

Transgás Armazenagem SA

Overview of the UGS in Portugal, at Carriço

Presentation at the IGU-WOC2 Meeting
at Bratislava, Slovakia, 23-26 October 2012



TRANSGÁS Armazenagem is a subsidiary of GALP ENERGIA



GALP ENERGIA is an Oil & Gas company, with headquarters in Lisbon, Portugal, and was Portugal's largest exporter in 2011.



GALP ENERGIA operates in 13 countries.

- Oil & Gas Exploration and Production:
 - 32 Projects in 15 Basins in 7 Countries.
 - Portugal, Brazil, Angola, Mozambique, Timor-Leste, Uruguay and Venezuela.



- Refining Oil Products:
 - 2 Refineries in Portugal.



Sines refinery. Distilling capacity of 220 thousand barrels/day.



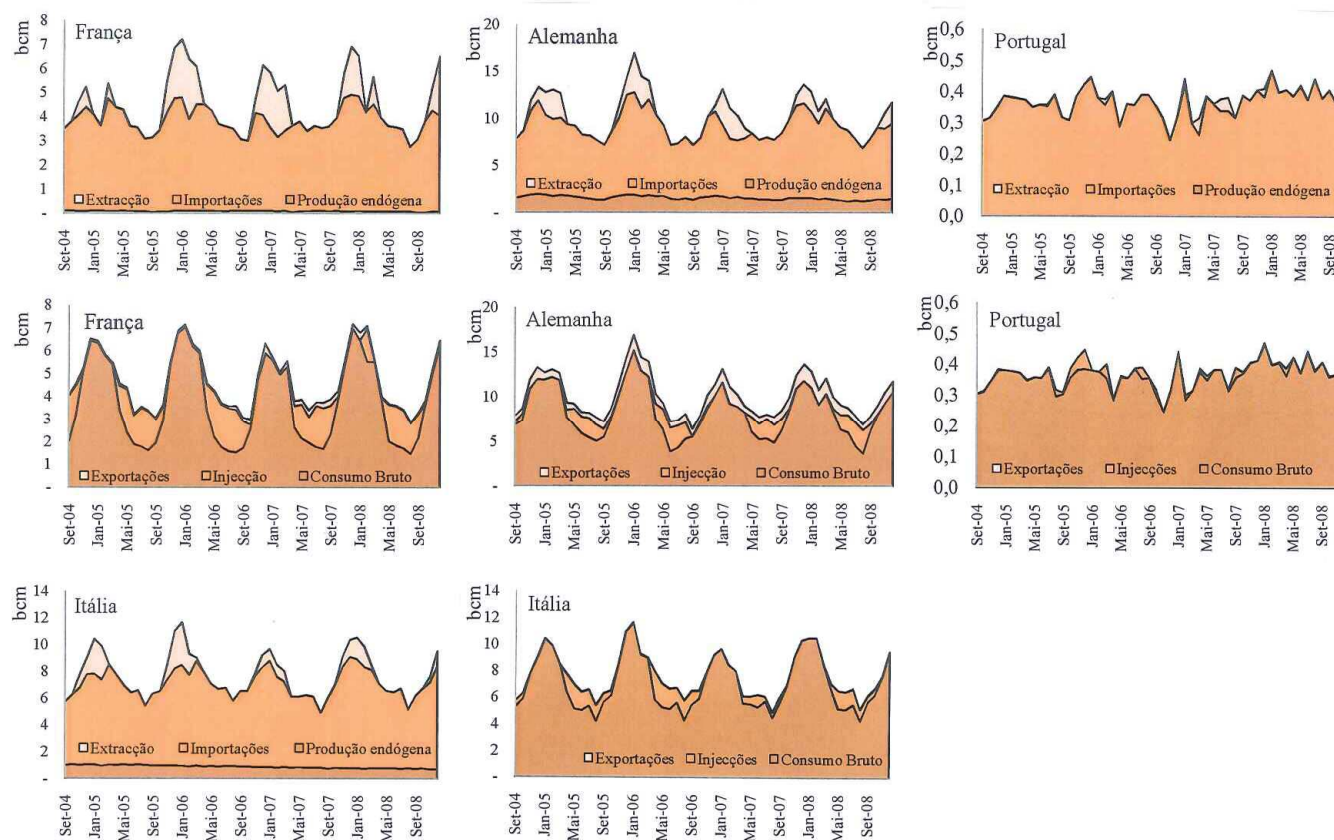
- Distribution of Fuel and Oil Products:
 - About 1500 Fuel Stations in 8 countries .
 - Portugal, Spain, Angola, Mozambique, Cape-Verde, Gambia, Guinea-Bissau and Swaziland.

- Distribution of Natural Gas:
 - 1,5 million consumers in two countries.
 - Portugal and Spain.



- Participates in 3 LNG Liquefying Plant Projects:
 - 10% of Project in Angola.
 - 15% of Project in Guinea-Equatorial.
 - 15% of Project in Venezuela.

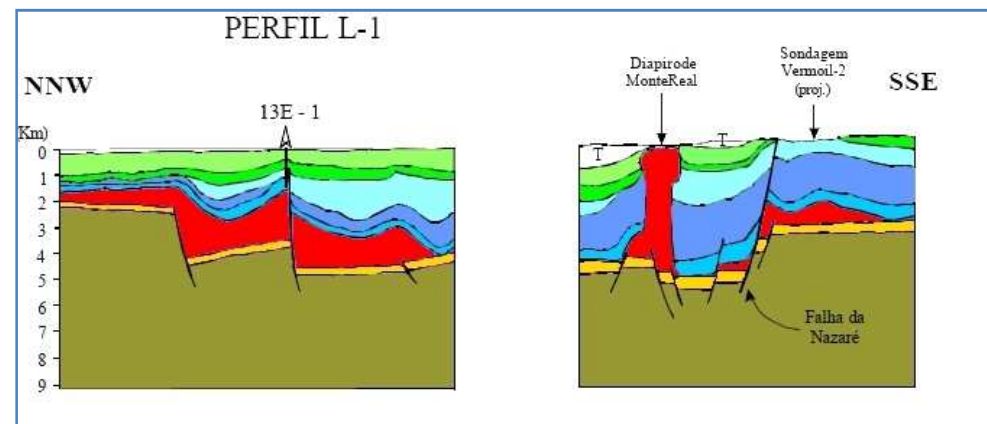
- However, UGS is a small business within Galp Energia.
- UGS in Portugal has to be small due to lower consumption of NG and low seasonality.



Supply and demand of natural gas in France, Germany, Italy and Portugal, between 2004 and 2008. Source: IEA, 2004-2009.

WHAT KIND OF STORAGE STRUCTURE?

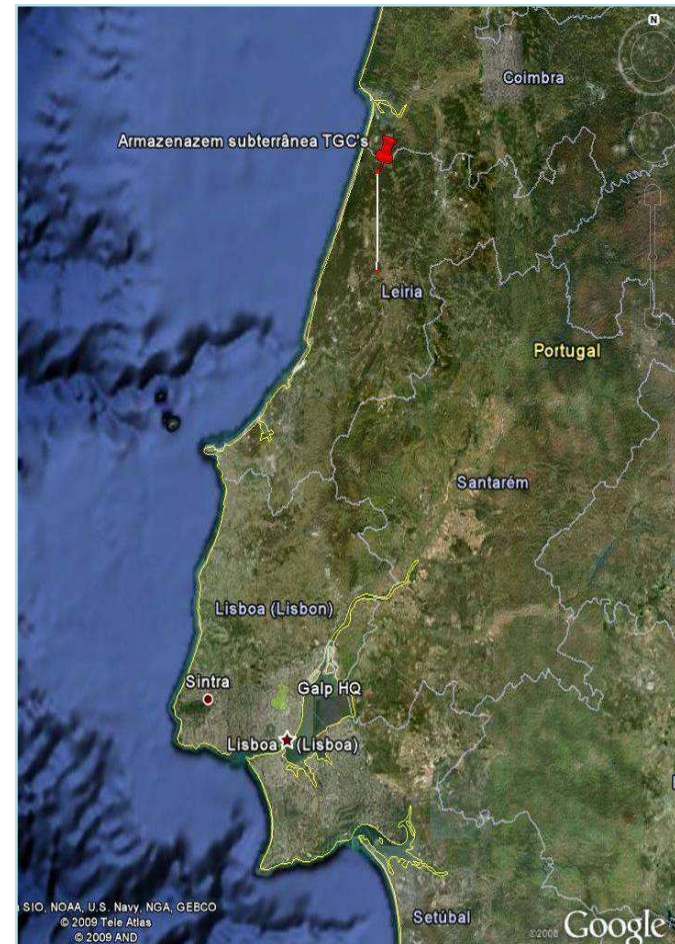
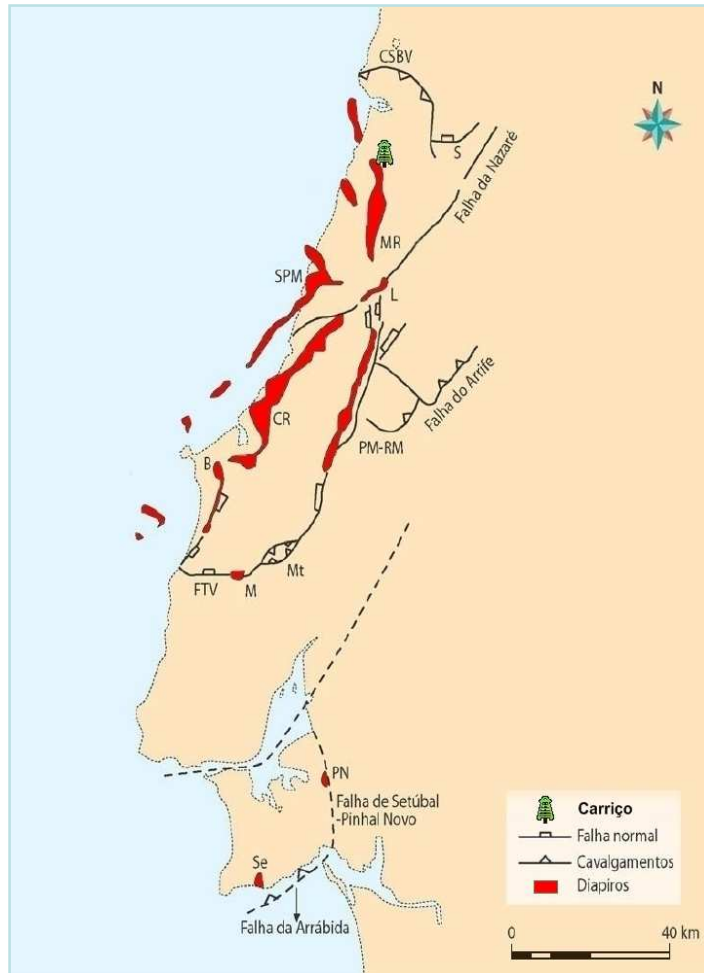
- UGS in Portugal has to be small due to lower consumption and small seasonality.
- UGS in Portugal is, mainly, for safety of supply, which require a high flow rate.
- Portugal is privileged with many salt domes.



- Therefore, the choice was for salt caverns instead of aquifers.

PORTUGAL IS PRIVILEGED WITH MANY SALT DOMES

- The choice was the north part of the Monte Real diapir, at Carriço.





- The Carriço UGS was placed close to an existent salt exploration.
 - The construction started in 1999, by the company Transgás, then a subsidiary of Galp Energia.
 - In 2006, the UGS became a Regulated activity, and the infrastructures were divided, under an unbundling process.
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- The company REN (the electrical and gas transmission operator) received:
 - The gas station and the leaching station;
 - Three caverns;
 - The option for constructing two more caverns (under the regulated regime).

- The remaining assets remained in Galp Energy Group, in a new company, Transgás Armazenagem.
- It's assets comprise:
 - The rights for the underground exploitation for UGS purposes;
 - Two caverns (one under construction);
 - The obligation for constructing two more caverns (under the regulated regime).

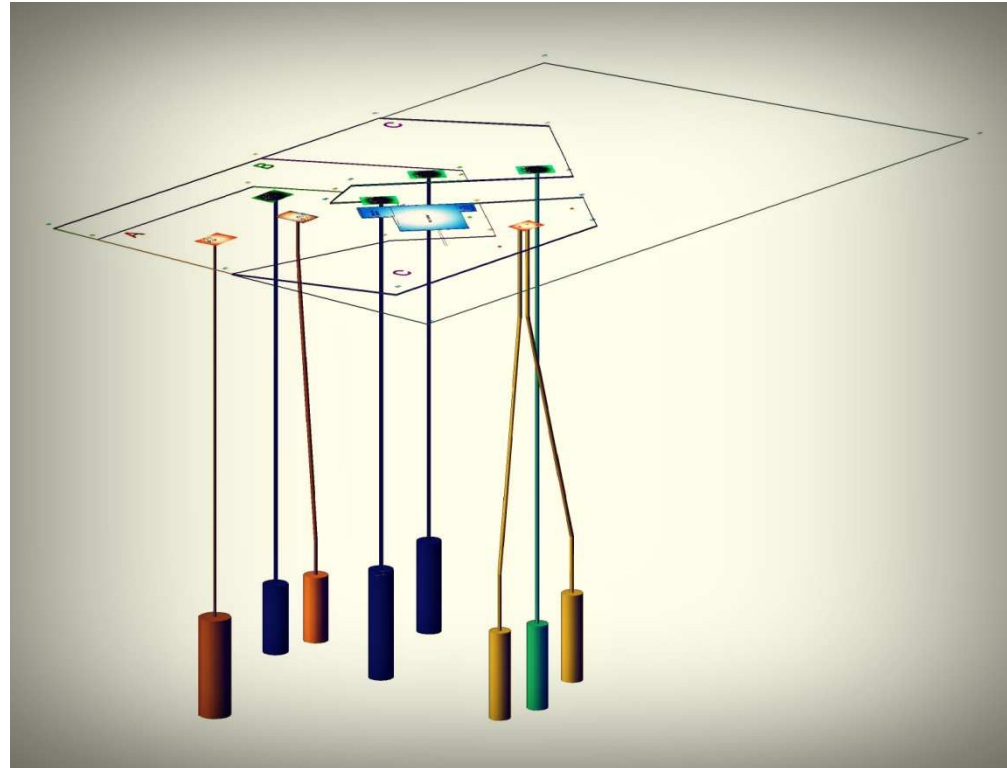


Property of Transgás Armazenagem outlined in orange.

Status of cavern construction

	Number / Owner		Year of Operation	Volume of Cavity (thousand m3)		Net Capacity (million m3)	
In Operation	3	REN	2005-09	1.500,9	1.863,5	144	173,0
	1	TRANSGÁS	2006	362,6		29	
In Construction	1	REN	2014	500,0	1.252,9	50	139,0
	1	TRANSGÁS	2013	752,9		89	
In Project	1	REN	2018	500,0	1.500,0	60	180,0
	2	TRANSGÁS	2018-21	1.000,0		120	
TOTAL	5	REN		4.616,4		492,0	
	4	TRANSGÁS					

3D view of Carriço UGS



- Portugal is one of the few European countries privileged with many **salt domes**.

- The Iberian Peninsula has **8 operating LNG terminals**.

- **Salt caverns** are the best type of storage for **FAST flow of gas**.

