PETROBRAS E&P
Projects and Investments

Platts
6th Annual Crude Oil Summit
May 13-14, 2013
London, UK

Dr. Antonio Cláudio F. Corrêa
PETROBRAS E&P London Office
acfcorrea@petrobras.com.br
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.

CAUTIONARY STATEMENT FOR US INVESTORS

The United States Securities and Exchange Commission permits oil and gas companies, in their filings with the SEC, to disclose only proved reserves that a company has demonstrated by actual production or conclusive formation tests to be economically and legally producible under existing economic and operating conditions. We use certain terms in this presentation, such as oil and gas resources, that the SEC’s guidelines strictly prohibit us from including in filings with the SEC.
Overview

1. Introduction
2. E&P Investment Plan
3. New Platforms
4. Technological Projects
Overview of Domestic & International E&P

Reserves 2012 (SPE/ANP)
- Proven reserves of 16.44 Billion Boe
- 103% of reserve replacement
- Domestic (96%) & International (4%)
- In 2011 acquired the right to produce 5 billion barrels from the pre-salt reservoirs (Transfer of Rights)

Production 2011
- Annual: 0.885 Billion Boe
- Daily: 2.42 MM Boe/d
- Gas fraction: 16%

Domestic Exploratory Area (2009)
- 137,000 km² (Petrobras & Partners)
- 194,899 km² (Other Companies)
Subsea Statistics

New R&D Center

Floating Production Unit x Water Depth
Evolution of Domestic Proven Reserves and Production

Criteria: ANP/SPE

<table>
<thead>
<tr>
<th>Year</th>
<th>Proven Reserves (10^9 boe)</th>
<th>Production (10^6 boe/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
<td>8.8</td>
<td>411</td>
</tr>
<tr>
<td>1999</td>
<td>9.5</td>
<td>465</td>
</tr>
<tr>
<td>2000</td>
<td>9.7</td>
<td>517</td>
</tr>
<tr>
<td>2001</td>
<td>9.7</td>
<td>540</td>
</tr>
<tr>
<td>2002</td>
<td>11.0</td>
<td>604</td>
</tr>
<tr>
<td>2003</td>
<td>12.6</td>
<td>616</td>
</tr>
<tr>
<td>2004</td>
<td>13.0</td>
<td>602</td>
</tr>
<tr>
<td>2005</td>
<td>13.2</td>
<td>673</td>
</tr>
<tr>
<td>2006</td>
<td>13.8</td>
<td>705</td>
</tr>
<tr>
<td>2007</td>
<td>13.9</td>
<td>708</td>
</tr>
<tr>
<td>2008</td>
<td>14.1</td>
<td>747</td>
</tr>
<tr>
<td>2009</td>
<td>14.2</td>
<td>786</td>
</tr>
<tr>
<td>2010</td>
<td>15.3</td>
<td>797</td>
</tr>
<tr>
<td>2011</td>
<td>15.7</td>
<td>819</td>
</tr>
<tr>
<td>2012</td>
<td>15.7</td>
<td>815</td>
</tr>
</tbody>
</table>
Exploratory Success

53 discoveries in the last 14 months (Jan/12 – Feb/13), from which 25 were offshore (15 in Pres-salt)

- Brazil
  - Discoveries: 53
    - Offshore: 25
    - Onshore: 28
  - Exploratory Success Ratio: 64%
  - Reserves: 15.7 Billion boe
  - RRR\(^1\): 103% for the 21\(^{st}\) consecutive year
  - R/P\(^2\): 19.3 years

- Pre-Salt
  - Discoveries: 15, of which 8 pioneers
  - Exploratory Success Ratio: 82%
  - Reserves: 300 km in the SE region, 55% of GDP

\(^1\) RRI: Reserves Replacement Ratio
\(^2\) R/P: Reserve / Production
Seismic Section – Santos Basin
Lula Field
Investments 2013-2017

**Total**
- US$ 236.7 Billion
- 947 projects

**Under Implementation**
- All E&P projects in Brazil and projects of the remaining segments in phase IV
- US$ 207.1 Billion
- 770 projects

**Under Evaluation**
- Projects for the remaining segments, excluding E&P, currently in phase I, II and III.
- US$ 29.6 Billion
- 177 projects

*Annual Investment by Segment (US$ Billion)*

- **E&P**: 62.3% (US$ 147.5 Billion)
- **Downstream**: 27.4% (US$ 64.8 Billion)
- **G&E**: 4.2% (US$ 9.9 Billion)
- **International**: 2.2% (US$ 5.1 Billion)
- **Other Areas**: 1.1% (US$ 2.9 Billion)
- **Pbio**: 0.4% (US$ 1.0 Billion)
- **Distribution**: 1.0% (US$ 3.2 Billion)
- **ETM**: 1.4% (US$ 1.1 Billion)
- **Other Areas**: 1.4% (US$ 2.9 Billion)

*Percentages and amounts are approximate.*

*Pbio = Petrobras Biofuel | ETM = Engineering, Technology and Materials | Other Areas = Financial, Strategy and Corporate

Phase I: Opportunity Identification; Phase II: Conceptual Project; Phase III: Basic Project; Phase IV: Execution
E&P Investments

2013-2017 Period
US$ 147.5 Billion

- Production Development: 73% (106.9)
- Exploration: 16% (24.3)
- Infrastructure and Support: 11% (16.3)

Exploration
US$ 24.3 Billion

- Post-Salt: 24% (5.8)
- Pre-Salt: 70% (17.1)
- Transfer of Rights: 6% (1.4)

Production Development
US$ 106.9 Billion

- Post-Salt: 43% (46.4)
- Pre-Salt: 32% (34.3)
- Transfer of Rights: 25% (26.2)

Exploration Investments in Brazil
Target: Keep R/P > 12 Minimizing Dry-Well Risks

Consolidation and delimitation of Pre-Salt and Transfer of Rights areas, besides Post-Salt Sergipe-Alagoas and Espírito Santo basins.

Selective investments in New Frontiers: Equatorial and East Margin.

US$ 24.3 Billion

- Pre-Salt: 24% (5.8)
- Transfer of Rights: 6% (1.4)
- Post-Salt: 70% (17.1)

Finding Cost (US$ / boe)

- 2007: 0.58
- 2008: 0.64
- 2009: 0.76
- 2010: 1.15
- 2011: 1.56
- 2012: 1.96

Concession Areas
March, 2012

Petrobras Costs Lower than Majors'
Oil & GNL Production Forecast

Oil and NGL Production (million bpd)

- Sapinhoá Pilot (Cld. São Paulo)
- Baúna (Cld. Itajaí)
- Lula NE Pilot (Cld. Paraty)
- Papa-Terra (P-63)
- Roncador III (P-55)
- Norte Pq. Baleias (P-58)
- Papa-Terra (P-61)
- Sapinhoá Norte (Cld. Ilhabela)
- Roncador IV (P-62)
- Iracema Norte (Cld. Mangaratiba)
- Lula Alto
- Lula Central
- Lula Sul (P-66)
- Franco 1 (P-74)
- Carioca
- Lula Norte (P-67)
- Franco SW (P-75)
- NE de Tupi (P-72)
- Iara NW (P-71)
- Deep Waters Sergipe
- Sul Pq. Baleias
- Maromba
- Espadarte I
- Carcará
- Júpiter
- Bonito
- Franco Leste
- Espadarte III
- Florim

25 new production units will start-up between 2013-17 or 38 new production units will start-up between 2013-20

Production units in operation
Overall Production Forecast

- **Oil and NGL Production (million bpd)**
- **Oil, NGL and Natural Gas Production (million boe)**

- **2011:** 2.0
- **2012:** 2.0
- **2013:** 2.0 ±2%
- **2014:** 2.4 ±2%
- **2015:** 2.4
- **2016:** 2.5
- **2017:** 2.75
- **2018:** 3.4
- **2019:** 4.2
- **2020:** 5.2

Petrobras
2013-2017 BMP: Production Curve Maintained

Production Curve in Brazil – Oil and NGL Production

- Sapinhoá Pilot (Cid. São Paulo)
- Baúna (Cid. Itajai)
- Lula NE Pilot (Cid. Paraty)
- Papa-Terra (P-63)
- Roncador III (P-55)
- Norte Pq. Baleias (P-58)
- Papa-Terra (P-61)
- Sapinhoá Norte (Cid. Ilhabela)
- Iracema Sul (Cid. Mangaratiba)
- Iracema Norte (Cid. Itaguaí)
- Franco SW (P-75)
- Franco 1 (P-74)
- Carioca
- Lula Alto
- Lula Central
- Lula Sul (P-66)
- Lula Ext. Sul (P-68)
- Lula Oeste (P-69)
- Franco Sul (P-76)
- Tartaruga Verde e Mesticha
- Iara Horst (P-70)
- Parque dos Doces
- Franco NW (P-77)
- NE de Tupi (P-72)
- Iara NW (P-71)
- Deep Waters Sergipe
- Sul Pq. Baleias Maromba
- Espadarte I
- Júpiter
- Bonito
- Franco Leste
- Florm

25 new production units will start-up between 2013-17 or 38 new production units will start-up between 2013-20

- Production units in operation
Sapinhoá Pilot Project: Operating since January 5th, 2013
FPSO Cidade de São Paulo: 120 kbdp

Sapinhoá Pilot Project: Drilling, completion and interconnection of 13 wells to a chartered FPSO from Schahin/Modec with capacity to process 120 kbdp of oil and 5 million m³/d of natural gas.
Baúna Project: Operating since February 16th, 2013
FPSO Cidade de Itajai: 80 kbpd

Baúna Project: Drilling, completion and interconnection of 13 submarine well to chartered FPSO Cidade de Itajai, with capacity to process 80 kbpd of oil and 2 million m3/d of gas.
Lula NE Pilot Project: Drilling, completion and interconnection of 14 wells to a FPSO chartered from QGOG/SBM with 120 kbdp.
Papa-Terra Project: Drilling, completion and interconnection of 30 wells to P-61 TLWP (Tension Leg Wellhead Platform) and P-63 (FPSO) with capacity to produce 140 kbdp and 1 MM m³/day of gas.
Roncador Project Module III: Drilling, completion and interconnection of 17 wells to SS P-55 with capacity to process 180 kbd of oil and 6 million m3/d of gas.
Parque das Baleias Project: Drilling, completion and interconnection of 24 wells to FPSO P-58, with a processing capacity of 180 kbd of oil and 6 MM m³/d of gas.
Papa-Terra Project: Drilling, completion and interconnection of 30 wells to P-61 – TLWP (Tension Leg Wellhead Platform) and to P-63 (FPSO) with capacity to process 140 kbpd and 1 MM m³/day of gas.
2013-2017 BMP: Production Curve Maintained

Production Curve in Brazil – Oil and NGL Production

- 25 new production units will start-up between 2013-17 or
- 38 new production units will start-up between 2013-20
Roncador Project Module IV: Drilling, completion and interconnection of 17 wells to FPSO P-62 with a processing capacity of 180 kbpd of oil and 6 MM m³/d of gas.
Sapinhoá Norte Project: Drilling, completion and interconnection of 15 wells to a production unit chartered from QGOG/SBM with processing capacity of 150 kbd of oil and compression of 6 MM m³/day of gas.
Lula Project – Iracema Sul Area: Drilling, Completion and interconnection of 15 wells to a FPSO charted from Schahin/Modec with processing capacity of 150 kbd and compression of 8MM m³/day of gas.
2013-2017 BMP: 24 Contracted Units and 15 to Be Contracted between 2013-17

Production Curve in Brazil – Oil and LGN Production

- 24 Production Units contracted, 3 already in operation
  - (***) Hull being built in Rio Grande Shipyard (RS)
  - (**) Hull being converted in Inhaúma Shipyard (RJ)

- 15 new Production Units to be contracted between 2013-17

- Sapinhoá Pilot (Cid. São Paulo)
- Baúna (Cid. Itajai)
- Lula NE Pilot (Cid. Paraty)
- Papa-Terra (P-63)
- Roncador III (P-55)
- Norte Pq. Baleias (P-58)
- Papa-Terra (P-61)
- Baleia Azul (Cid. Anchita)
- Lula Alto (*)
- Lula Central (*)
- Lula Sul (P-66) (**)
- Franco 1 (P-74) (***)
- Carioca
- Lula Norte (P-67) (**)
- Iracema Norte (Cid. Ilhabela)
- Iracema Sul (Cid. Mangaratiba)
- Franco SW (P-75) (***)
- Lula Ext. Sul (P-68) (***)
- Lula Oeste (P-69) (***)
- Franco Sul (P-76) (***)
- Tartaruga Verde e Mestiça
- Iara Horst (P-70) (**)
- Parque dos Doces
- Franco NW (P-77) (***)
- NE de Tupi (P-72) (***)
- Iara NW (P-71) (***)
- Deep Waters Sergipe
- Sul Pq. Baleias
- Maromba
- Espadarte I
- Carcará
- Entorno de Iara (P-73) (**)
- Júpiter
- Bonito
- Franco Leste
- Espadarte III
- Florim

Million bpd


2.0 2.0 2.0 ±2%
Investments in R&D by Large Energy Companies (2011)

<table>
<thead>
<tr>
<th>Company</th>
<th>US$ MM</th>
<th>(% of Gross Income)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petrochina</td>
<td>2,056</td>
<td>(0.7%)</td>
</tr>
<tr>
<td>Petrobras</td>
<td>1,454</td>
<td>(1.0%)</td>
</tr>
<tr>
<td>Shell</td>
<td>1,125</td>
<td>(0.2%)</td>
</tr>
<tr>
<td>Total</td>
<td>1,086</td>
<td>(0.5%)</td>
</tr>
<tr>
<td>Schlumberger</td>
<td>1,073</td>
<td>(2.7%)</td>
</tr>
<tr>
<td>ExxonMobil</td>
<td>1,044</td>
<td>(0.2%)</td>
</tr>
<tr>
<td>BP</td>
<td>780</td>
<td>(0.2%)</td>
</tr>
<tr>
<td>Sinopec</td>
<td>750</td>
<td>(0.2%)</td>
</tr>
<tr>
<td>Chevron</td>
<td>627</td>
<td>(0.3%)</td>
</tr>
<tr>
<td>Baker Hughes</td>
<td>462</td>
<td>(2.0%)</td>
</tr>
</tbody>
</table>

Source: Energy Evaluate, 2012

( ) % of Gross Income

Service Companies
R&D Initiatives

CENPES
PETROBRAS R&D CENTER

2010 ➔

1972 ➔
Petrobras R&D Interacting Players

Petrobras

Academy

Suppliers

Operators
Pre-Salt Technological Network

- 38 national R&D technological networks
- 71 institutions in 19 States
Current Technology Programs

- PROFEX: Exploratory Frontiers
- PROMOB: Basin Modeling
- PROCAP: Deep Water
- PROTRAN: Transportation
- PROCONF: Optimization & Reliability
- PRAVAP: Advanced Oil Recovery
- PROSAL: Pre-Salt Reservoir Development
- PROLOF: Offshore Logistics
- PROGAS: Natural Gas
- PROFLEX: Refining Flexibilization
- INOVA: Fuel and Lubricant Innovation
- PROBIO: Biofuels
- PROCLIMA: Climate Change
- PRO-CO2: CO2 Management in Pre-Salt
New Technologies

- MOBO
- 4D Seismic
- CAISSON
- Helical-Axial Pump
- New VASPS
- High Power BCSS
- SBMS
- RWI
- SSAO
- S-BCS
- Well Technologies (uniform flow in horizontal wells, ...)
- TLWP
Offshore Technology Timeline

Technological Achievements

1977
Enchova Early Production System
SS-6 – Sedco 135D
BOP + EZ-Tree @ Well 1-EN-RJS

1979
Enchova East Early Production System
SS-10 – Penrod 72
First WXT @ Well RJS-38
BOP + EZ-Tree @ Well 4-EN-RJS

1st Offshore Monobuoy
Offshore Technology Timeline
Technological Achievements

1979
Underwater Atmospheric Wellhead – Garoupa

1985
Development in Seismic Quality and Stratigraphy Concepts - Marlim
Wet Christmas Tree not Operated by Divers – Marimbá

1986
Remote ANM Connection – Albacora

1992
Calm Buoy (Record Depth) – Marlim

1994
First Completion with ESP - Carapeba
Geochemical Characterization and Modeling of Lacustrine Rock Rifts - Santos Basin
LDA 2,500m Horizontal Christmas Tree - Roncador
VASPS Operation – Marimbá
ERW (Extended Reach Well) MSL-42

1997
Anchorage System with Polyester Line – Marlim

1998
Rigid Steel Riser in Catenary for Deep Waters in Semi-Sub – Marlim
Completion with ESP without Aid of Divers – Albacora Leste
First Horizontal Christmas Tree – Albacora Leste

2001

2002
Production by Drill Pipe Riser – Jubarte
ESP on ANM – Jubarte

Production by Drill Pipe Riser – Jubarte
ESP on ANM – Jubarte
Offshore Technology Timeline
Technological Achievements

2005
Torpedo Piles for the Anchorage System – Albacora Leste

2006
Installation of Manifold by Pendulum Method – Roncador
Characterization of Pre-Salt Carbonate Rocks

Free Standing Hybrid Riser - Roncador
High Performance Pumping Jubarte
ESP – MOBO - Jubarte
Base Torpedo 2007

2008
Ultra Heavy Oil Production System – Badejo

2007
Flexible Risers in LDA of 2200m – Tupi
4D Seismic
Marlim; Marlim Sul; Albacora
Dual polarity Electrostatic coalescer and electrostatic treater
2009

Vessel for installation of underwater equipment – SESVI
First Single Trip Multi-Zone – Frac Pac System in deep wells (Cascade & Chinook)
ROP: 5.5m/h to 20m/h in 4 years (3.6x faster)
2010

Skid-mounted ESP (Espadarte-Phase III)
Subsea Water/Oil Separation – SSAO (Marlim)
2011

First FPSO in GoM
Deepest FPU (Cascade & Chinook)
Underwater raw water injection – RWI – Albacora
Multi-fracture well (Bonito)
2012
Offshore Technology Timeline – Past and Future
R&D Roadmap

2013
- Offshore pilot of closed-loop control and optimization
- Microbubbles as contrast agents test
- High strength cement TLWP (Papa-Terra)

2014
- High ΔP MP
- High performance epoxy coating as a matrix for composite materials for pre-salt wells casing.
- Predictive maintenance pilot

2015
- Compact O/W Separation
- Compact G/L Separation
- Subsea power distribution (3MW)
- BHA prototype onshore field test
- Production risers in carbon fiber with modified matrix
- Organic self-repairing coating

2016
- Predictive maintenance pilot
- Full closed-loop control and optimization
- Robotic systems for operations and maintenance support
Future Vision

- New Generation of Process Equipment
- Subsea Processing
- Nanoparticles
- Laser Drilling
- Future FPSO
- New Generation of Process Equipment
- Autonomous Underwater Vehicle

Copyright © by Petróleo Brasileiro S/A
Thank you

acfcorrea@petrobras.com.br