The Brazilian Oil and Gas Sector Resumption

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Notice

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• There is no guarantee of realization for the estimated values

• The data, information, opinions, estimates and projections presented in this document are subject to change without prior notice
Outline

1. Oil and Gas Scenario
2. Improvements
3. Bidding rounds
4. Gas and Downstream
4. Final Remarks
# Oil Industry in Brazil

**E&P**

<table>
<thead>
<tr>
<th>10th</th>
<th>largest oil producer, the largest of Latin America</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>311 blocks and 443 fields</td>
</tr>
<tr>
<td></td>
<td>95 companies</td>
</tr>
</tbody>
</table>

**Downstream**

<table>
<thead>
<tr>
<th>7th</th>
<th>largest consumer of oil products</th>
</tr>
</thead>
<tbody>
<tr>
<td>3rd</td>
<td>largest consumer of transportation fuels</td>
</tr>
<tr>
<td></td>
<td>Refining Capacity (2016): 2.3 million bbl/d</td>
</tr>
<tr>
<td></td>
<td>126,472 companies</td>
</tr>
</tbody>
</table>

**11%**

Industrial’s GDP (CNI, 2014)

**50%**

Energy supply

**R$295**

Billions in government revenues (2005-2016)

Billions of annual investments

Billions of investments in R&D & I

Millions of jobs

The numbers still not reflect all the brazilian potential
Five years without rounds (2008-2013), Petrobras’ investments reduction and oil price collapse: strong decrease in exploratory activities

**Exploration Scenario in Brazil**

*Until 08/09/2017*
Drilling Scenario in Brazil

Reduction in the number of drilling rigs in operation

Number of Drilling Rigs in Brazil (up to July 2017)

1 rig = 1,000 jobs

Development Wells Concluded

*Until 23/08/2017

Source: Baker Hughes
Onshore Scenario in Brazil

### Onshore Oil Production

<table>
<thead>
<tr>
<th>Year</th>
<th>Oil (thousand bbl/d)</th>
<th>Gas (thousand m³/d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>180</td>
<td></td>
</tr>
<tr>
<td>2017</td>
<td>131</td>
<td></td>
</tr>
<tr>
<td>Variation (%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Reserves

<table>
<thead>
<tr>
<th>Year</th>
<th>Reserves (Million boe)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>1.382</td>
</tr>
<tr>
<td>2017</td>
<td>1.018</td>
</tr>
<tr>
<td>Variation (%)</td>
<td></td>
</tr>
</tbody>
</table>

### Onshore Wells Concluded

<table>
<thead>
<tr>
<th>Year</th>
<th>Exploratory Wells Concluded</th>
<th>Development Wells Concluded</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>119</td>
<td>426</td>
</tr>
<tr>
<td>2017</td>
<td>9</td>
<td>72</td>
</tr>
<tr>
<td>Variation (%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1. Up to 06/2017
2. BAR (31/12/2016)
3. Up to 08/09/2017

*Until 13/07/2017*
Offshore Scenario

Were it not the pre-salt blocks offered in the last decade…

Campos Basin – post-salt production

Santos and ES Basins – post-salt

Northeast Basins- offshore production

Total Offshore  Post salt Offshore  Pre salt

Were it not the pre-salt blocks offered in the last decade…
The pre-salt’s prospectivity

Unparalleled Potential

30,000 bbl/d
Top wells average oil production

High Quality
Reservoirs

Large Structures

Light Oil

1.56 million boe/d
Average pre-salt production in 2017

Dozens Bbbl
of Potential Resources
(contractured and to be contracted)

A huge opportunity
## Prospectivity: besides the pre-salt

<table>
<thead>
<tr>
<th>Area</th>
<th>Contracted Area</th>
<th>Drilled wells</th>
<th>Fields</th>
</tr>
</thead>
<tbody>
<tr>
<td>East Margin</td>
<td>~ 1.5 million km²</td>
<td>0.054 million km²</td>
<td>~5,100</td>
</tr>
<tr>
<td>Equatorial Margin</td>
<td>~ 1 million km²</td>
<td>0.033 million km²</td>
<td>~800</td>
</tr>
<tr>
<td>Onshore Basins</td>
<td>~ 5 million km²</td>
<td>0.17 million km²</td>
<td>~23,000</td>
</tr>
</tbody>
</table>

All basins have potential for **oil discovery** in turbidite reservoirs from the Upper Cretaceous to the Paleogene.

**New Frontier** Basins
- Geological evolution similar to the West African Margin and French Guiana
- Expectation of light oil discoveries in turbidite reservoirs of the Upper Cretaceous

**Mature** Basins (Remaining Potential)
- Solimões Basin: Potential for light oil
- Other Basins: Potential for gas
Less than 5% of the sedimentary areas are contracted

2 basins without a single well

Only 30,000 wells were drilled

“The Stone Age did not end for lack of stone, and the Oil Age will end long before the world runs out of oil”
Sheik Zaki Yamani

Need of improvements to:

attract new investments
expand knowledge
resume industry growth (before oil loses relevance)

R&D&I to explore our potential

New Technologies and innovations increase reserves and field production

Selectivity in the approval of new investments

Global competition for investments (2017: around 40 rounds in progress)

Renewable energy sources gaining ground (transition to a low-carbon economy)
Blocks on offer in the next rounds contain 41 areas excluded from the 9th Bidding Round.

The blocks exclusion caused the postponement/loss of billions of reais in government revenues.

It was the greatest opportunity lost in a generation.

Measures must be taken to resume activity.
Improvements in the energy policy

- Petrobras is no longer sole operator
- Bidding rounds calendar
- New E&P and LC Policies
- Government Programs (REATE etc)
- REPETRO’s Extension

2017
- 14th
- 2nd PSC (Unitization)
- 3rd PSC
- 15th
- 4th PSC
- 5th Marginal Fields

2018 (May)
- 16th
- 5th PSC

2018 (tbd)
- 6th Marginal Fields

2019
- 3rd q
- 5th PSC

2019 (tbd)
- 6th Marginal Fields
Improvements in the regulatory framework

Measures to unlock investments in the **short-term**
More related to ongoing contracts (regulatory improvements)

Measures to unlock investments in the **medium and long-term**
More related to **new** contracts (rounds)
Main Measures to unlock investments in the short-term

<table>
<thead>
<tr>
<th>06</th>
<th>Other measures (Regulatory Agenda 2017/2018)</th>
</tr>
</thead>
<tbody>
<tr>
<td>05</td>
<td>Onerous Transfer of Rights Negotiation</td>
</tr>
<tr>
<td>04</td>
<td>Speed up Environmental Licenses Issuance</td>
</tr>
<tr>
<td>03</td>
<td>Exploratory Phase Extension (11th and 12th Rounds)</td>
</tr>
<tr>
<td>02</td>
<td>Royalties reduction regulation</td>
</tr>
<tr>
<td>01</td>
<td>Local Content Waiver Regulation</td>
</tr>
</tbody>
</table>
Local Content

**New Ordinance under public consultation**

Allow the operators choose the same local content rules and percentage from the 14th bidding round.

**Unlock Investments**

**Accelerate** development of projects/reserves

US$ 2,6B in government revenues for each year of delay

**Brazil Santos basin oil production outlook by LC commitment**

A significant impact in the **ramp up** of pre-salt fields

22 Production Units still to be contracted between 2017 – 2027

+ 17 Production Units from the new bidding rounds
Incentives to mature fields

- Royalties reduction, up to 5%, on the incremental production
- RBL (Reserve base lending)
- Production phase extensions
- CNPE 17/2017: to promote new technologies for oil and gas recovery
- CNPE 17/2017: To encourage transfer of rights

**Recovery Factor (O&G)**
- **Brazil**: 21%
- **Noruega**: 70%

1% additional in the recovery factor:

**New Investments**
- US$ 18B

**Royalties**
- US$ 11B

**Reserves**
- 2,2B bboe
Main Measures to unlock investments in the medium and long-term

01 Bidding Rounds
02 Open Acreage
03 Improved Regulation
04 Environmental Licenses
Open acreage

Example: Recôncavo and Tucano Sul basins

To revitalize onshore activity

To stimulate small and midsize companies

Blocks previously offered, except in the pre-salt polygon

Blocks/Fields relinquished

Areas Nomination process under development

First round in 2018
Potential Investments in Development (2017–2027)

Ongoing Contracts

- 15 New Production Units to be contracted

R$ 585 B
Investments (all fields)

New Contracts (rounds)

- 17 New Production Units to be contracted

R$ 260 B
Investments

R$ +845 B
Investments (all fields) between 2017/2027

+39
New Production Units (to be contracted between 2017/2027)
Stationary Production Units – SPU
Estimated Demand* (2017/2027)

~ 300 MODULES

Will be contracted with the Brazilian industry for...

39 PLATFORMS

With investments in Brazil around....

R$ 32 billions

in MACHINES and EQUIPMENTS

R$ 53 billions

In CONSTRUCTION, ASSEMBLY and INTEGRATION

R$ 13 billions

In ENGINEERING

Wells and Subsea
Estimated Demand* (2017/2027)

39 Projects

Will be realized in Brazil with estimated expenditures of...

R$ 121 billions

in WELLS and…

R$ 125 billions

In SUBSEA INSTALLATIONS

R$ 344 billions

of potential investments in Brazil between 2017-2027

*Numbers estimated considering Petrobras’ forecast for 19 production units of ongoing contracts and ABESPETRO study “Estimativa de bens & Serviços, PROJETO TIPO – Pré-sal” (May/2017)
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Concession Rounds

- 14th Bidding Round
  - 287 Blocks
  - ~50 Bbbl - OOIP

- 15th Bidding Round
- 16th Bidding Round
Production Sharing Rounds

Areas in the pre-salt

In the 2nd PSC Round

4

In the 3rd PSC Round

4

In the 4th PSC Round

7

In the 5th PSC Round

3
Bidding Rounds

**Done**
Blocks, Tender Protocols and Contracts Approved

- ✓ 14th Bidding Round
- ✓ 2nd PSC Bidding Round
- ✓ 3rd PSC Bidding Round

**Improvements in the 14th Round**
- Reduced entry costs
- Simpler contracts
- Incentives for investments funds to participate
- Royalties adjustment in mature and frontier basins
Bidding Rounds – In the pipeline

15th and 16th Bidding Rounds
(Blocks being defined, Tender Protocols and Contracts under development)

4th and 5th PSC Bidding Rounds
(Blocks being defined, Tender Protocols and Contracts under development)

Sectors being defined to 2020 and 2021
Bidding rounds expected results

**US$ +80 B**
New Investments

**+300**
New offshore wells

**+10 Bbbl**
Recoverable

**+17**
New Productions Units

**+600 Km**
Gas Pipeline

**+2 Mbpd**
Oil in 2027

**+1,100 Km**
Flow Lines

**+20**
Offshores Rigs simultaneously

**Thousands of Jobs**
Outline

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

Brazil’s gas production is expected to **grow significantly**.

A number of **opportunities** to invest in profitable projects, e.g.:

- NGL terminals
- Gas pipelines
- Natural gas processing plants
Natural Gas Market

For the first time ever an open, diverse and competitive natural gas market

Petrobras’s repositioning

Increasing domestic and global offer

Growing consumption in power generation

LDCs direct contracting Bolivian gas and LNG

Investments in NG logistics

Natural gas supply and demand

Million m³/day

2012 2013 2014 2015 2016 2017

Local Bolivian gas LNG Demand
Downstream Infrastructure

Current infrastructure is insufficient for such a large country

A number of opportunities to invest in profitable projects, e.g.:

- Refineries
- Fuel terminals
- Oil pipelines
Downstream Opportunities

Petrobras’s repositioning

International prices

Increasing competition

Increasing oil exports

Logistics inefficiency: 4 to 7 US$/bbl

CO2 emission reduction targets

Increasing % mix of biodiesel

Increasing oil products imports, mainly ethanol

2nd generation ethanol

Refining capacity expansion

Biofuels production increase

**Crude oil exports**

Source: EPE (PDE 2026)

**Biodiesel Production**

*Up to June/2017
Downstream

*2017 Results up to June

Increasing oil products and ethanol imports
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O&G sector in Brazil since the 50’s

**Exploration and Production**

- 1953: Petrobras monopoly
- 1975: Risk Contracts: minimal impact
- 1997: End of monopoly (Oil Act), Bidding Rounds (Concession contracts)
- 2010: New pre-salt law (Petrobras sole operation – PSC)
- 2016: New E&P policies, Petrobras’ Repositioning (focus on large offshore fields)

**Downstream, logistics and natural gas**

- 1953: Petrobras monopoly
- 1997: End of monopoly (Oil Act), Remains Petrobras’ dominance
- 2016: Petrobras’ Repositioning (In favor of an open and competitive market)
O&G scenario in 2017

The greatest transformation in the Brazilian E&P sector

Unique E&P opportunity:
- immediate reserves certification
- fast production development
- reserves and production growth

First ever effective opening in the natural gas business

Creation of a competitive, open, diverse and internationally referred refining and fuels market

Development of a diverse and competitive supply chain and services market

Bidding round schedule and open acreage

Need of additional service companies

Diverse and Competitive Market

Petrobras divestment plan

Improvements in the energy policy
National Agency of Petroleum, Natural Gas and Biofuels ANP

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