Exploration assets
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Head of Exploration
Overview

**Exploration assets**

Angola development

Brazil exploration assets

Pre-salt Santos basin

Final remarks
Portuguese basins with an acreage of over 21,000 km$^2$

- Galp Energia entered in the deepwater acreage of Portuguese basins in 2007
- Mesozoic rift basins with salt structures (Peniche) and Tertiary inversion structures
- Conjugate margin of New Foundland (White Rose, Hibernia fields)
- Oil and gas show in wells from earlier shallow water exploration drilling (17 wells in Peniche, one well in Alentejo)
- Key uncertainty is the presence of hydrocarbon generating source rock
Exploration now focuses on 3D seismic

- A total of 11,700 km of 2D seismic acquired in Peniche and Alentejo basins
- Several large structural oil leads identified allowing to define 3D seismic target areas
- 2,100 km\(^2\) of 3D seismic acquired at end 2010 in Peniche and interpretation of fast track 3D seismic is about to start
- 3D seismic acquisition planned for Alentejo basin in 2011
- First exploration well as early as 2013 in either Peniche or Alentejo basin, pending on evaluation outcome
Exploring natural gas reservoirs in Angola with LNG II project

LNG II project

- Galp Energia is part of the first integrated natural gas project consortium in Angola since 2007
- Exploration and appraisal works to establish gas reserves base for LNG II
- Key areas covered by blanket 3D seismic
- First appraisal well Garoupa-2 in Block 2 successfully completed in the beginning of 2011
- Well planning ongoing to drill next gas exploration well in Etele Tampa or Garoupa area
East Timor as a frontier acreage

- Galp Energia entered in East Timor in 2007
- Frontier acreage of 8,600 Km²
- Timor island accretionary wedge and foreland basin (Northern Bonaparte)
- Main oil targets are excellent reservoir levels at Jurassic Laminaria/Plover level
Entering a new phase of exploration

- Blanket coverage of 3,150 km of 2D and 8,400 km² of 3D seismic
- First frontier exploration well Cova-1 completed in early 2011 was considered to be non-commercial, but gathered valuable subsurface information
- Evaluation ongoing to determine well location of second exploration well to be drilled in 2011
Uruguay is a new acreage to Galp Energia

- Galp Energia entered in Uruguay in 2009
- Frontier acreage of 8,500 km²
- 6,290 km of 2D seismic over Blocks 3 and 4 in Punta del Este basin
- 2D seismic evaluation ongoing with focus on Tertiary stratigraphic and Paleozoic syn-rift plays
Galp Energia is an early mover into deepwater offshore Mozambique

- Galp Energia entered into deepwater offshore Mozambique in 2007
- Basin contains one of the largest Tertiary delta on the coast of East Africa
- Block size with large running room initially of over 17,500 km²
Material gas play potential identified

- 2,320 km 2D and 2,560 km$^2$ 3D seismic
- Slope channel fan complex at multiple levels
- High quality Tertiary reservoirs constituted by laterally extensive turbidite deep sea fans
- Presence of consistent direct hydrocarbon indicator responses for gas
- Unrisked volumes are material allowing to model different LNG development scenarios
Nearby gas discoveries significantly reduce exploration risk

- Four gas discoveries and one oil encounter announced in Area 1
- Nearest gas discovery is only 3 km away from block boundary
- Confirmed presence of a considerable gas potential in the Tertiary
- First well to be drilled in 2H11 with consideration given to accelerate exploration/appraisal campaign
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
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<tbody>
<tr>
<td>HR</td>
<td>Human Resources</td>
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<tr>
<td>IOC</td>
<td>International Oil Company</td>
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<tr>
<td>IPO</td>
<td>Initial Public Offering</td>
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<tr>
<td>Kboepd</td>
<td>Thousand barrels of oil equivalent per day</td>
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<tr>
<td>Kbopd</td>
<td>Thousand barrels of oil per day</td>
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<tr>
<td>Km</td>
<td>Kilometre</td>
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<tr>
<td>Km²</td>
<td>Square kilometre</td>
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<td>LLI</td>
<td>Long Lead Item</td>
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<tr>
<td>LNG</td>
<td>Liquified Natural Gas</td>
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<tr>
<td>LT</td>
<td>Lobito Tomboco</td>
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<tr>
<td>M³/d</td>
<td>Million cubic metre per day</td>
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<td>Mln</td>
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<td>MW</td>
<td>MegaWatt</td>
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<td>NOC</td>
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<td>p.p.</td>
<td>Percentage point</td>
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<tr>
<td>R&amp;M</td>
<td>Refining &amp; Marketing</td>
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<tr>
<td>RCA</td>
<td>Replacement Cost adjusted</td>
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<td>TL</td>
<td>Tômbua-Lândana</td>
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<td>Ton</td>
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<tr>
<td>TS</td>
<td>Tômbua South</td>
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<tr>
<td>UOTE</td>
<td>Oil Transhipment Unit</td>
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<tr>
<td>WAG</td>
<td>Water-alternating-gas</td>
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<tr>
<td>WAT</td>
<td>Wax appearance temperature</td>
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<tr>
<td>WI</td>
<td>Working interest</td>
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<td>YE</td>
<td>Year End</td>
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**Notes:**
- # Number
- $ United States dollar
- % Percentage
- 2D Two dimensional seismic
- 3D Three dimensional seismic
- ANP Brazilian agency for oil, natural gas and biofuels
- API gravity American Petroleum Institute gravity
- BB Benguela and Belize
- BBLT Benguela, Belize, Lobito, and Tomboco
- Bcm Billion cubic metres
- Bln Billion
- Boe Barrel of oil equivalent
- c. Circa
- CAGR Compound Annual Growth Rate
- CSEM Control Source of Electromagnetic Method
- CO₂ Carbone Dioxide
- CP'T Compliant Piled Tower
- E&P Exploration & Production
- EPC Engineering, Procurement and Construction
- EWT Extended Well Test
- FLNG Floating Liquified Natural Gas
- FPSO Floating Production Storage Offloading
- G&P Gas & Power
- GWh GigaWatt hour
- H₂S Hydrogen sulfide
- HC Hidrocarbon
- 2011 Capital Markets Day - March 14th 2011
Financial outlook figures are RCA figures except otherwise noted.

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