

## Exploration assets

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Overview

**Exploration assets**

Angola development

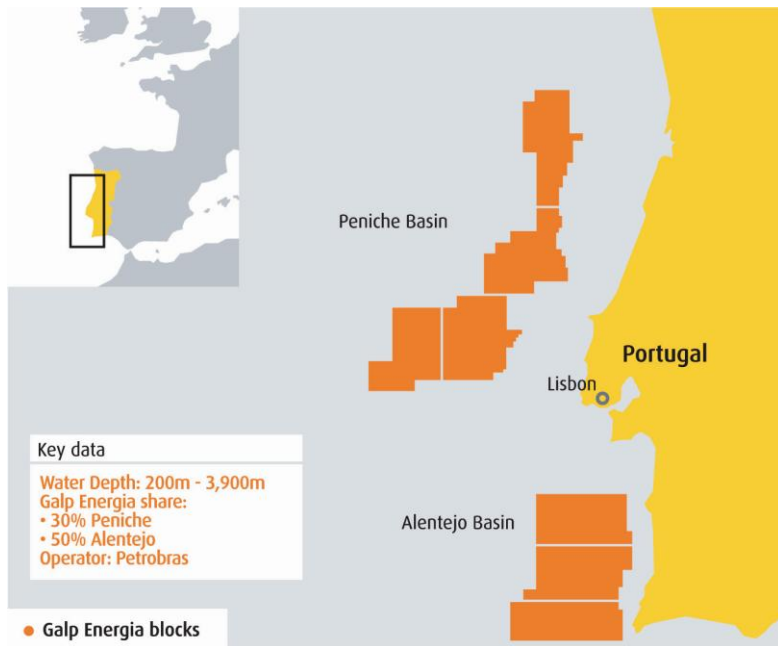
Brazil exploration assets

Pre-salt Santos basin

Final remarks

# Portuguese basins with an acreage of over 21,000 km<sup>2</sup>

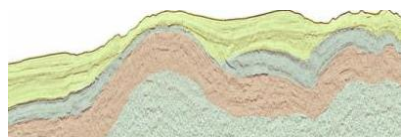
## Portuguese basin location



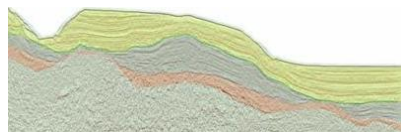
- Galp Energia entered in the deepwater acreage of Portuguese basins in 2007
- Mesozoic rift basins with salt structures (Peniche) and Tertiary inversion structures
- Conjugate margin of New Foundland (White Rose, Hibernia fields)
- Oil and gas show in wells from earlier shallow water exploration drilling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

# Exploration now focus on 3D seismic

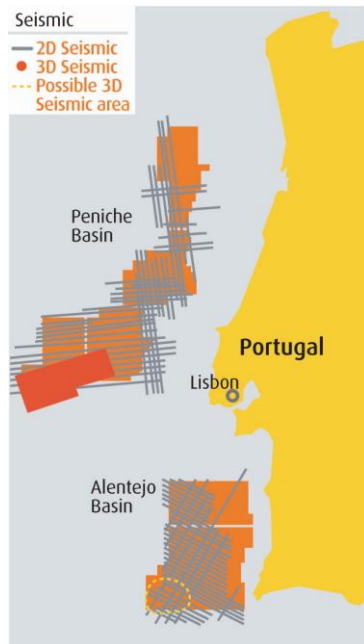
## 2D and 3D seismic coverage



Peniche



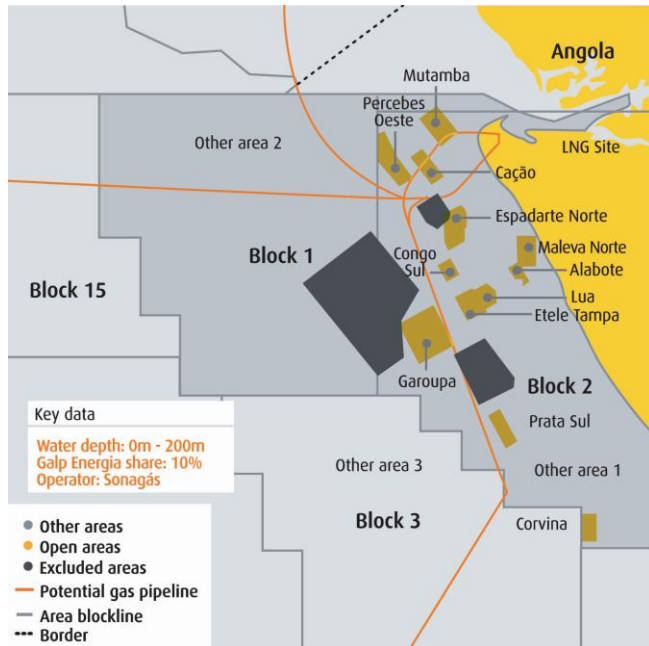
Alentejo



- 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<sup>2</sup> 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

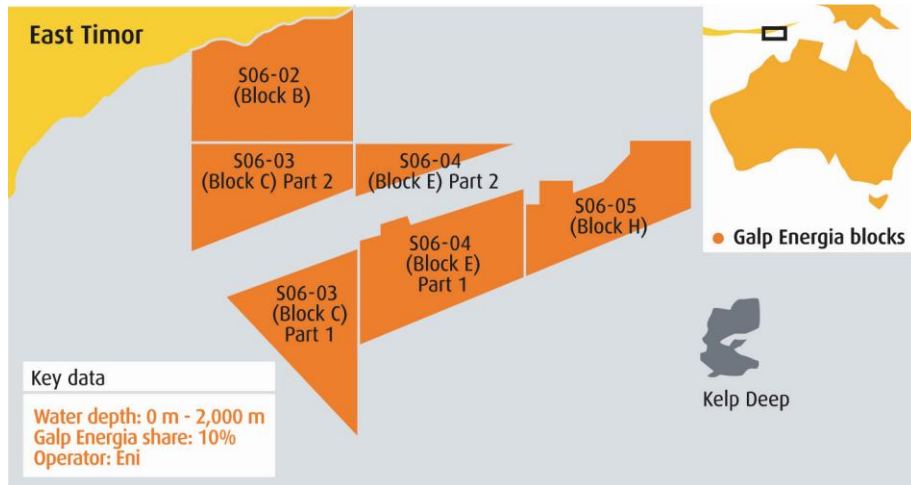
## LNG II project



- 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

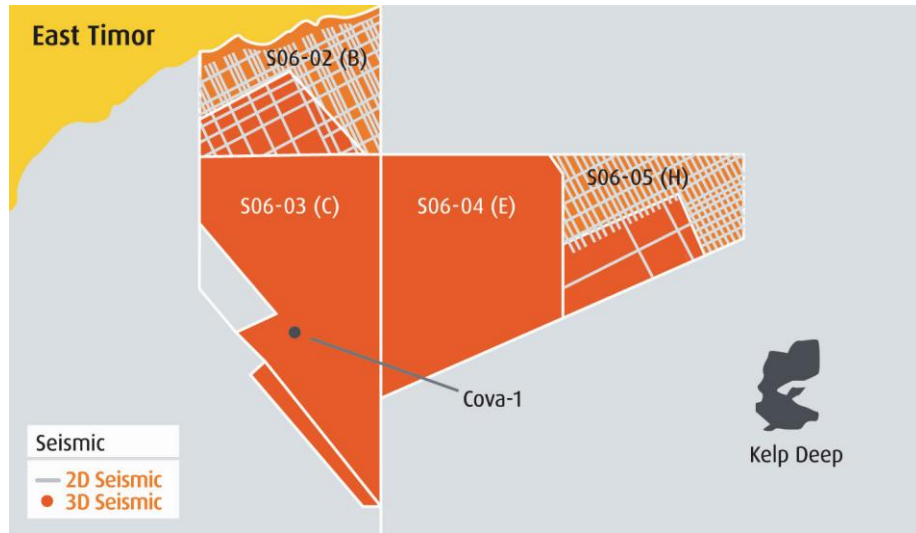
## East Timor blocks location



- Galp Energia entered in East Timor in 2007
- Frontier acreage of 8,600 Km<sup>2</sup>
- 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

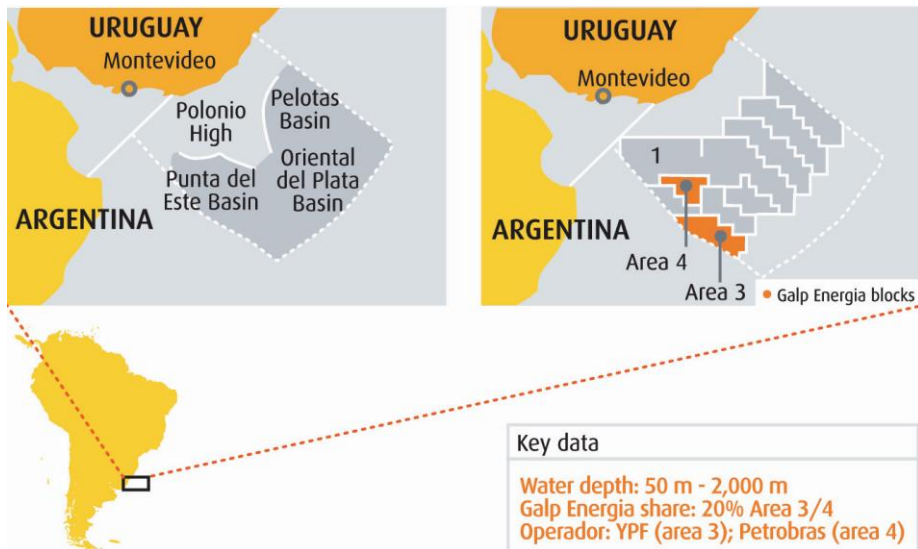
## 2D and 3D seismic



- Blanket coverage of 3,150 km of 2D and 8,400 km<sup>2</sup> 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

## Punta del Este basin location

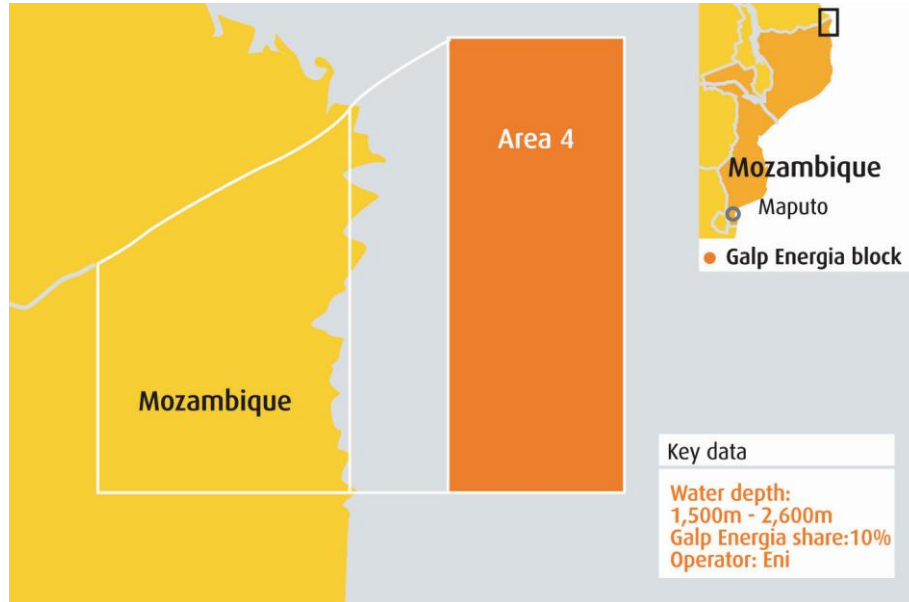


- Galp Energia entered in Uruguay in 2009
- Frontier acreage of 8,500 km<sup>2</sup>
- 6,290 km of 2D seismic over Blocks 3 and 4 in Punta del Este basin
- 2D seismic evaluation ongoing with focus on Tertiary stratigraphic and Paleozoic syn-rift plays



# Galp Energia is an early mover into deepwater offshore Mozambique

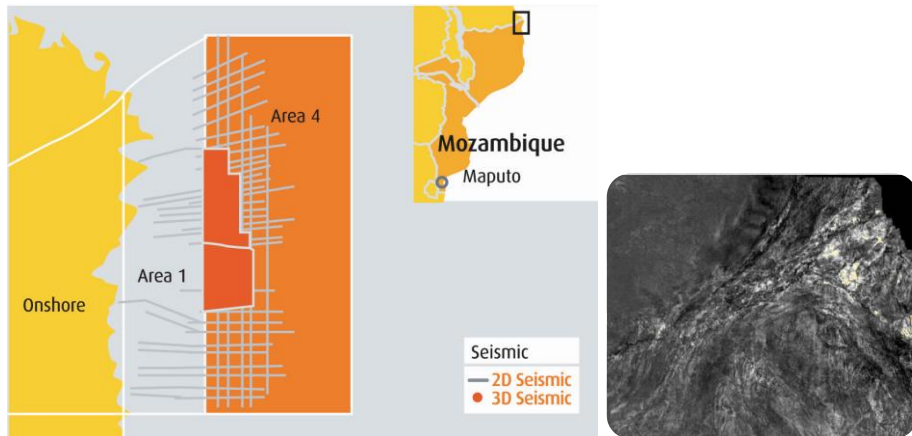
## Rovuma basin Area 4 location



- 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 km<sup>2</sup>

# Material gas play potential identified

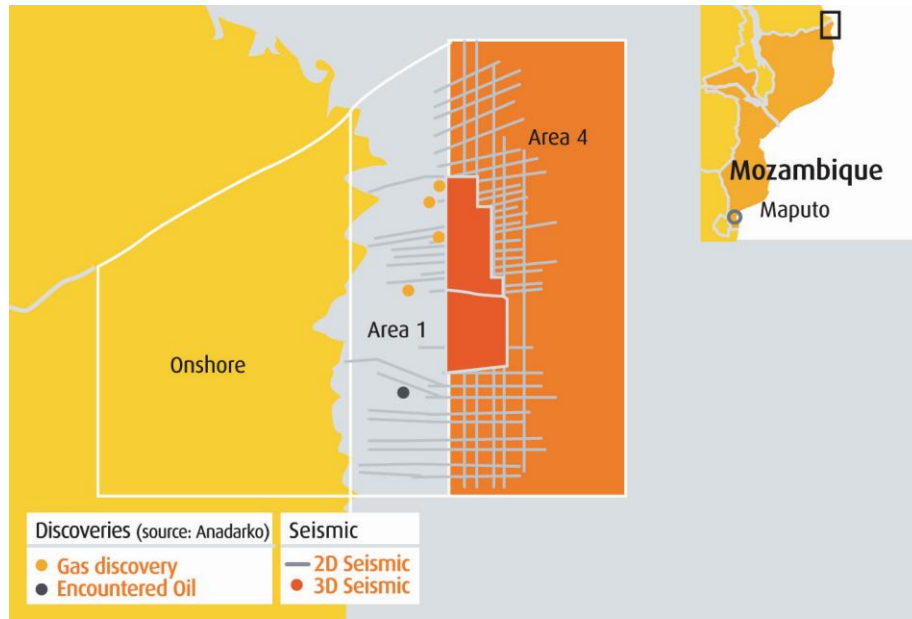
## 2D and 3D seismic



- 2,320 km 2D and 2,560 km<sup>2</sup> 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

## Area 1 discoveries



- 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

# Acronyms

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#	Number	HR	Human Resources
\$	United States dollar	IOC	International Oil Company
%	Percentage	IPO	Initial Public Offering
2D	Two dimensional seismic	Kboepd	Thousand barrels of oil equivalent per day
3D	Three dimensional seismic	Kbopd	Thousand barrels of oil per day
ANP	Brazilian agency for oil, natural gas and biofuels	Km	Kilometre
API gravity	American Petroleum Institute gravity	Km <sup>2</sup>	Square kilometre
BB	Benguela and Belize	LLI	Long Lead Item
BBLT	Benguela, Belize, Lobito, and Tomboco	LNG	Liquified Natural Gas
Bcm	Billion cubic metres	LT	Lobito Tomboco
Bln	Billion	M <sup>3</sup> /d	Million cubic metre per day
Boe	Barrel of oil equivalent	Mln	Million
c.	Circa	MW	MegaWatt
CAGR	Compound Annual Growth Rate	NG	Natural Gas
CSEM	Control Source of Electromagnetic Method	NOC	National Oil Company
CO <sub>2</sub>	Carbone Dioxide	p.p.	Percentage point
CPT	Compliant Piled Tower	R&M	Refining & Marketing
E&P	Exploration & Production	RCA	Replacement Cost adjusted
EPC	Engineering, Procurement and Construction	TL	Tômbua-Lândana
EWT	Extended Well Test	Ton	Tonne
FLNG	Floating Liquified Natural Gas	TS	Tômbua South
FPSO	Floating Production Storage Offloading	UOTE	Oil Transhipment Unit
G&P	Gas & Power	WAG	Water-alterning-gas
GWh	GigaWatt hour	WAT	Wax appearance temperature
H <sub>2</sub> S	Hydrogen sulfide	WI	Working interest
HC	Hydrocarbon	YE	Year End

# Disclaimer

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