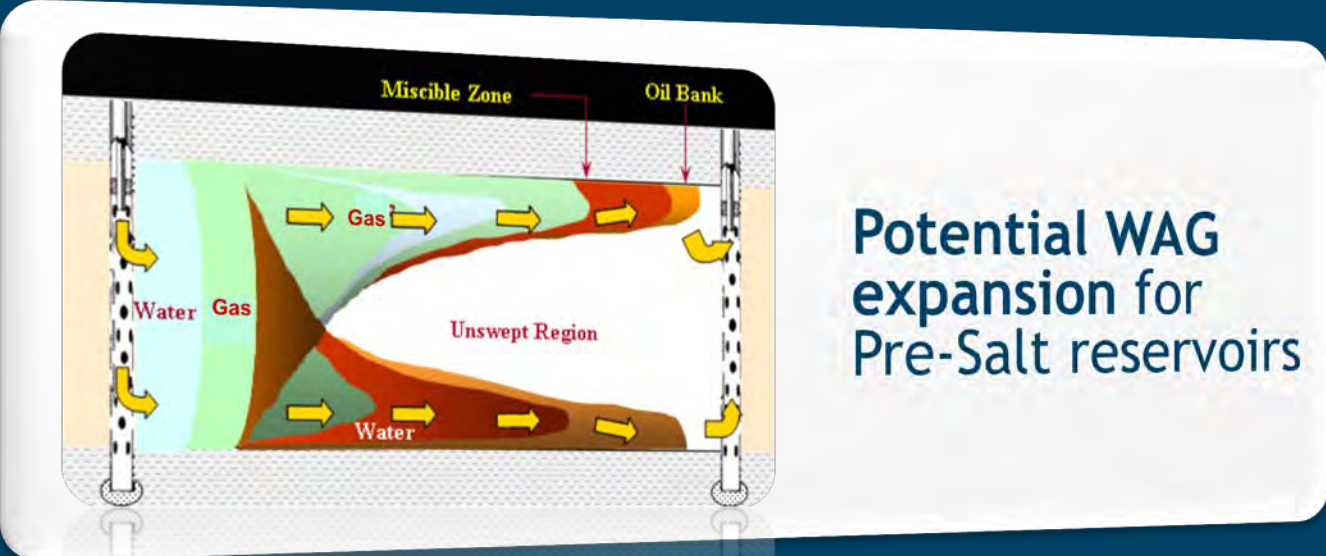
4.2 million bopd

Petrobras Production in Brazil



3.7 million bopd

million bopd



Potential WAG expansion for Pre-Salt reservoirs

2020

2020-2030

2030

The way forward to 2030 - Petrobras Oil Production

4.2 million bopd



3.7 million bopd

million bopd



High Pressure Separation (HighSep) for bulk CO₂ removal

2020-2030

2020

2030

The way forward to 2030 - Petrobras Oil Production

4.2 million bopd



3.7 million bopd

million bopd



Large Capacity FPU's

2020-2030

2020

2030

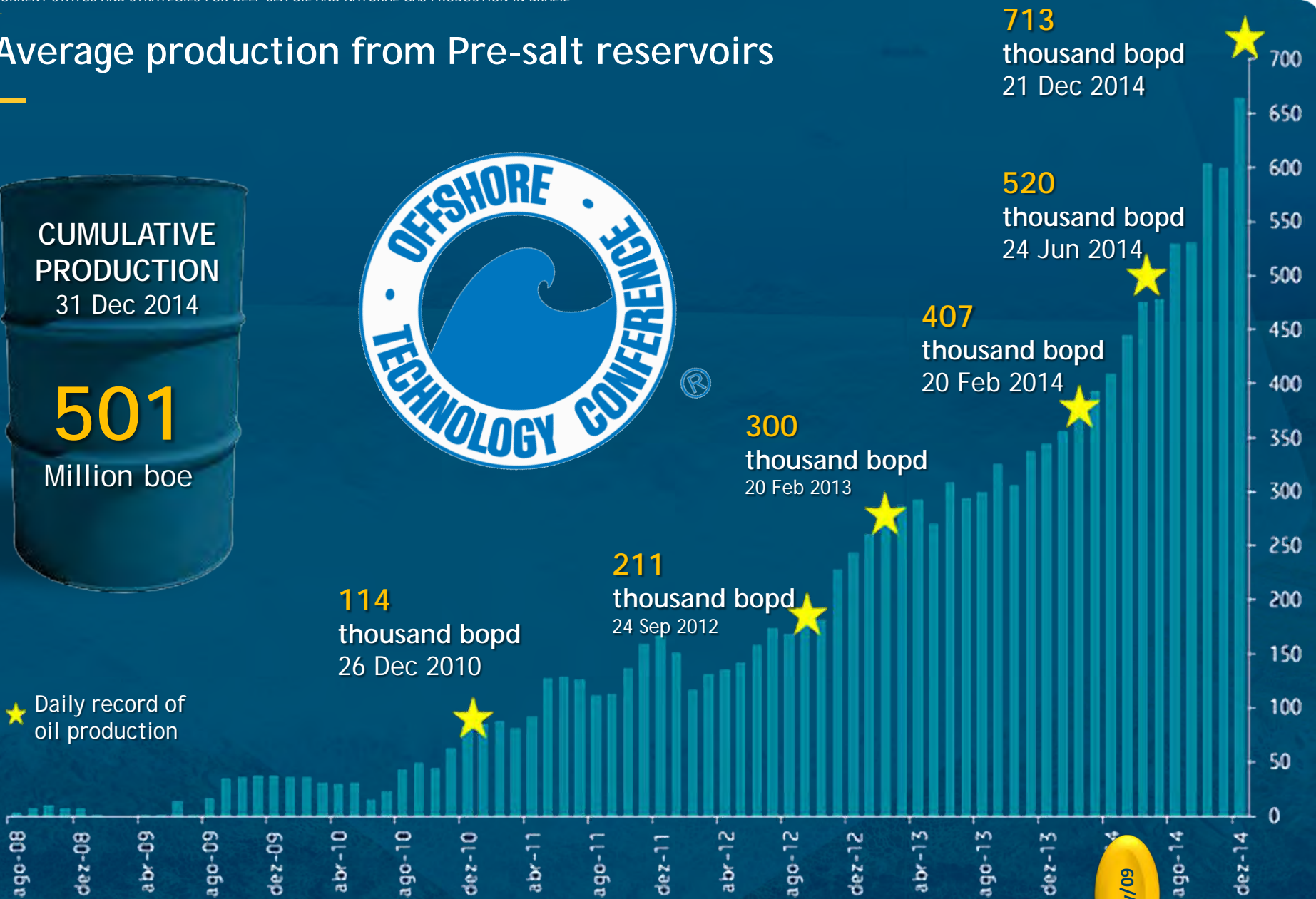
Average production from Pre-salt reservoirs

CUMULATIVE PRODUCTION
31 Dec 2014

501
Million boe



★ Daily record of oil production





Leticia Midori Sugita
Sapinhoá Pilot 1st Oil

Thank you

comunica.uobs@petrobras.com.br