Brazilian Exploration Scenario and Opportunities

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Agenda

1. Main Regulatory Enhancements
   - Implemented Regulatory Measures
   - Year to Date Results

2. Investment Opportunities
   - Brazil’s Unique E&P Environments
   - Calendar of Bid Rounds & Strategic Initiatives

3. Final Remarks
   - Regulatory Framework
   - Brazil E&P Potential
“The most excitement at the moment is from the deepwater,” Mr Brown* told the Financial Times, saying projects in Brazil, the Gulf of Mexico and West of Shetland in the North Sea were among the most attractive.

* Andy Brown, Shell’s head of exploration and production

March 2018 - Exxon Mobil and other oil companies opened their wallets at an offshore oil auction in Brazil on Thursday in a sign that the industry was stepping back into the deepwater drilling business. It was the third encouraging Brazilian offshore auction since September, and a vote of confidence for the country’s energy reform program (...)

This fresh investment, notably in offshore pre-salt basins, follows the introduction of significant regulatory changes to the oil and gas sector within Brazil.
Main Regulatory Enhancements

2017
- 3 Bidding Rounds PSA 2 & 3 / R14
- New Simplified Contract Rules
- New Local Content Rules 2017 & Beyond
- Bidding Schedule 2018/2019
- Extension - Exploration Phase (Rounds 11 and 12)

2018
- 3+ Bidding Rounds PSA 4 & 5 / R15
- Local Content Waver (previous rounds - up to 13th Round)
- Open Acreage – Entire Onshore
- Royalties Reduction (incremental production in mature fields)
- Collateral Burden Reduction (100% to 30% in marginal fields)
- New E&P Database (BDEP) (ANP/IBAMA joint Environmental Database)
- Reserve Based Landing (RBL)
- Bidding Rounds Schedule 2020/2021
The New Pre-Salt Exploration Scenario

Before 2017

YTD
## 2017 - 2018 Bidding Rounds Results

<table>
<thead>
<tr>
<th>Bidding Round</th>
<th>Acquired Blocks</th>
<th>Signing Bonus (US$ billion)</th>
<th>Registered Companies</th>
<th>Winner Companies</th>
<th>Premium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brasil 14 Round</td>
<td>37 (24 onshore and 13 offshore)</td>
<td>1.035</td>
<td>32</td>
<td>17</td>
<td>1,556%</td>
</tr>
<tr>
<td>PRE-SALT Brazil 2</td>
<td>3</td>
<td>0.889</td>
<td>10</td>
<td>7</td>
<td>261%</td>
</tr>
<tr>
<td>PRE-SALT Brazil 3</td>
<td>3</td>
<td>0.768</td>
<td>14</td>
<td>6</td>
<td>202%</td>
</tr>
<tr>
<td>PRE-SALT Brazil 4</td>
<td>3</td>
<td>0.849</td>
<td>16</td>
<td>7</td>
<td>202%</td>
</tr>
<tr>
<td>ROUND Brazil 15</td>
<td>22</td>
<td>2.159</td>
<td>17</td>
<td>12</td>
<td>622%</td>
</tr>
<tr>
<td>PRÉ-SAL Brasil 5</td>
<td>4</td>
<td>1.838</td>
<td>12</td>
<td>8</td>
<td>170%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>72</strong></td>
<td><strong>7.5</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*R$/US$ = 3.71

*Fierce Competition with Fantastic Results!*
Estimated Impact from 6 Recent Oil Auctions...

2017-2018

- New Investments: US$ 112B
- Tax Revenues: US$ 425B
- Million bpd: 2.5 (added peak production)
- New Platforms: ~20
- Hundreds of Wells!
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Brazil’s Current State

Area under concession
~ 280,000 km²

324 Blocks
440 fields

Production
(Dez, 2018)
Oil 2.691 million barrels/d
Natural Gas 114 million m³/d

Proven Reserves
(Dez, 2017)
Oil 12.8 billion barrels
Natural Gas 369 billion m³

9th largest oil producer in the world
and the largest in Latin America
### Three Different E&P Environments

<table>
<thead>
<tr>
<th>Environment</th>
<th>Average Oil Production per Well</th>
<th>Wells</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pre-Salt</strong></td>
<td>17,655 bpd</td>
<td>85</td>
<td>One of the World’s hottest oil play, home to the largest offshore oil discoveries in the last decade.</td>
</tr>
<tr>
<td><strong>Conventional Offshore</strong></td>
<td>1,650 bpd</td>
<td>628</td>
<td>East Margin adjacent to the pre-salt region and Equatorial Margin, including new frontier areas and a significant number of large mature fields.</td>
</tr>
<tr>
<td><strong>Onshore</strong></td>
<td>16 bpd</td>
<td>6,683</td>
<td>Mature Basins and New Frontier Basins (mostly gas prone). Potential for unconventional to be unleashed.</td>
</tr>
</tbody>
</table>

December 2018
Onshore oil Production (Oct, 2018)

- **4.500 bpd**
- **6.500 bpd**
- **8.500 bpd**
- **10.500 bpd**
- **12.500 bpd**
- **14.500 bpd**
- **16.500 bpd**

Northeast Basins Offshore Oil Production

- **62%**

Pre-Salt Oil Production

- **729%**

Post-Salt Campos Basin Oil Production

- **41%**

Exploratory Wells Concluded

- **87%**

Development Wells Concluded

- **70%**

Onshore oil Production

- **38%**

107,415 bpd
Maximize Recovery Factor

- **Campos Basin**
  - Current O&G Recovery Factor: 14%
  - Final O&G Recovery Factor: 23%
- **Brazil**
  - Final O&G Recovery Factor: 21%
- **World**
  - Average Final O&G Recovery Factor: 35%

1% addition in Campos Basin: 985 Mboe

1% addition in Onshore: 200 Mboe

Source: ANP (December 2017)
Bidding Rounds Schedule

- **November 1st**: 3rd Semester
- **October 28th**: Transfer of Rights Surplus
- **2018**: 1st Wave
- **2019**: 2nd Wave
- **2020**: To be defined
- **2021**: To be defined
Continuous offer of blocks and mature fields.

Companies can bid on blocks not sold in previous auctions.

Applications can be submitted anytime and not just at designated points.

It will promote exploration activity especially in onshore areas.
Data packages available

- 346,035 Km² area
- 14 Mature fields
- 884 Blocks
- 15 Sedimentary basins

Blocks not acquired in previous rounds included

- 722 blocks in 9 onshore basins
- 162 blocks in 6 offshore basins
Open Acreage 2\textsuperscript{nd} Wave

Technical and economic parameters under evaluation

1,054 Blocks

441,400 Km\textsuperscript{2} area

85 blocks in 7 onshore basins

969 blocks in 13 offshore basins
### 6th Pre-Salt Bidding Round (2019)

**Estimated Unrisked Oil in Place Volumes (P50)**

<table>
<thead>
<tr>
<th>Areas</th>
<th>Blocks</th>
<th>Min. Oil Profit (%)</th>
<th>Sig. Bonus (R$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aram</td>
<td>Aram</td>
<td>24,53</td>
<td>5.050.000.000,00</td>
</tr>
<tr>
<td>Bumerangue</td>
<td>Bumerangue</td>
<td>26,68</td>
<td>550.000.000,00</td>
</tr>
<tr>
<td>Cruzeiro do Sul</td>
<td>Cruzeiro do Sul</td>
<td>22,87</td>
<td>1.150.000.000,00</td>
</tr>
<tr>
<td>Sudoeste de Sagitario</td>
<td>Sudoeste de Sagitario</td>
<td>26,09</td>
<td>500.000.000,00</td>
</tr>
<tr>
<td>Norte de Brava</td>
<td>Norte de Brava</td>
<td>36,98</td>
<td>600.000.000,00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>Total</strong></td>
<td><strong>7.850.000.000,00</strong></td>
<td></td>
</tr>
</tbody>
</table>

**5 Areas**

**42B/bbl**
16th Bidding Round (2019)

42 Offshore blocks
~30,000 km²

Pernambuco-Paraíba, Jacuípe, Camamu-Almada, Campos & Santos basins
Several blocks in the Pre-Salt play including giant leads.
Sectors Under Examination

2020
Para-Maranhão, Potiguar, Santos Campos & Pelotas Basins

2021
Ceara, Espirito Santo & Pelotas
October, 28th

4 Fields

Atapu, Itapu, Buzios and Sepia
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Attract Suitable Players

- Major Operators
- Exploration Specialists
- Mature Field Players
- Supermajors
- Major Operators
- Small and mid-sized Companies

Supported by Oilfield Service Companies, Suppliers and Financial Institutions!
Brazil E&P Potential

Production Forecast (next 10 years)

- 5.5M bpd
- >50 New FPSOs
- Mature Fields/Basins
- Improve Recovery Factor
  - 1% addition
  - 2.2Bboe reserves
  - US$18B investments
- New Frontier Basins

We barely Know our Potential...

Unconventional resources under discussion

Contracted / In Progress to be unlocked
ANP main objective is to promote a Predictable and Stable Regulatory Framework, that Attract New Investments and Accelerate the Development of the Pre-Salt, Conventional Offshore and Onshore E&P Environment.

**Final Remarks**

**Attract the Right Players**
- Giant Fields
- New Frontiers
- Mature Fields
- Onshore

**Maximize Production**
- Diversity of Players
- EOR/IOR initiatives
- New RD&I focus
- Financing Opportunities

**Increase E&P Activities**
- Accelerate Pre-Salt Development
- Improve Mature Fields Production
- Improve Recovery Factor
- Enhance Onshore Incentives
- Expedite Environmental Licensing

**Create a Secondary Market**
- Attract mid/small-sized companies

**Create Value through a Developed, Diverse and Competitive Market!**
National Agency for Petroleum, Natural Gas and Biofuels – ANP

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Additional Information:
http://rodadas.anp.gov.br/en
www.anp.gov.br