

**IENE**

**2<sup>nd</sup> Regional Oil and Gas Exploration  
and Production Workshop**

# **Exploring for Hydrocarbons in Greece: Hellenic Petroleum experience**

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Hellenic Petroleum S.A.**

# **Is there oil in Greece?**

## **Are there interesting business opportunities in the Greek upstream sector?**

### **Exploration activities in Greece**

- **Licensing rounds**
- **Past exploration activity**
- **Petroleum System**
- **Unexplored areas and targets**

### **Hellenic Petroleum Group**

- **Corporate Structure**
- **R&M activities**
- **E&P portfolio – current activity**
- **Group's E&P strategy**

## 2500 ago Herodotus was reporting from Zante island



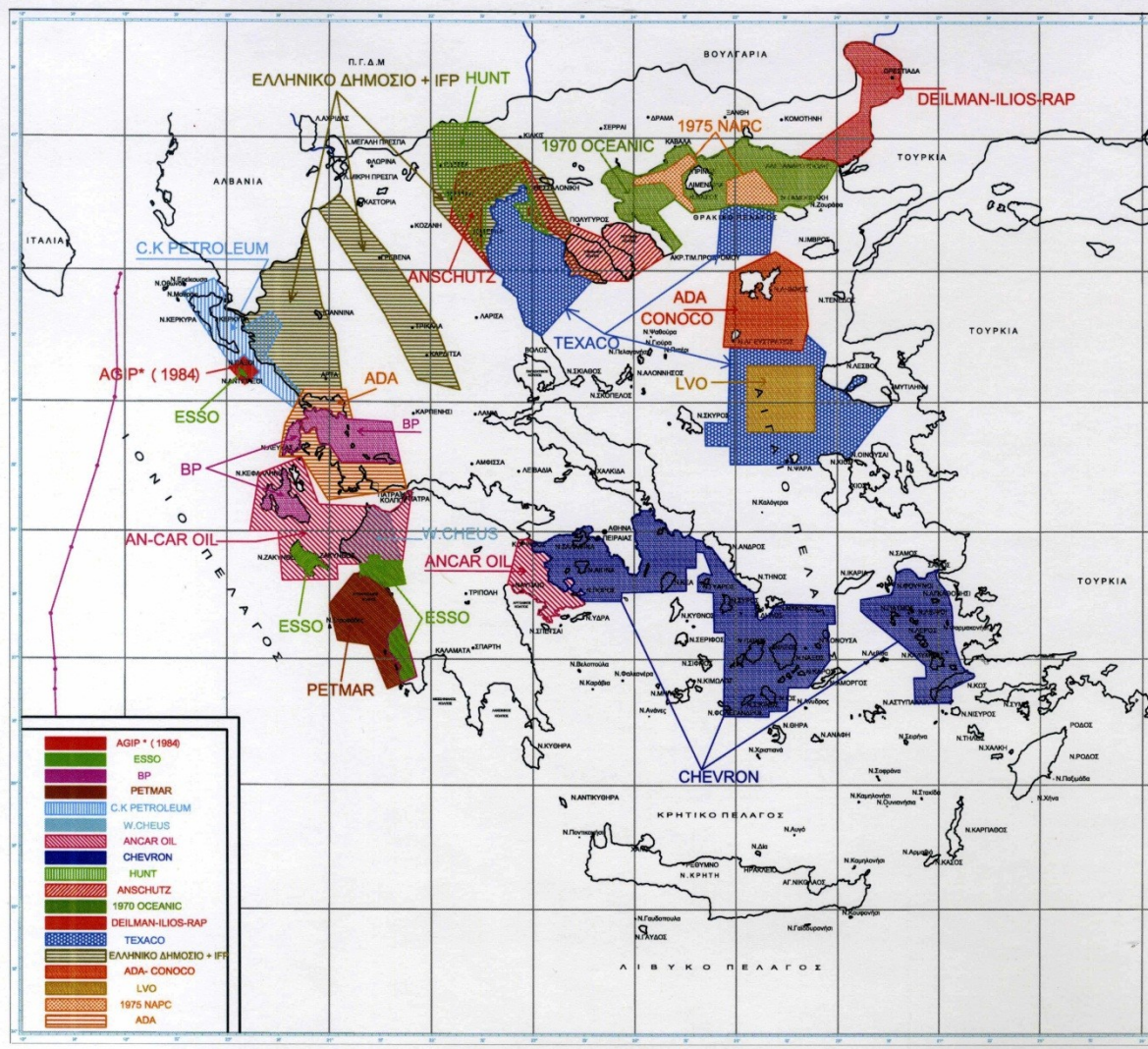
Εἴη δ' ἂν παν, ὅκου και  
εν Ζακύνθῳ εκ λίμνης  
και ὕδατος πίσσαν  
αναφερομένην αὐτός  
εγὼ ορών. Εἰαί μεν και  
πλέονες αι λίμνες  
αὐτόθι, η δ' ὡν μεγίστη  
αυτέων εβδομήκοντα  
ποδῶν πάντη, βάθος δε  
διώρυγος ἐστί ...  
(Herodotus 425 bc)

**... only oil shows ...**  
**there is no evidence that it was**  
**a commercial discovery ...**



# Greek E&P licenses during 60 – 70's

**Oil system was proved:** Prinos oil field and Kavala gas fields (NE Greece)  
BP's non commercial oil discoveries (W. Greece)

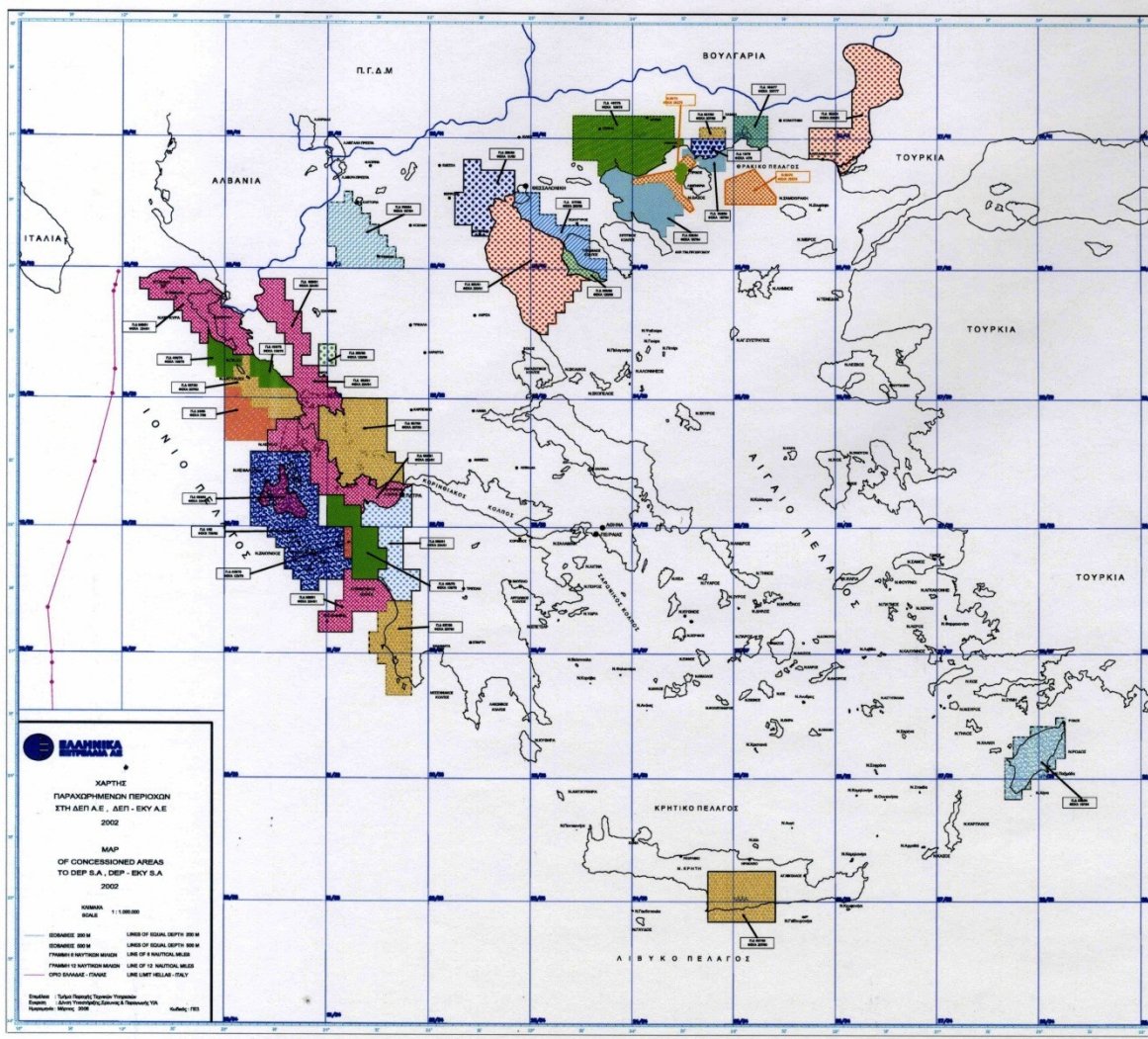


- Late sixties significant number of licenses were awarded to oil companies (amongst them **Chevron, Conoco, BP, ESSO, Agip**)
- Some offshore seismic were shot (12,000 Km)
- **45 wells drilled, mainly shallow;** most of them encountered oil shows
- **BP** drilled some **deep wells in W. Greece** proving the oil system existence
- **Discovery of Prinos oil and Kavala gas fields**
- Ministry of Energy overviewed operations



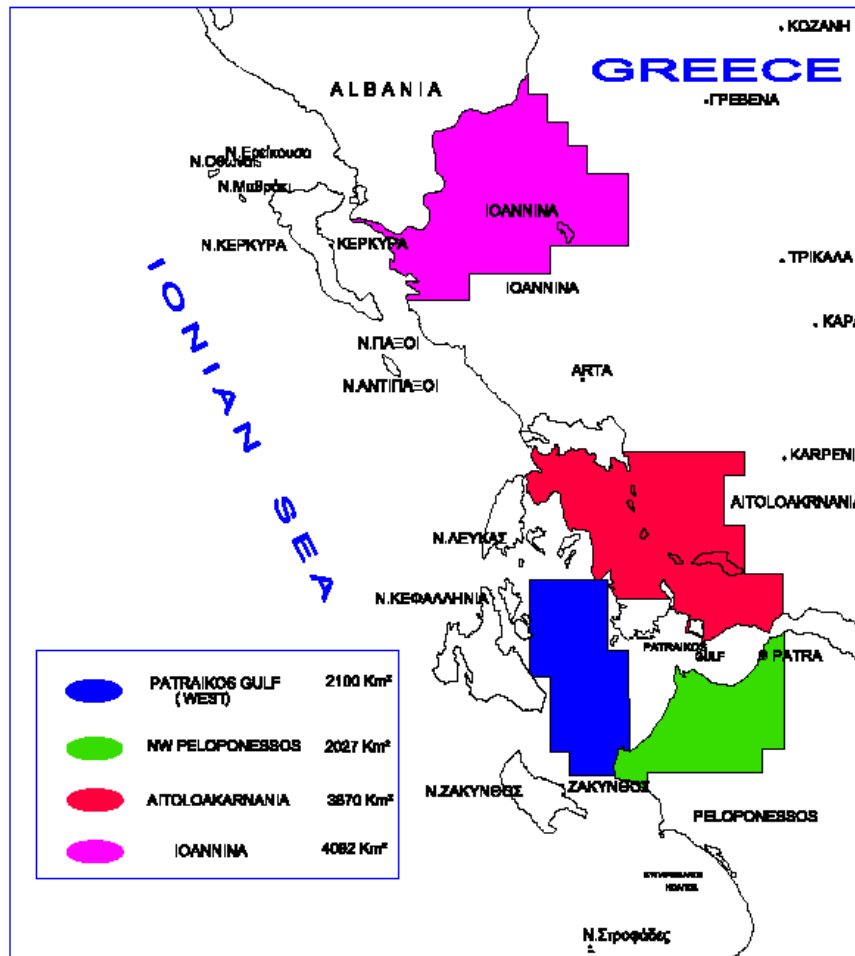
## Two marginal fields discovered:

**Katakolo oil field (1981, offshore W. Greece)**  
**Epanomi gas field (1989, onshore N. Greece)**



- **DEP formed (1975)** and staffed with experienced personnel
- Greek State granted to DEP rights in **26 blocks**
- DEP, acting as **operator**, explored the country acquiring **63.000 km seismic** data (12.000 km with its own seismic crews)
- All G&G data processed and interpreted in house
- **75 wells were drilled**
- Offshore areas in deep waters (>500m) and deep structures remained unexplored.

# 1997: 1<sup>st</sup> Licensing Round      1998: DEP privatised to Hellenic Petroleum



**Ioannina:** Enterprise 80% (operator), Hellenic Petroleum 20% An oil promising prospect mapped based on dynamite, Vibro and heli portable seismic data. The well Demetra due to high pressure did not reach the target (3,966 m). Following Enterprise takeover by Shell the area relinquished.

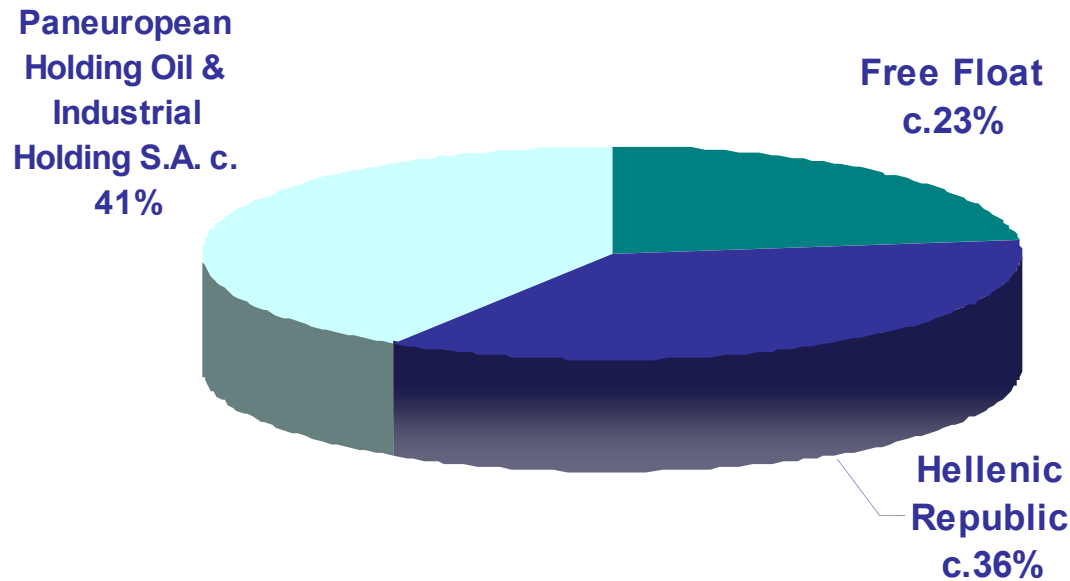
**NW. Peloponnese:** Enterprise 80% (operator), Hellenic Petroleum 20%. Based on old and newly acquired seismic 2 dry wells drilled.

**W. Patraikos:** Triton 88% (operator), Hellenic Petroleum 12% Numerous Interesting prospects and leads are mapped based on a dense grid of seismic data. Triton, following its acquisition by Ameranda, relinquished the area.

**Aitolokarnania:** Triton 88% (operator), Hellenic Petroleum 12%. Two dry shallow wells drilled based on G&G (gravity, magnetics, MT, seismic) before relinquishing this mountainous area.

**2002: All four areas were relinquished mainly for commercial reasons**

# Hellenic Petroleum formed at 1998



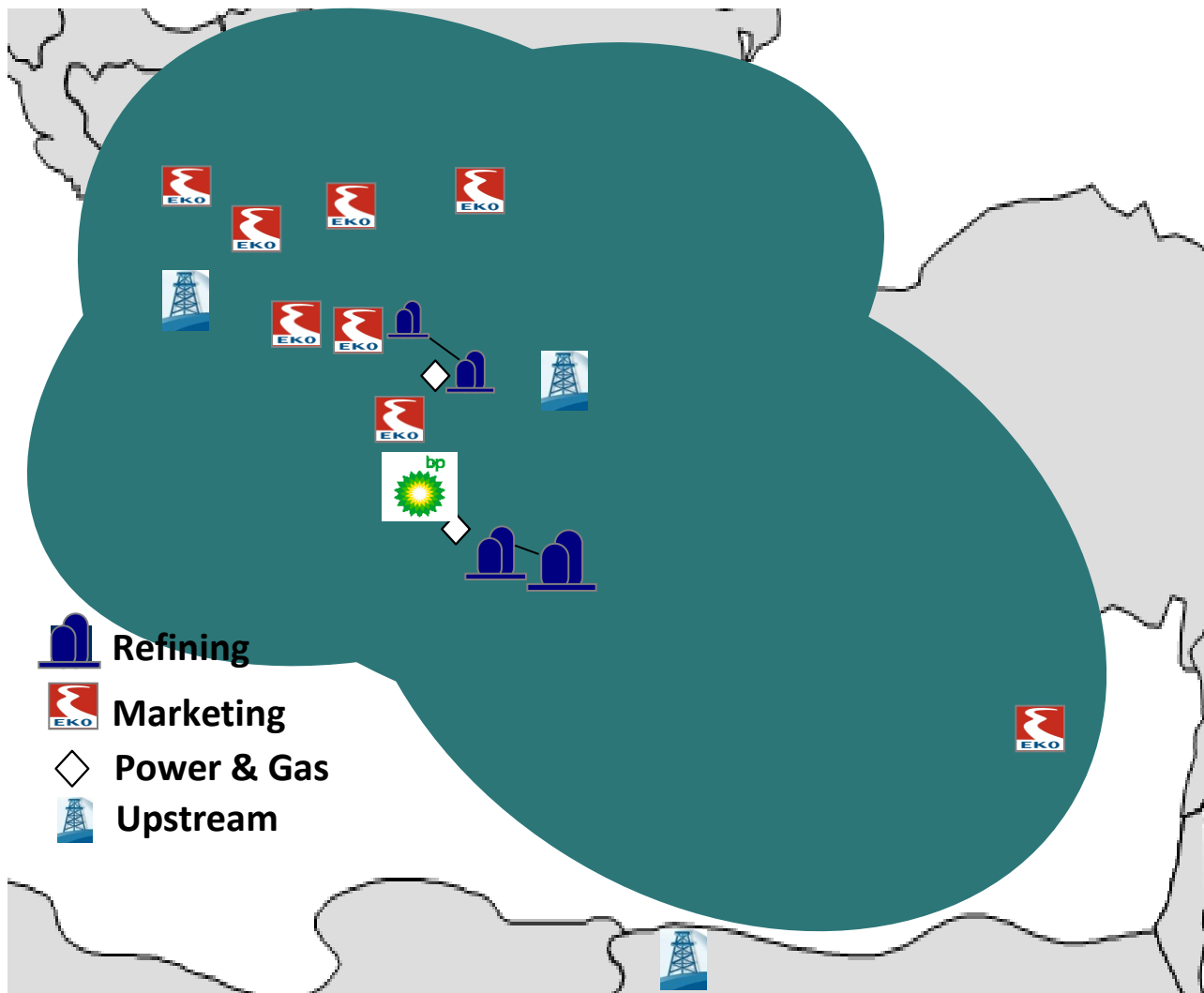
- Comes from the **merger of the state companies** in the upstream (**DEP and DEP EKY**), downstream and retail Greek oil sector
- Listed in Athens Stock Exchange since **1998**
- Paneuropean Oil, member of **Latsis Group**, is **major shareholder with 41%** having a long term presence in the oil refining and trading industry in Greece.

## Hellenic Petroleum is a diversified regional energy player undergoing a significant transformation

- A leading regional energy Group, built around its strong R&M asset base (**annual sales: €10 billion; EBITDA €375 million**)
- **Completed its transformational investment plan (\$ 2 billions)**, moving to the delivery phase of a significant cash generation improvement
- Delivering on a substantial performance improvement program, enabling over performance vs. benchmarks
- **Solid financial position** throughout the cycle, enabling to successfully complete the heavy capex period and manage through Greek crisis and challenges in the region; concluding the refinancing of major facilities
- Involved in two major privatisations so far (HP and DEPA)



## Geographical location supports a regional integration role and provides growth opportunities in neighboring markets



- **Coastal location of refineries** ensures ample availability and variety of crude oil; ability to capture opportunities and respond to supply disruptions
- **Cost advantaged** to supply SEE/East Med markets with end-products
- Opportunities for **regional consolidation**

# Vertically integrated - leading position in Greece and SEE with high quality asset base

## Domestic Refining

- **Strong refining asset base with significant cash flow generation potential post upgrade:**
  - Aspropyrgos: 142kbd<sup>1</sup> – 7.4mt<sup>2</sup> pa
  - Thessaloniki: 95kbd – 3.6mt pa
  - Elefsina: 100kbd – 5.0mt pa
- Ownership of key logistics assets (7 million m<sup>3</sup>)
- Key location advantage with access to multiple sources of crude oil

▶ **65% wholesale market share**

## Domestic Marketing

- **EKO:** Retail, aviation, marine, commercial & industrial, lubricants ▶ **16% mkt share**
- Acquisition of **BP's** retail and Commercial & Industrial Supply ("C&I") businesses in Greece ▶ **12% mkt share**

## International R & M

- **Skopje refinery** 50kbd – 2.5mt pa
- Thessaloniki – Skopje crude pipeline
- Retail: **Cyprus, Montenegro, Serbia, Bulgaria, Albania & FYROM**

## Petrochemicals

- **Sole producer and main marketer in Greece** with strong export orientation: Polypropylene, BOPP, Inorganics, Solvents, integrated operations with refineries
- Strategic alliance (50:50 JV) with Italy's **Edison** targeting a portfolio of 1.5-2.0GW
- **390MW and 420MW CCGT plants in operation**
- Power trading and marketing
- Development of a renewable energy portfolio

## Power

## Natural Gas

- **35% stake in DEPA**, Greece's incumbent natural gas supply company and **100% owner of regulated HTSO3 (DESFA)**

## E&P

- Exploration **assets in Egypt, Montenegro and Greece**

## Engineering

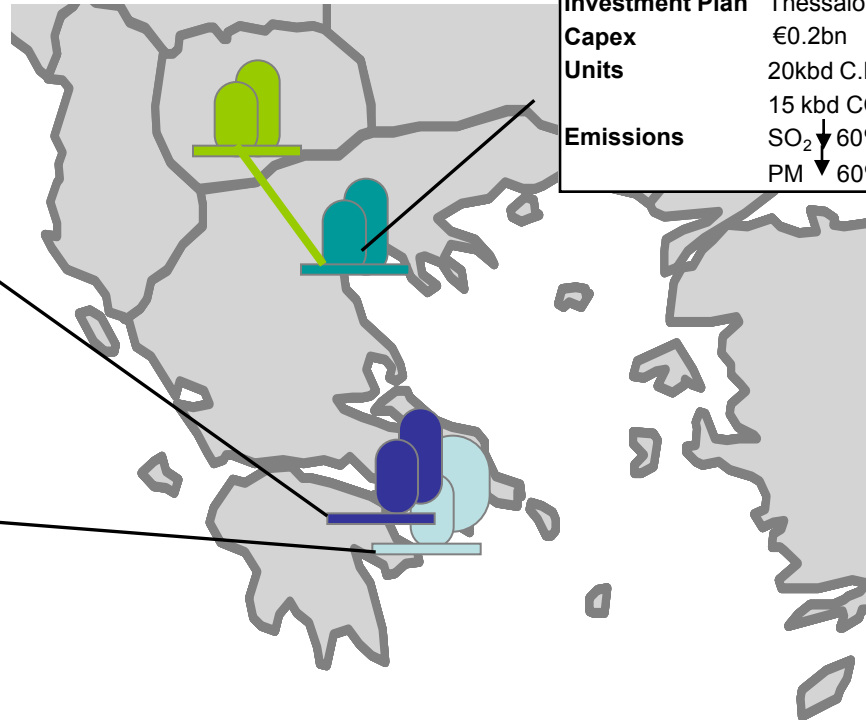
- Provides high quality engineering services through its affiliate **Asprofos**

# Overview of Refining and Upgrades

4 refineries –  
65% wholesale domestic market share

Upgrade - Key Facts	
Investment Plan	Elefsina Refining upgrade
Capex	c €1.2bn
Units	40 kbd hydrocracker 20 kbd flexicoker
Emissions	SO <sub>2</sub> ↓ 70% PM ↓ 84%

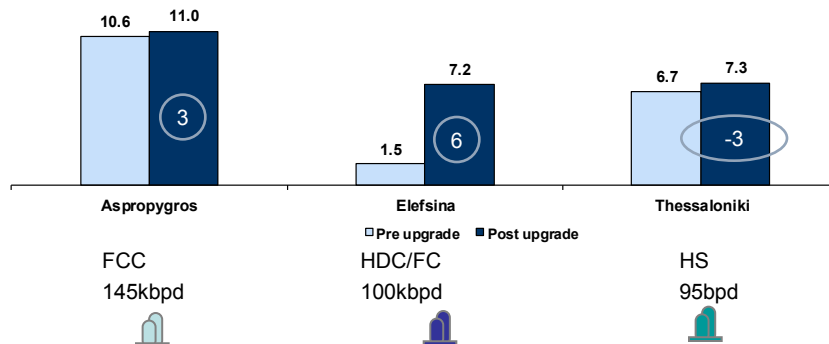
Upgrade - Key Facts	
Investment Plan	Thessaloniki Refining upgrade
Capex	€0.2bn
Units	20kbd C.D.U 15 kbd CCR
Emissions	SO <sub>2</sub> ↓ 60% PM ↓ 60%



Hydrocracker – flexicoker  
start-up: end Q2 2012

Transformation	
Improve	2 Quartiles in Solomon Index
Improve	Net Cash margin by 1.0-1.5\$/bbl

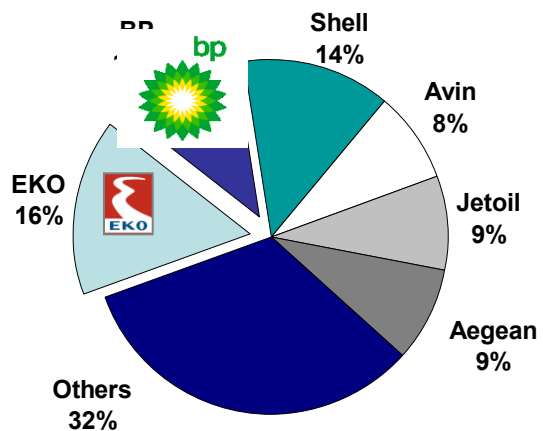
## Refining Assets NCI evolution



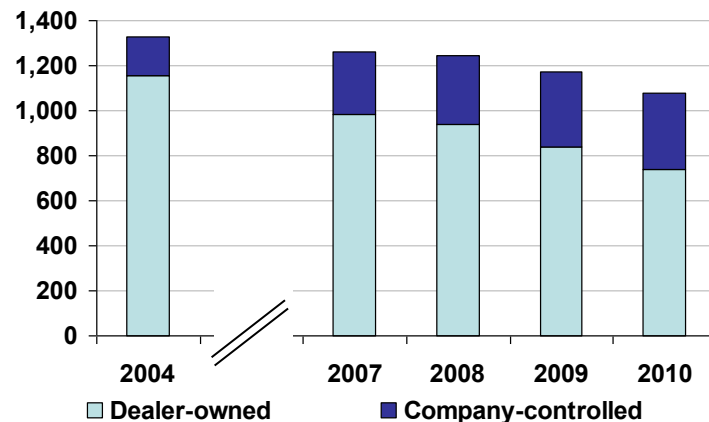
# Domestic marketing: BP's network acquisition

## - leading position 28% market share

Domestic retail market shares



EKO petrol station network evolution



## Hellenic Fuels

- Acquisition of BP's nationwide network of c1,200 service stations and storage facilities, as well as the C&I business strengthened leading position in the domestic market
- Significant logistics synergies

## EKO

- Optimised logistics and network footprint and rationalised the channel of trade mix (ie Company controlled vs Dealer owned)
- Focus on operational effectiveness
- Improving marketing offer (new products to respond to market conditions) and commercial policies



## International Marketing:

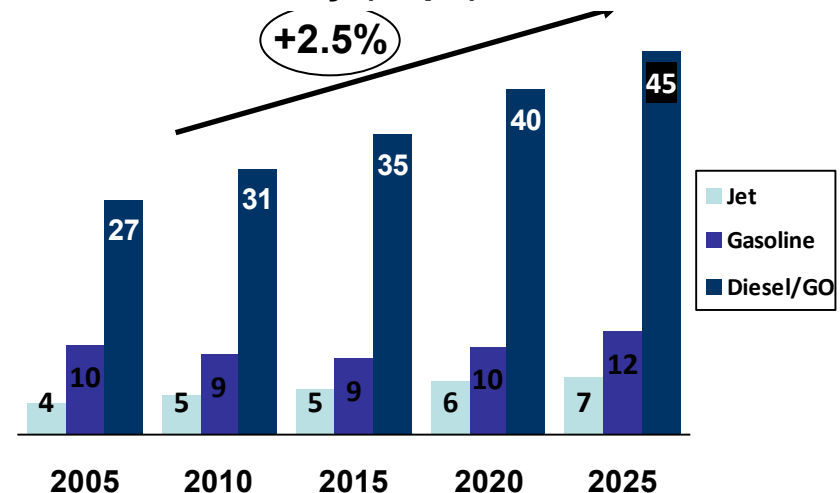
### Market diversification strategy and value chain integration

- Operating a network of c.300 stations in **7 countries** exceeding 1MT of annual sales
- Maintain **market leadership** in:
  - Cyprus (EKO): 35% market share
  - FYROM (OKTA): 90% market share (wholesale)
  - Montenegro (JPK): 54% market share
- Strategic targets:
  - Enhance footprint: added 156 petrol stations since 2004; continue growing in selected markets
  - Secure top-3 position in all markets
  - Secure supply advantage (Northern hub, in-market logistics, strategic supply agreements)
  - On the look-out for potential acquisitions/strategic partnerships in SEE/East Med

#### International: Regional footprint



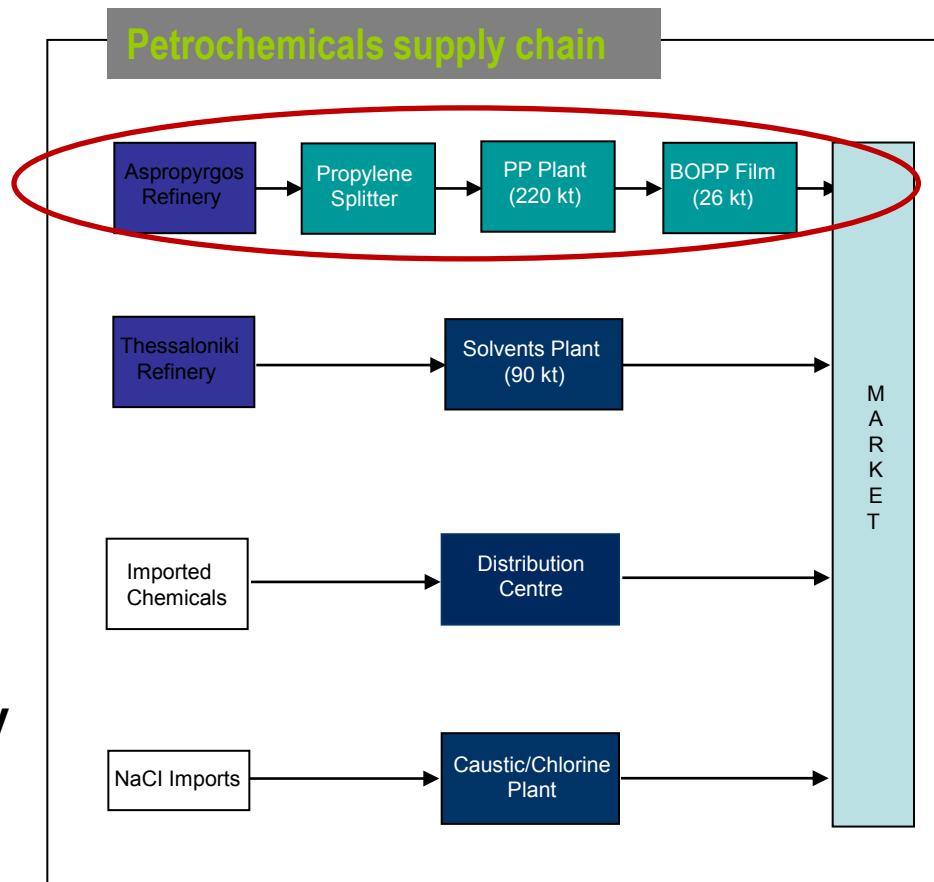
#### SEE\* & Turkey (mtpa)



\* Albania, Romania, Bulgaria, FYROM, Bosnia, Montenegro, Greece, Serbia, Croatia  
Source: WoodMac

## Petrochemicals: Vertical integration aimed at extracting additional value and maximising regional trading advantage

- **Vertical integration** with refining business
- **Only petrochemicals producer in Greece** with material presence
- Domestic market share exceeds 50% in all products, produced or traded
- Strong competitive advantage in polypropylene -vertical integration play
- **Exports account for 60%** of total sales; strong export markets in **Italy and Turkey**



## Gas: 35% participation in DEPA, Greece's incumbent gas company

- Driven by new gas-fired power plants and increasing retail penetration, gas consumption is expected to double by 2020
- DEPA:
  - Owns 100% of DESFA, Greece's gas grid owner and operator
  - Owns 51% of the local supply companies (EPAs),
  - Long-term contracts on pipeline gas (Russian & Azeri) and capacity rights on two in-bound interconnecting pipelines
  - Long-term contracts with power generators (PPC, ELPEDISON) and existing EPAs
  - Participates in ITGI, South Stream (via DESFA) and Interconnector Greece-Bulgaria pipelines



DEPA's contribution to Group Net Income

**Asprofos:** provides high quality engineering and managerial services across the energy chain

## Power: ELPEDISON second largest power generator in Greece

- Owned by Elpedison, a 50/50 joint venture between Hellenic Petroleum and Edison, Italy's 2<sup>nd</sup> largest electricity producer and gas distributor
  - 2<sup>nd</sup> largest independent power producer in Greece, owns and operates 810MW of installed CCGT capacity: a 390MW plant in Thessaloniki since 2005 and a 420MW in Thisvi since Dec 2010
  - Active in power trading & marketing, albeit with limited exposure due to Greek market crisis

## Development of a renewable energy portfolio

- Hellenic Petroleum is targeting a renewables portfolio exceeding 100 MW (wind, PV, biomass)
- Currently >100 MW renewables in various development stages; first PV park in operation

**Thisvi 420MW CCGT power plant**

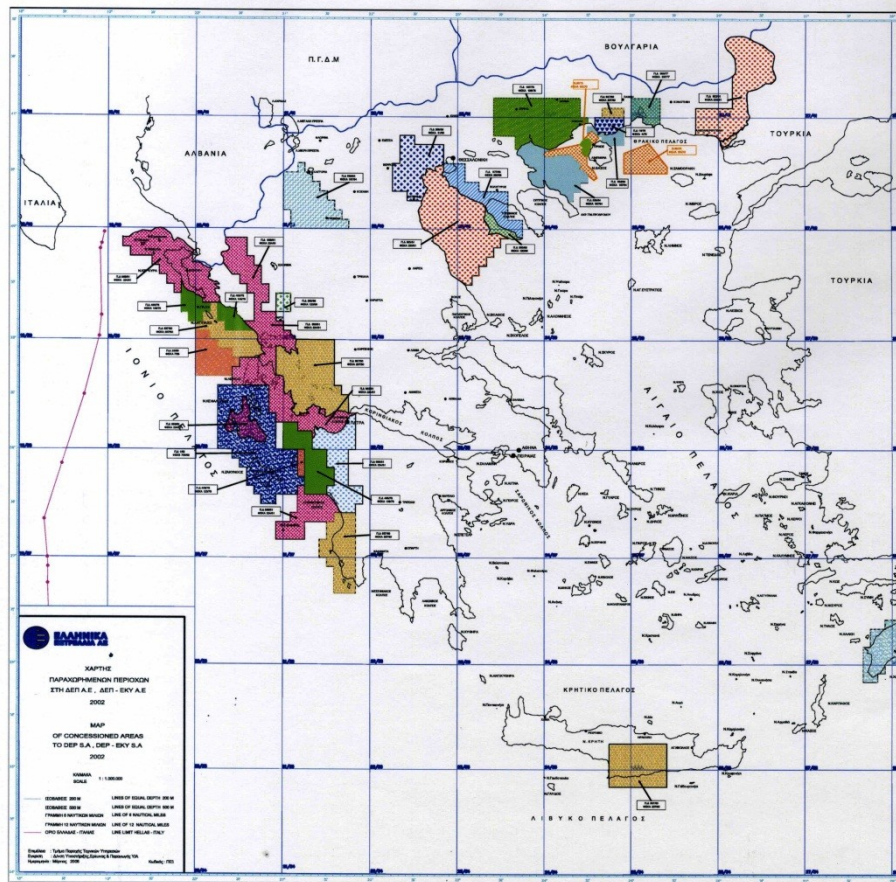


**Thessaloniki 390MW CCGT power plant**





# Since 1998 Hellenic slowed down its E&P activities in Greece



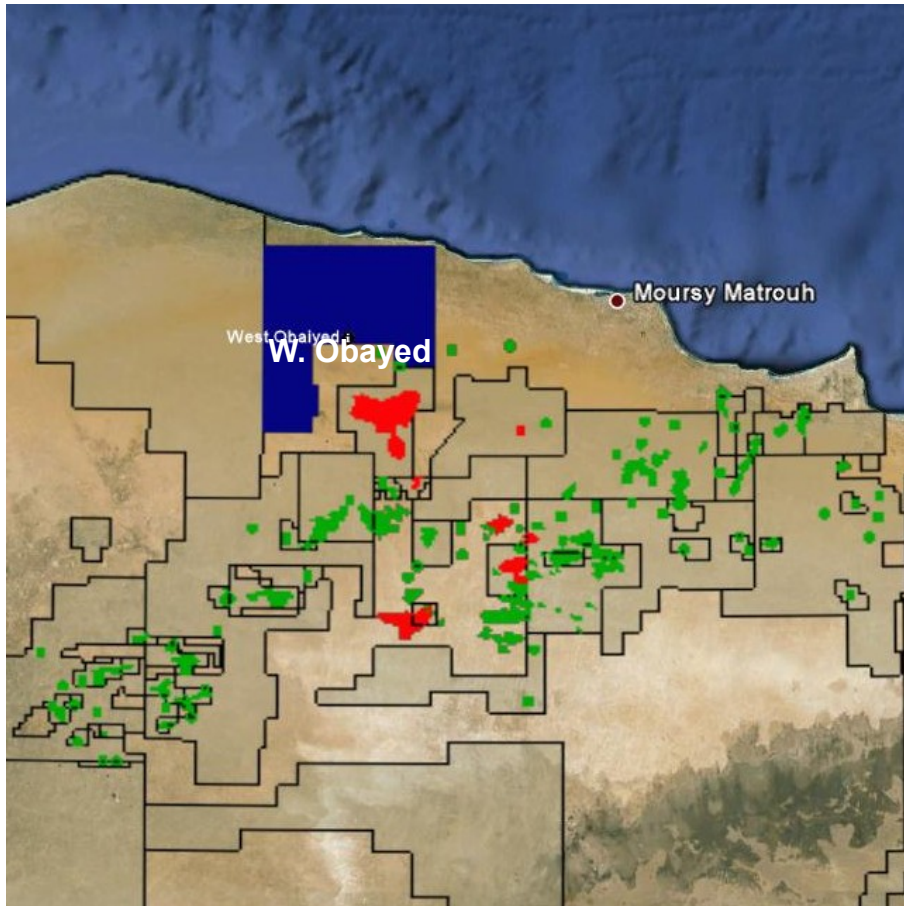
- Following the privatization of DEP, its rights, granted in the past, in **26 areas** were transferred to Hellenic Petroleum
- However according to the legislation (Law 2289) Hellenic Petroleum should explore the areas in Greece alone (it was not allowed to farm out); so the BoD of the new private company decided
  - continue its participation in the JV with Enterprise and Triton in W. Greece
  - do not undertake further alone the technical risk in the rest of the Greek areas and slow down its activity only in low cost desk studies
  - invest in E&P business opportunities in the greater area
- The **Greek State revoked Hellenic's rights** (2007) in the above areas because of the limited exploration activity

# Hellenic's international expansion in E&P



Hellenic expanded internationally and the last six years invested more than USD 200 millions in exploration activities

- **Albania:** 3 blocks (licensing round - 49% in JV with OMV)
- **Libya:** 6 blocks (EPSA III – 20% in a JV with Woodside and Repsol)
- **Egypt:** 2 blocks (2006 EGPC and 2007 Ganope - JV with Melrose and Oil Search)
- **Montenegro:** 3 blocks (acquisition of the local state company JPK)
- **Greece:** kept rights only in Sea of Thrace concession (in JV Calfrac)



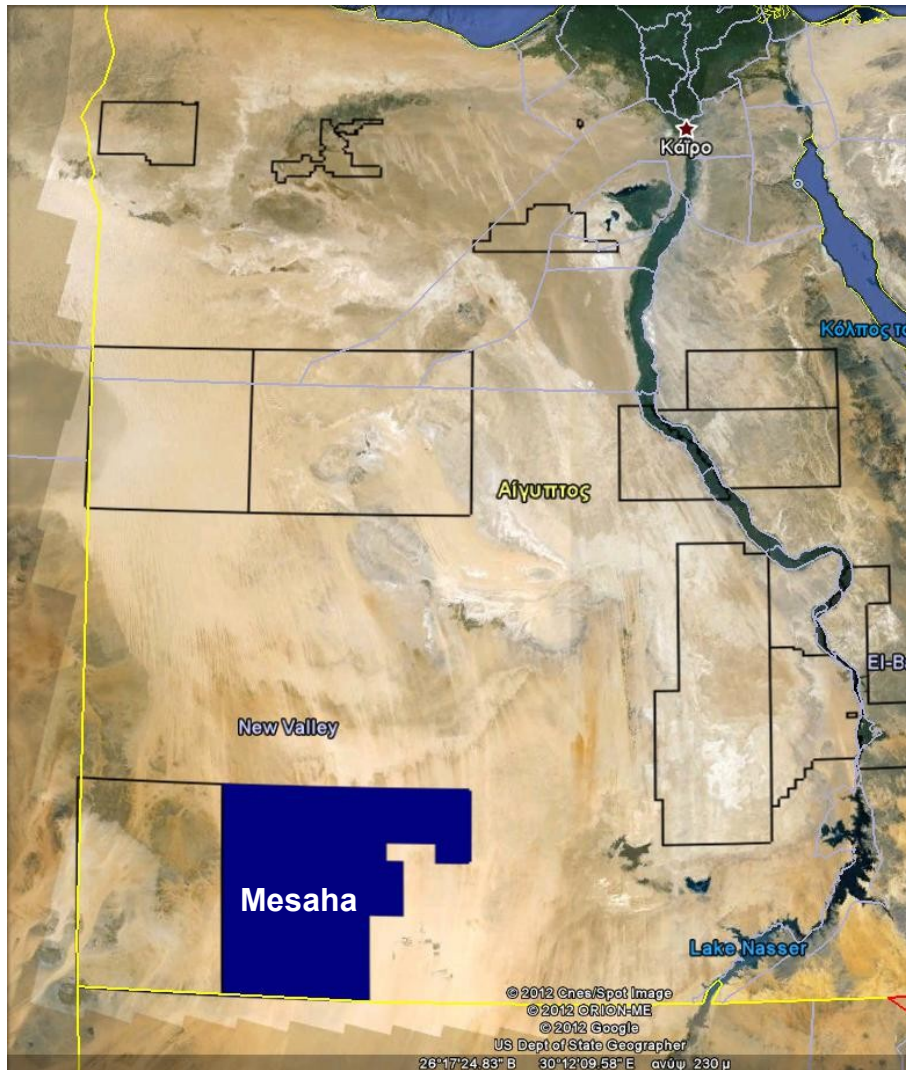
**W. Obayed** (1,380 sq. km Western Desert)

- **Hellenic Petroleum** 30%
- **Vegas Oil & Gas** 70% (operator)

## Current status:

- 2D and 3D seismic data (PSDM) identified 8 prospects
- Four wells drilled so far, one of those tested natural gas and condensate and another one oil (35° API, not moveable)
- Currently we are reprocessing the existing seismic data before start drilling the next wells
- The Exploration Period ends June 2014 ((with an contractual allowed extension for 6 months)





**Mesaha (42,750 sq.km Upper Egypt)**

- **Hellenic Petroleum** 30%,
- **Melrose Resources** 40% (operator)
- **Kuwait Energy** Company 15%
- **Beach Petroleum** 15%

## **Current status:**

- Gravity, aeromagnetic and seismic 1700 Km 2D and the first wildcut well completed
- Currently we are reviewing the results before decide the next steps
- The current Exploration Period ends October 2014 (with an contractual allowed extension of 2 additional years to October 2016)



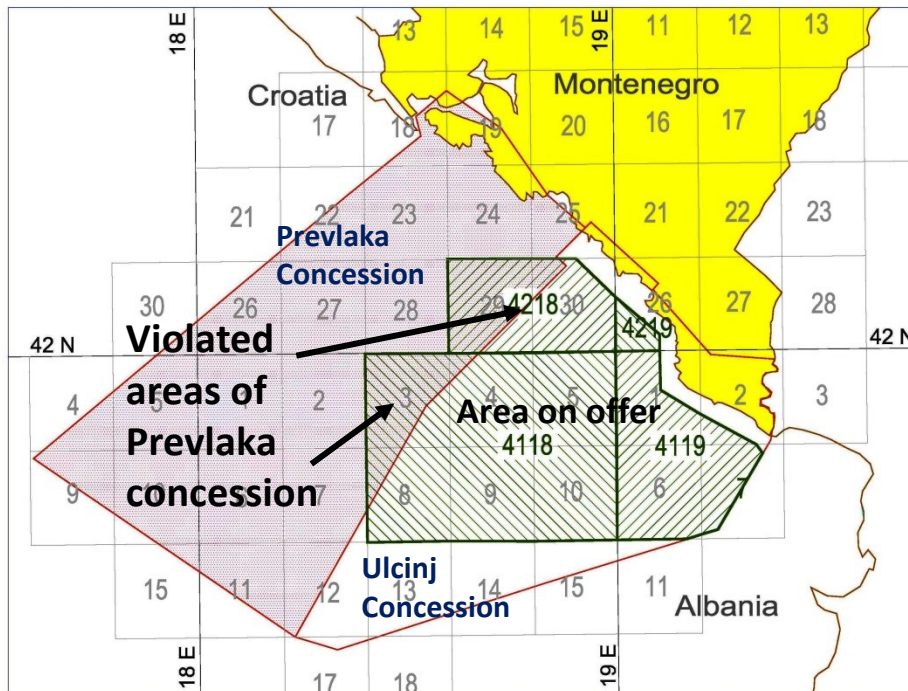
# Montenegro – Prevlaka & Ulcinj concessions

## Prevlaka Concession

- Concession holder **JPK 100%**

According to legislation a JV formed for investing and exploring the block:

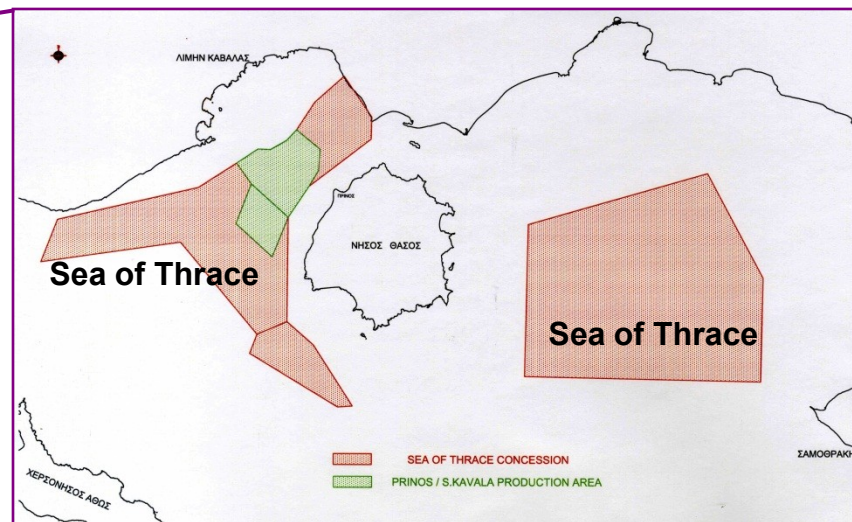
- Hellenic Petroleum (JPK– HPI) 60%**
- Gas Monte 40%**



## Current Status

- Back in 2007 the GoM, with a Ministerial Decree, forced the Prevlaka JV to complete a 3 year exploration program (seismic and one well) in 6 months. **The dispute is still unresolved.**
- In August 2013 the GoM released a tender for E&P rights in Ulcinj. To our surprise, **part of the areas on offer are covering acreage from Prevlaka concession**
- JPK has filed a relevant claim in the **Constitutional Court of Montenegro**; probably to be followed at international courts.
- Regardless the above Hellenic Petroleum has been prequalified by the GoM, for the ongoing round for Ulcinj block

# Greece – Sea of Thrace



**Sea of Thrace (1,559 sq. km)**

- **Hellenic Petroleum 25%**
- **Calfrac Well Services 75%**

An offshore oil promising area surrounding the Prinos oilfield and Kavala gas field.

We are in discussions with partners to decide the next steps<sub>22</sub>

**The main goal is to increase further upstream contribution to Group's value and growth by:**

- **managing the existing assets** portfolio to increase its value
- **focus homeland**, grasping the benefit of our competitive advantages:
  - the **vast technical expertise in the Greek** oil promising basins and
  - the **strong Group's commercial position** in country's energy sector

# Hellenic Petroleum's view for the Greek E&P sector

## Greece is offering

- attractive areas for exploration
- a new updated legal framework quite flexible for the investors
- a competitive fiscal regime (tax 25% - royalties 2 – 15%)

## Hellenic Petroleum, the leading oil company in Greece,

- having deep knowledge of the Greek geology
- been operator in the past in 26 blocks in Greece and Egypt
- with international experience participating in numerous JVs with other oil companies in Libya, Egypt, Albania and Montenegro

**is following closely the recent interesting developments**

**in the Greek upstream sector**

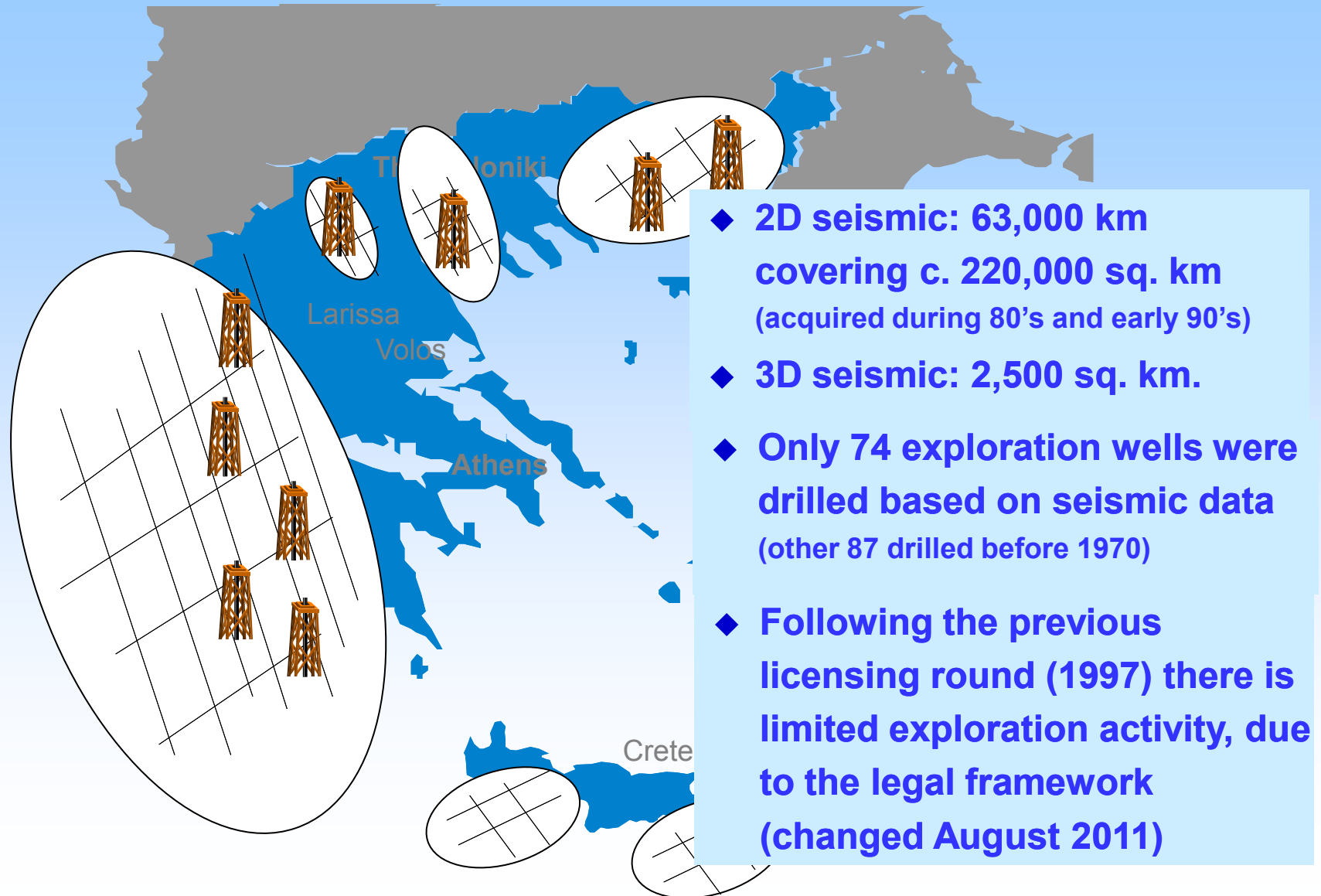
**evaluates the business opportunities**

**and will participate in the upcoming licensing rounds**

**in JV with other oil companies.**



# Past exploration activity in Greece



# Is there any source rock ?

## SOURCE ROCK

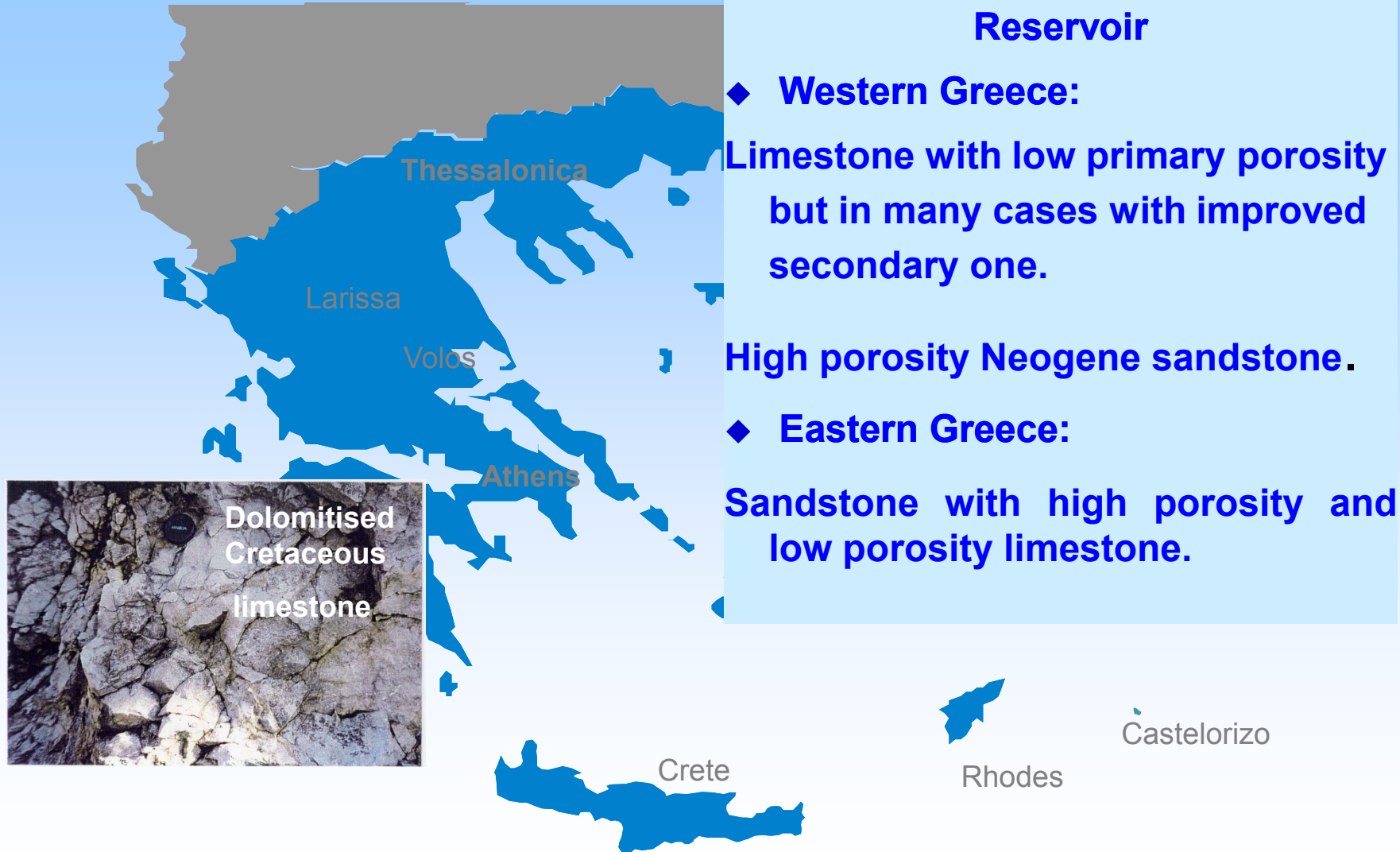
- ◆ **Western Greece:**  
the main source rock are the Posidonia beds of early Jurassic age
- ◆ **Eastern Greece:**  
Miocene – Oligocene shales

A map of Greece with major cities labeled: Thessalonica, Volos, Athens, Crete, Rhodes, and Castelorizo. The map is overlaid with a light blue background.

A photograph showing a steep, rocky cliff face with distinct horizontal layers of sedimentary rock, identified as Posidonia beds.

A photograph showing a hand holding a small, dark, irregularly shaped rock fragment over a dark, oily substance, identified as Dragopsa oil seeps.

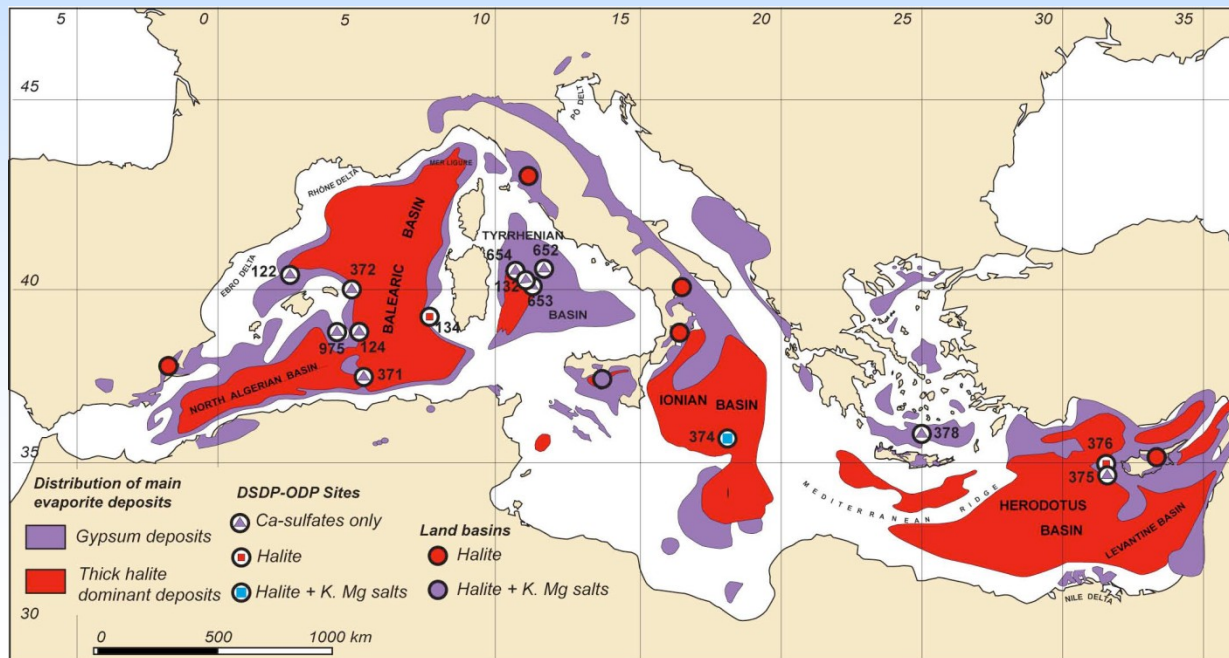
# Is there any reservoir ?



# Is there any seal rock ?

## Seal

- ◆ **Western Greece:**  
Neogene shales, Flysh or evaporites (Miocene or Triassic)
- ◆ **Eastern Greece:**  
shales and Messinian evaporites



Deposition of Messinian evaporites in Mediterranean sea. (Roushy, 2000)



# What about traps and migration ?



## Traps

- ◆ Western Greece
- Mostly tectonic
- ◆ Eastern Greece:
- Tectonic and stratigraphic traps

## Migration

Based on all available data  
hydrocarbon maturation and  
migration occurred at the right  
geological moment.

# Are there any discovered oil and gas fields in Greece ?

## Thermaikos basin

**Discovered: 1 Bcm NG** (Epanomi gas field)

Oil and gas shows in many wells

## Prinos basin

**Produced: 120 MMbbls** (Prinos field)

Additional prospects identified

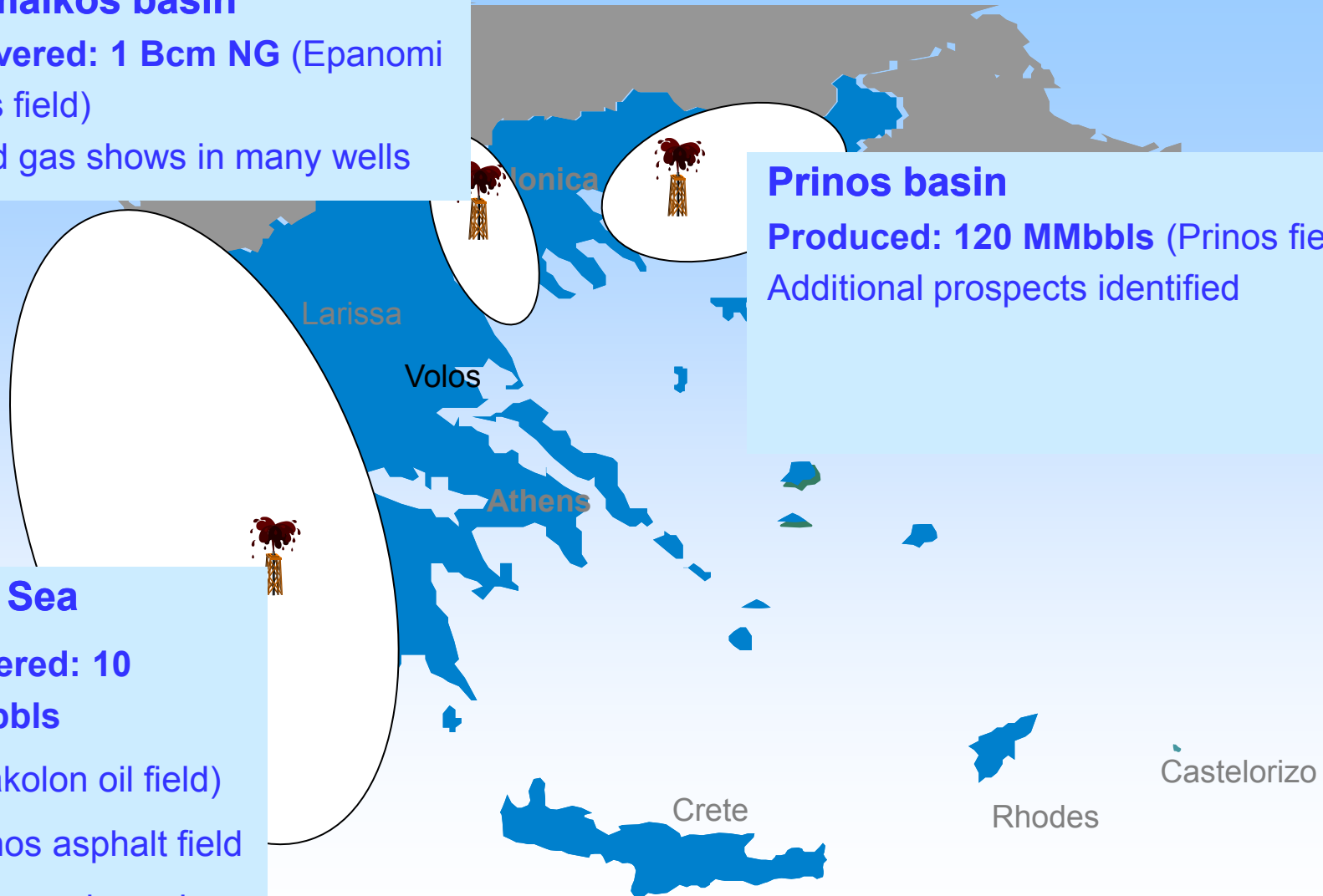
## Ionian Sea

**Discovered: 10 MMbbls**

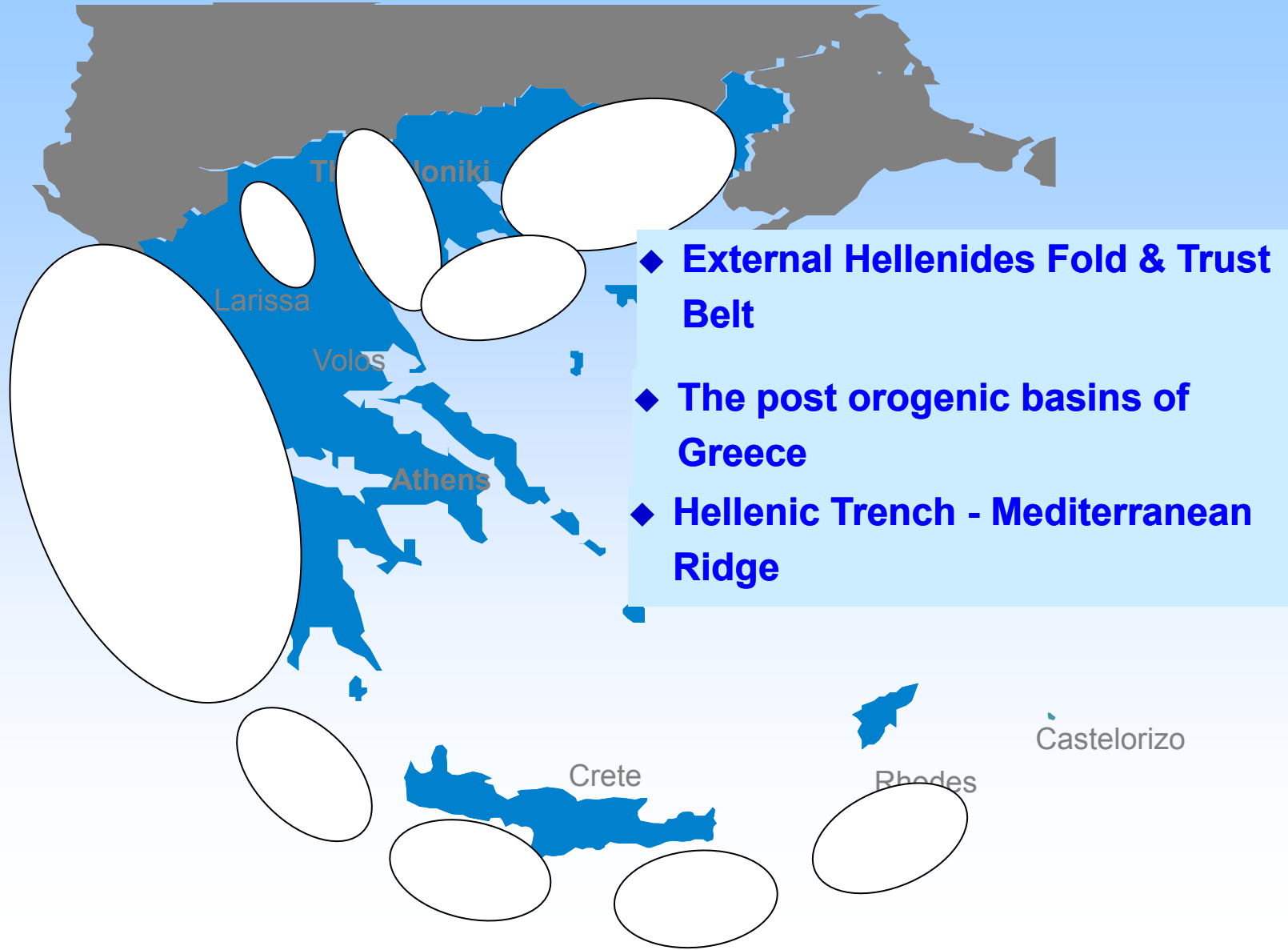
(Katakolon oil field)

Zakynthos asphalt field

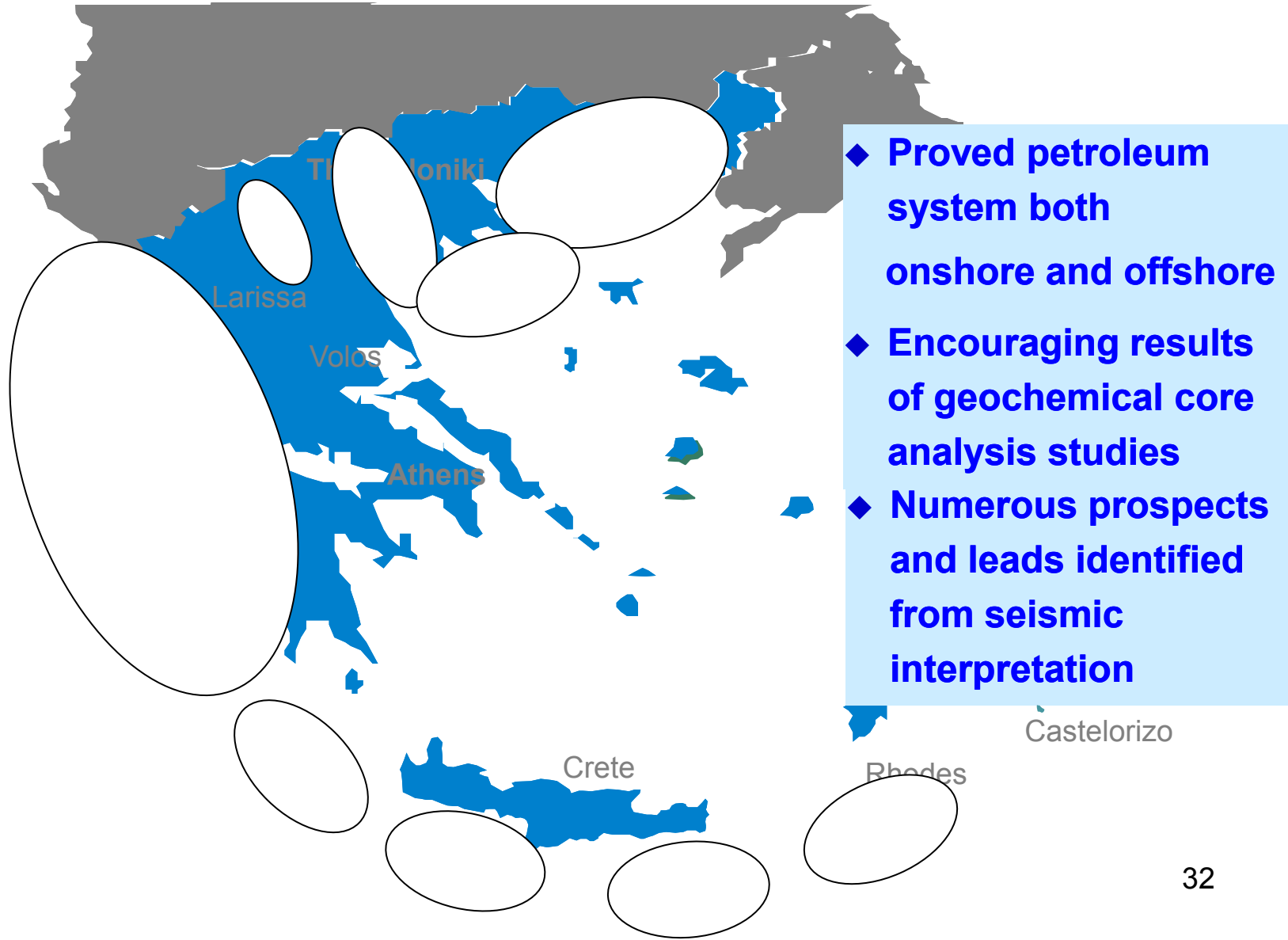
Oil and gas shows in many wells



# Oil promising areas in Greece

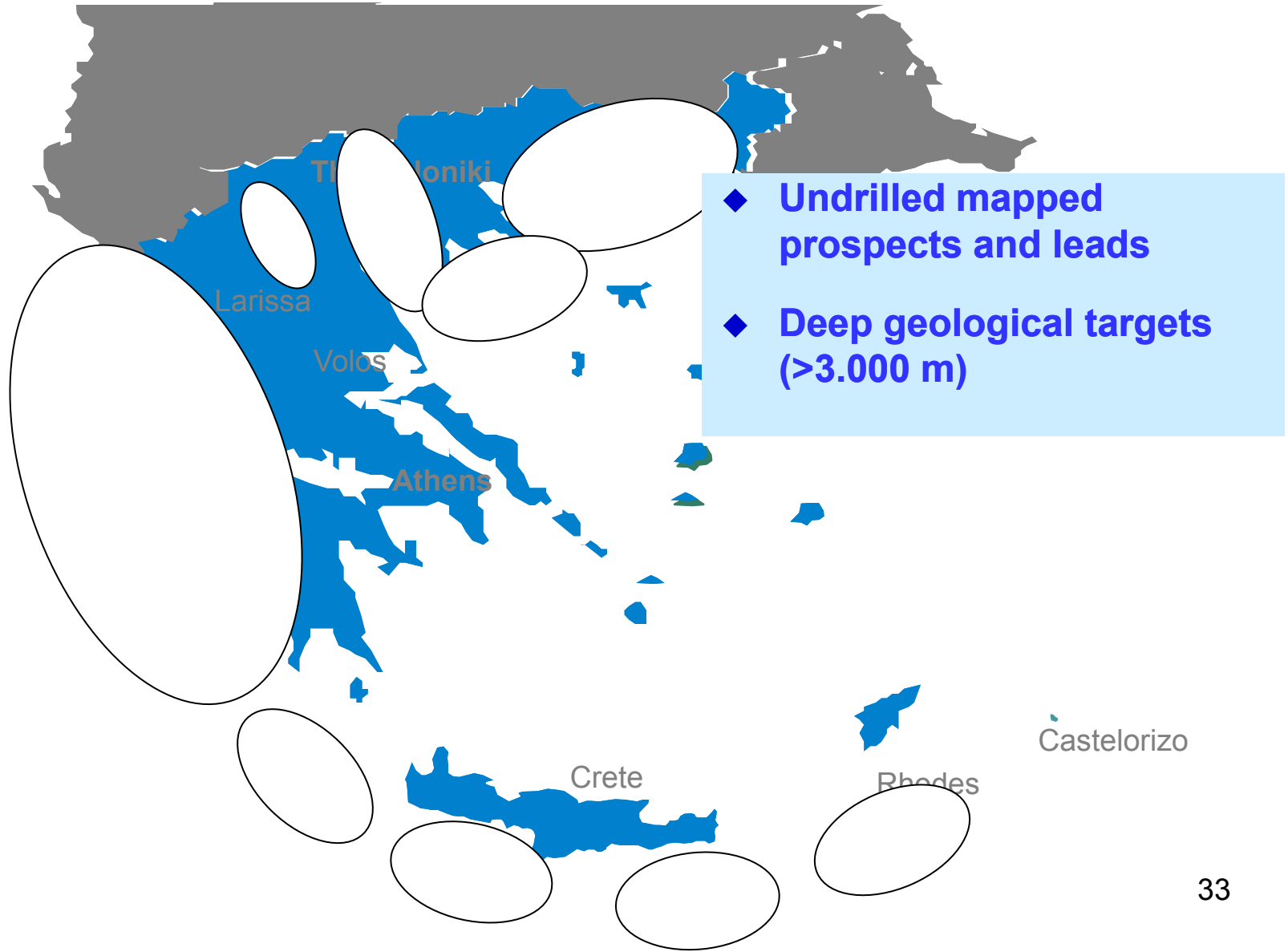


# Oil promising areas in Greece

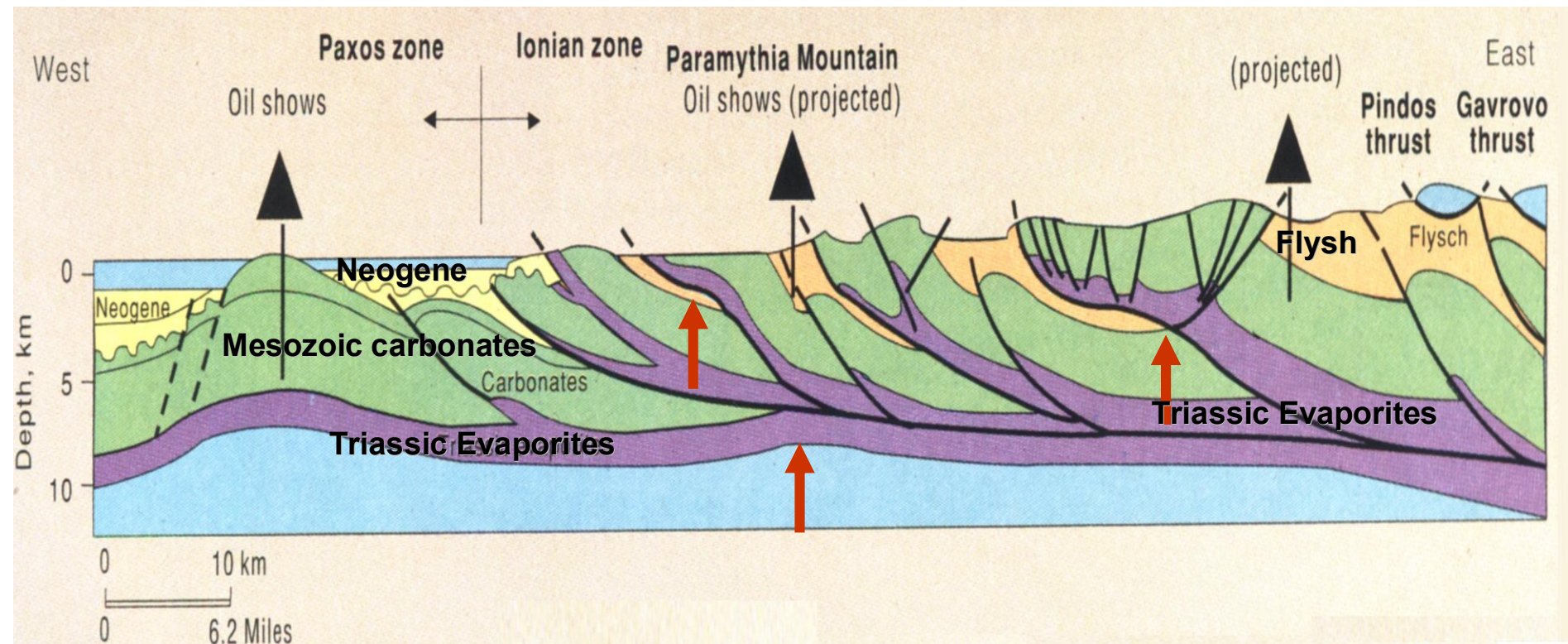




# Oil promising areas in Greece

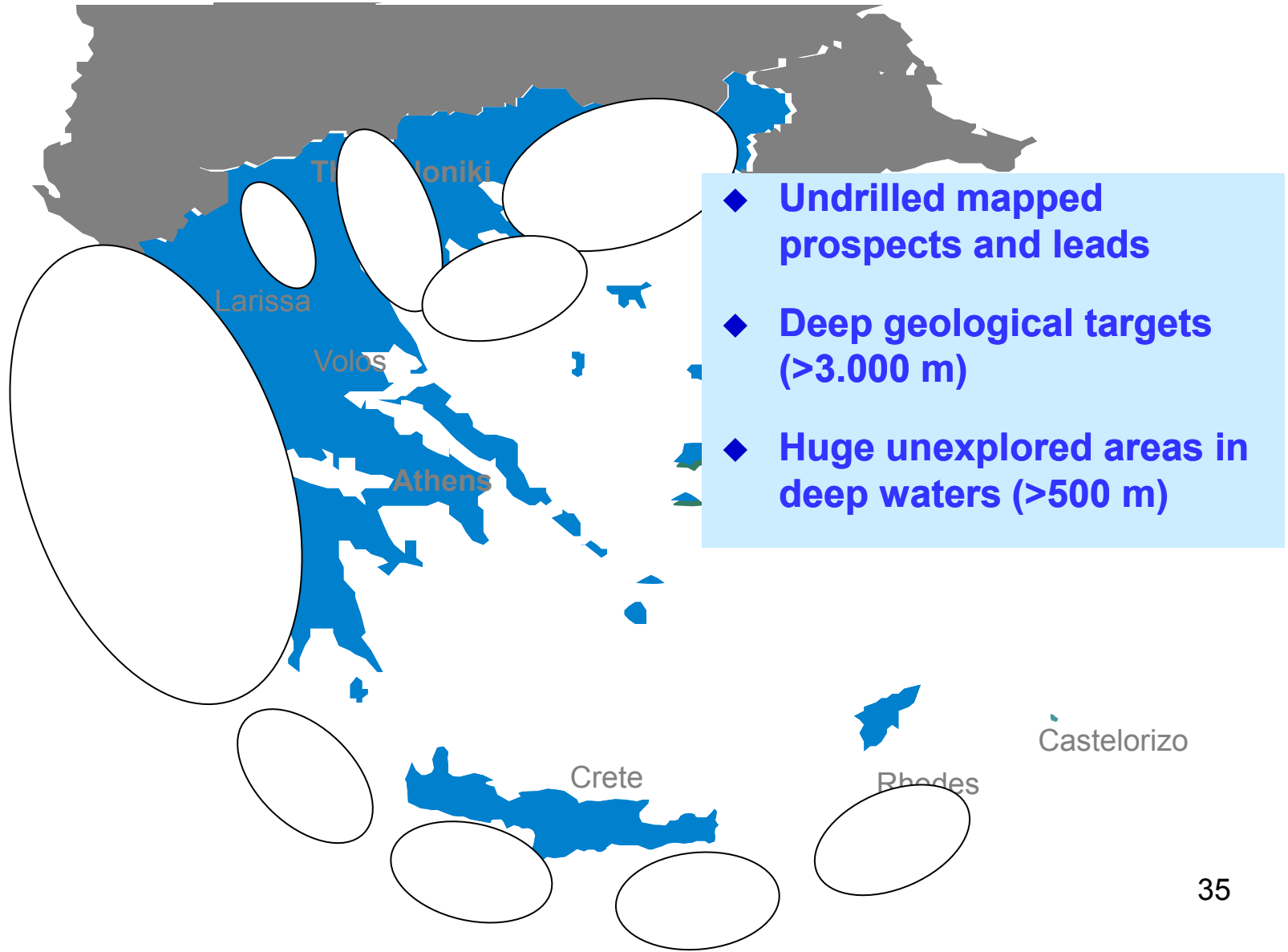


# Unexplored deep targets below Triassic

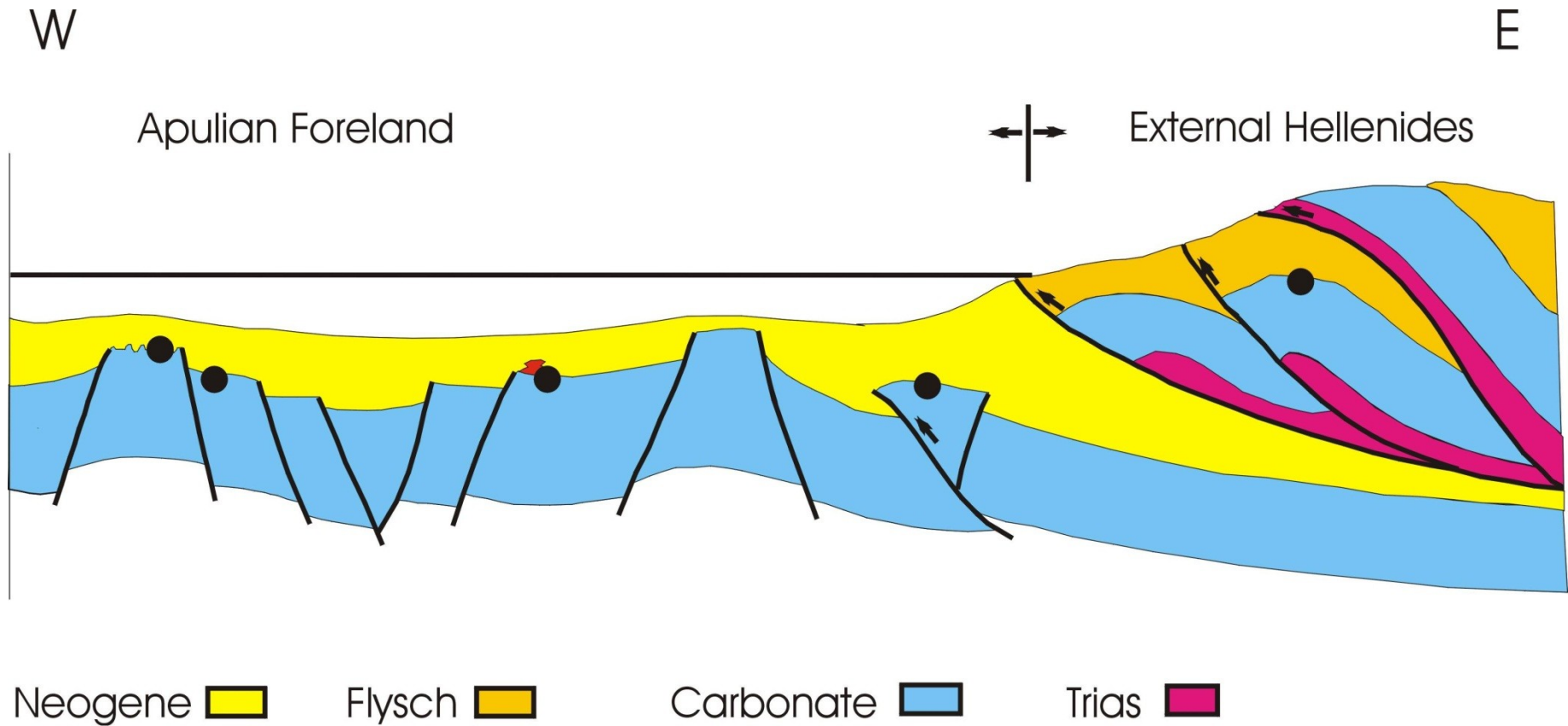


Geoseismic section W. Greece:  
Unexplored deep oil plays below Triassic evaporites

# Oil promising areas in Greece



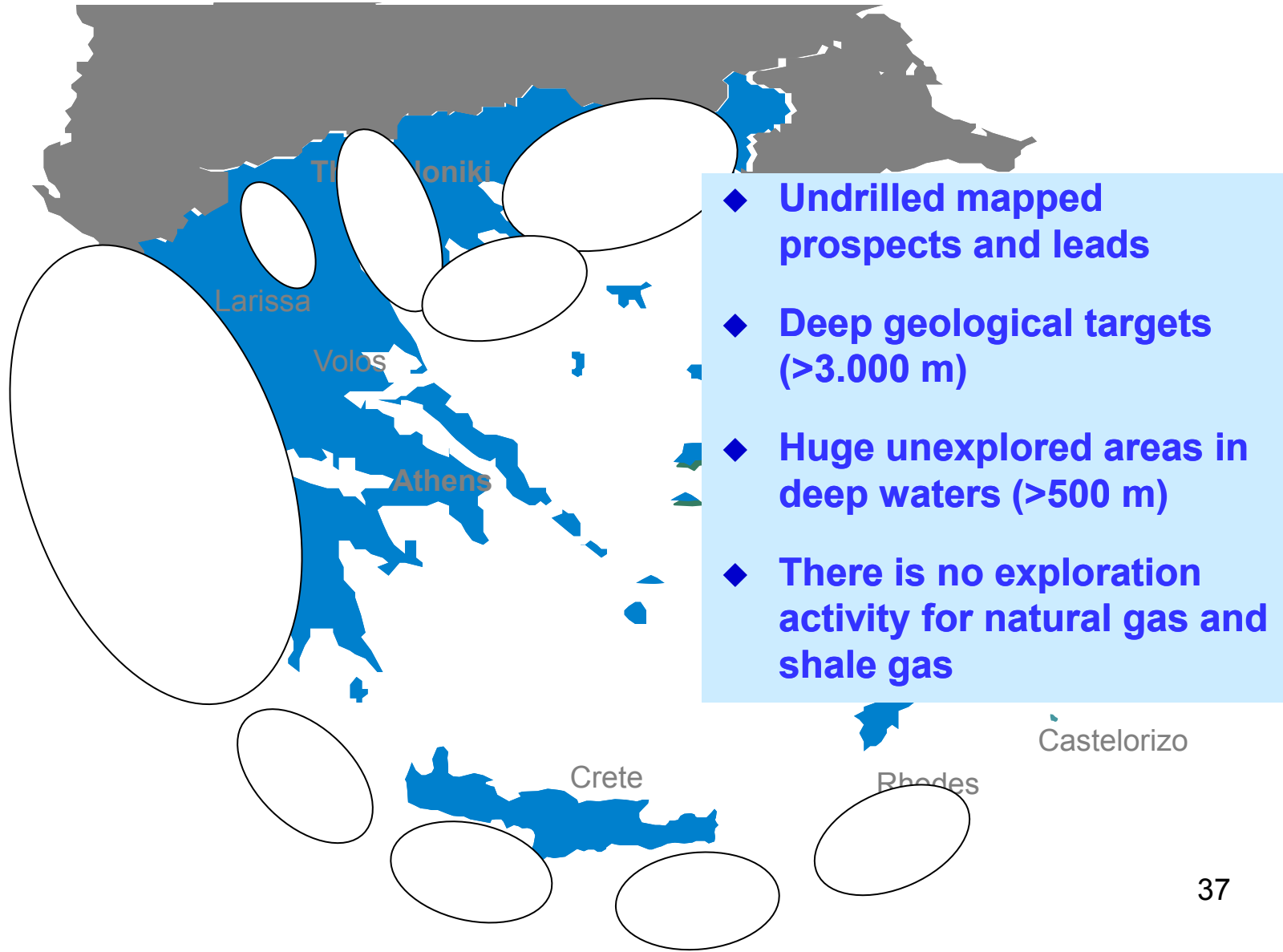
# Unexplored deep water targets



**Geoseismic section W. Greece:** Anticlines and reefal buildups in Mesozoic carbonates covered by Neogene clastic sediments in the Apulian Foreland



# Oil promising areas in Greece



# Hellenic Trench - Mediterranean Ridge

## Basins of Hellenic Trench

- Unknown but probable Petroleum system based on the known geology and relevant references.
- With the exception of Kyparissiakos area very limited seismic coverage.
- Great water depth and rough sea bottom topography.

## Mediterranean Ridge

- Petroleum system not proven but the thick expected sedimentary section may have generate hydrocarbons. East and West flags are the most promising.
- Very limited seismic coverage. Most of the programs have been acquired by different Universities' or Institutes' projects. Existing data may indicate some structures but are inadequate to map any targets.



## Abyssal plain

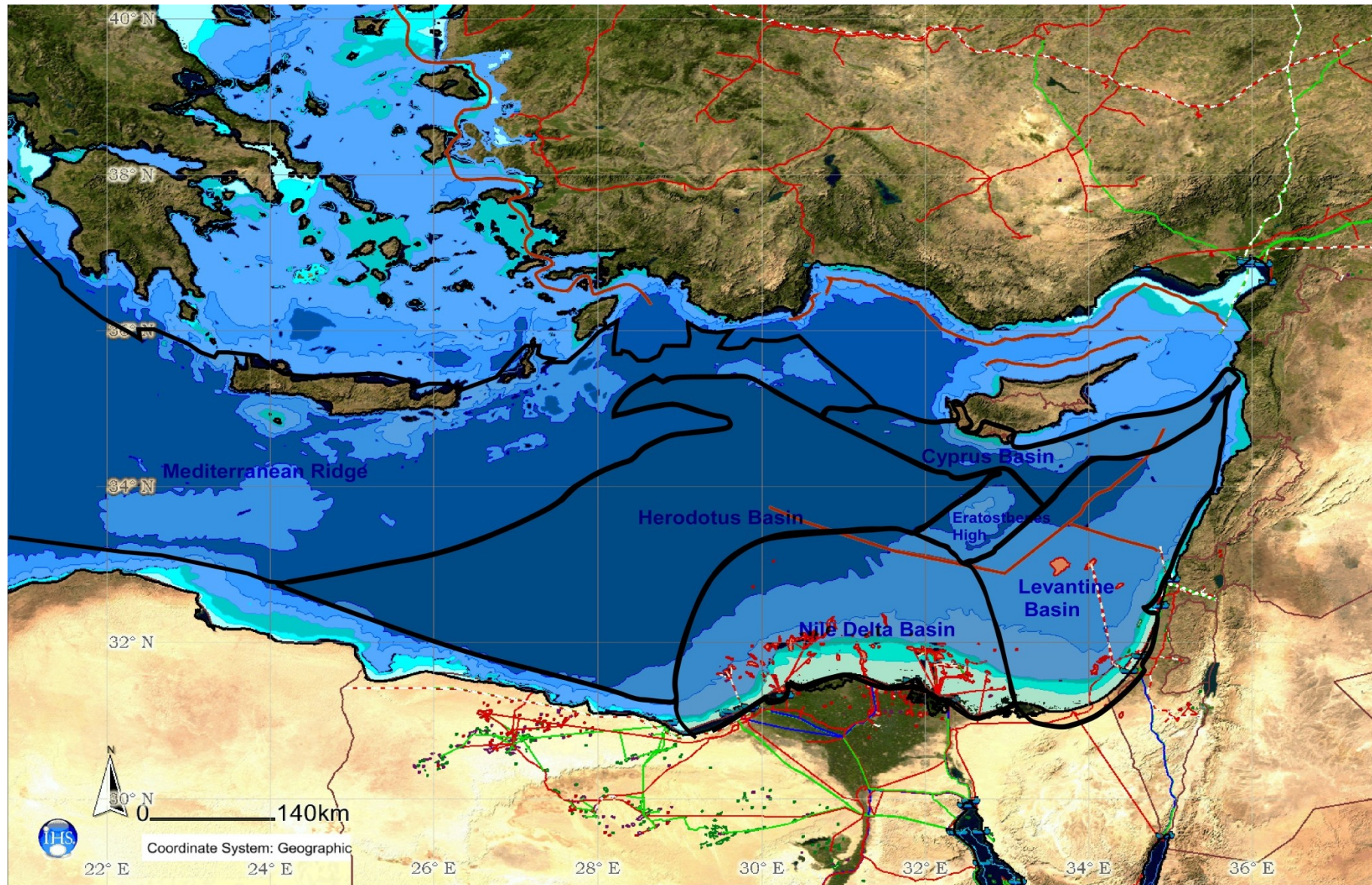
- The Herodotus plateau at the East is consider to be the most promising.
- The few existing data are inadequate to map any targets.

# Not quantitatively assessed resources

Total Petroleum Systems (TPS) and Assessment Units (AU)	Field type	Expected largest mean field size	Total undiscovered resources											
			Oil (MMBO)				Gas (BCFG)				NGL (MMBNGL)			
			F95	F50	F5	Mean	F95	F50	F5	Mean	F95	F50	F5	Mean
Nile Delta Basin Province, Mesozoic-Cenozoic Composite TPS														
Nile Margin Reservoirs AU	Oil	214	449	1,150	2,600	1,288	551	1,425	3,237	1,597	11	29	66	32
	Gas	766					698	2,193	5,750	2,574	21	68	181	80
Nile Cone AU	Oil	311	42	256	1,666	475	152	930	6,123	1,758	6	38	255	73
	Gas	17,194					91,213	197,850	410,825	217,313	2,413	5,269	10,962	5,789
Eratosthenes Seamount AU	Not quantitatively assessed													
Mediterranean Ridge AU	Not quantitatively assessed													
Total Conventional Resources			491	1,406	4,266	1,763	92,614	202,398	425,935	223,242	2,451	5,404	11,464	5,974



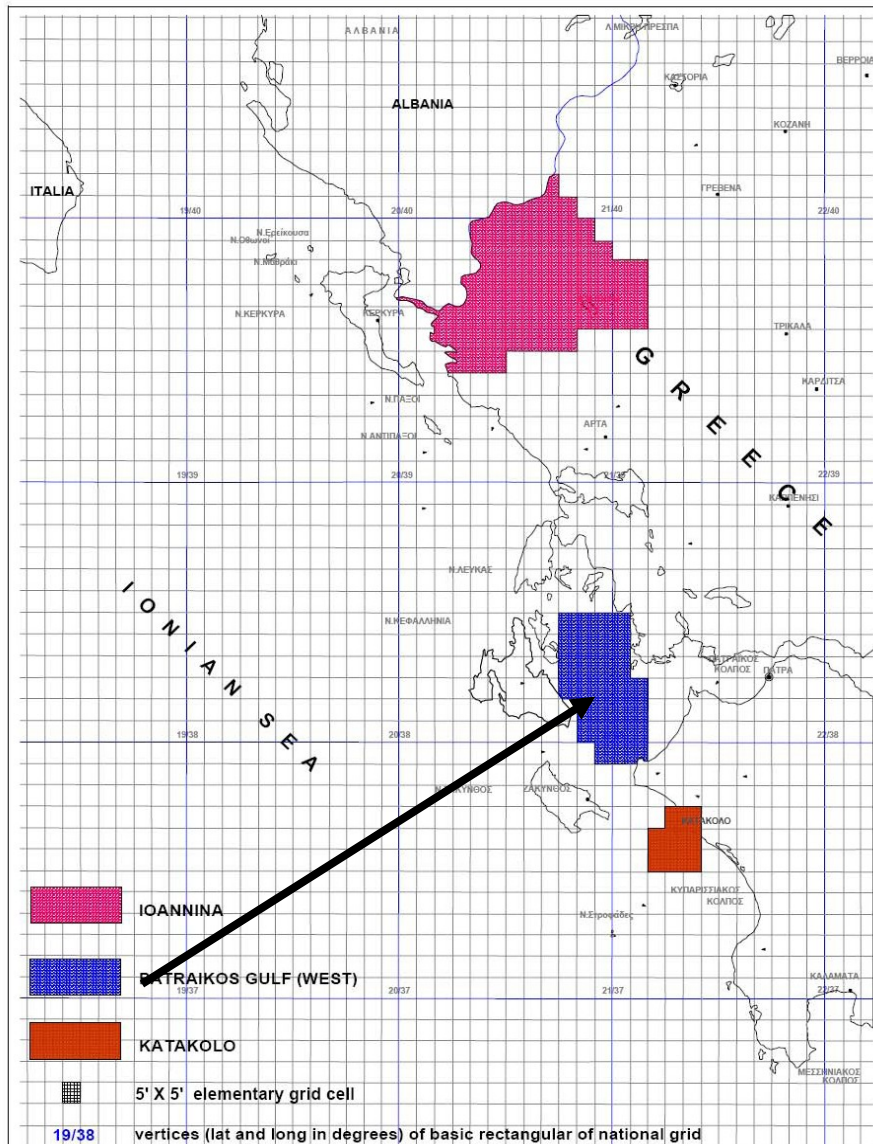
# Intense exploration effort is needed in this frontier area





# Greece – Open door process

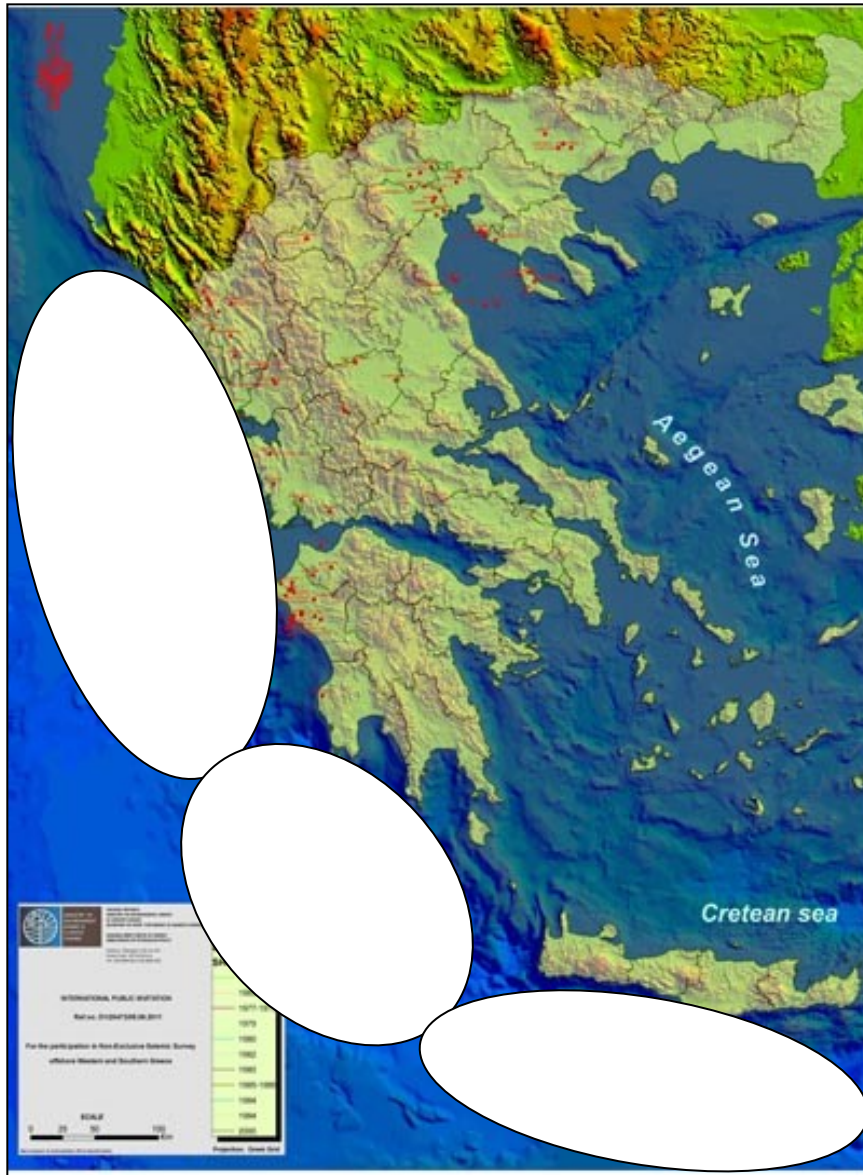
AREAS UNDER CONCESSION IN WESTERN GREECE



- The Greek State released an international tender offering 3 blocks in W. Greece under an “open door process” (bid date was 2 July 2012)
- The company participates in a JV
  - **Hellenic Petroleum** (33.3%, operator)
  - **Edison International SpA** (33.3%)
  - **Petroceltic** (33.3%)
- The ministry, having evaluated the offers, has announced recently that the JV as the “**preferred bidder**” for W. **Patraikos** offshore area and we are in negotiations to finalise the Lease Agreement
- We are expecting that the Lease Agreement will be ratified soon to allow starting our work program.



# Greece – New promising areas are expected to be released



- The Greek State last year retained **PGS to acquire non exclusive seismic** data offshore W. Greece, covering a huge area of more than 200.000 sq. km
- Hellenic Petroleum purchased the data; so far we have already received some lines, which we are **reviewing enhancing our knowledge** in the area. By year end we will receive the whole volume.
- We are also expecting the Greek State to release **an international licensing round** (4Q14) for a number of oil promising areas offshore W. Greece
- **Hellenic Petroleum strategic target is to increase its presence in the Greek upstream sector**

# How we could connect ....

**EUROPE**

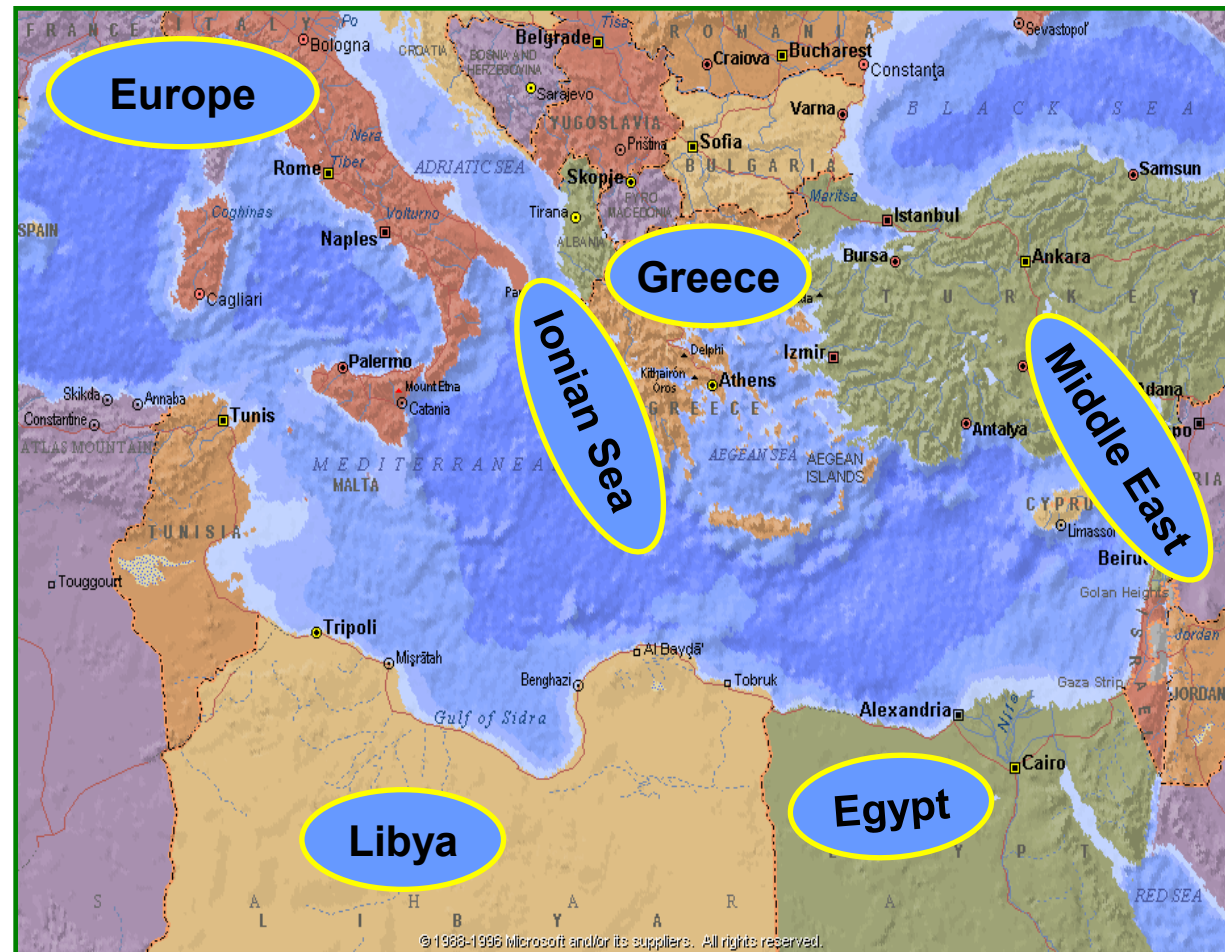
**GREECE**

**IONIAN SEA**

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**EGYPT**

**LIBYA**





# How we could connect ....

**EUROPE**

**GREECE**

**IONIAN SEA**

**M. EAST**

**EGYPT**

**LIBYA**

**PRETTY WOMAN**

**JEALOUS WIFE**

**COW**

**HORSE FLY**



... some thousands years ago, in ancient Greece ...



L. v. Klenze, 1784-1864: Die Akropolis von Athen. Photo © Maicar Förlag - GML

... some thousands years ago, in ancient Greece ...

*IO,  
a pretty woman  
was princess in Argos  
a famous city in  
Peloponnesus,  
Greece*





... some thousands years ago, in ancient Greece ...

**ZEUS,**  
*God's father*  
*fall in love with*  
*beautiful IO*



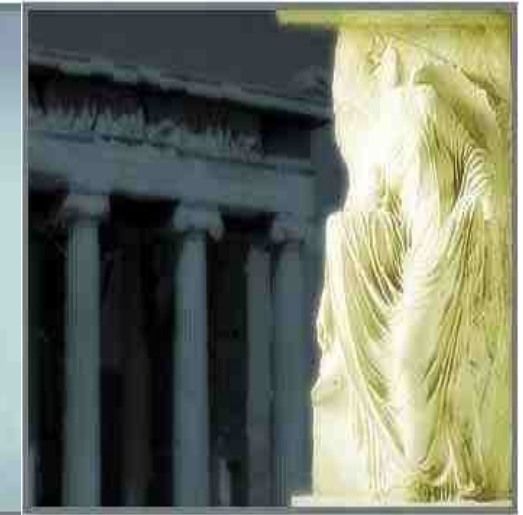
... some thousands years ago, in ancient Greece ...

*IO soon  
was pregnant*

**HERA,**  
*Zeus jealous wife  
found out  
the romance*

*and ....*

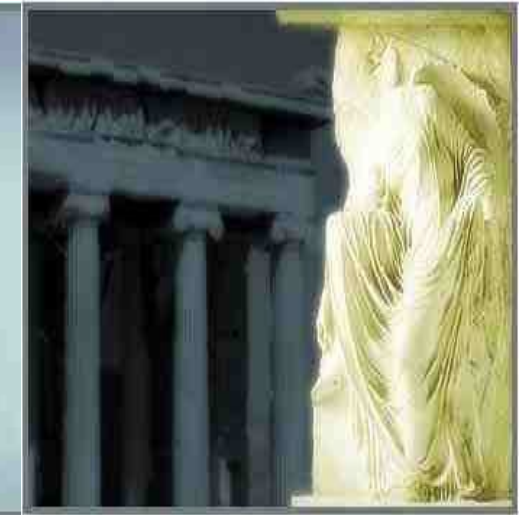
*IO  
was  
in trouble*



... some thousands years ago, in ancient Greece ...

***ZEUS, tried to save IO  
and transformed her  
to a COW***

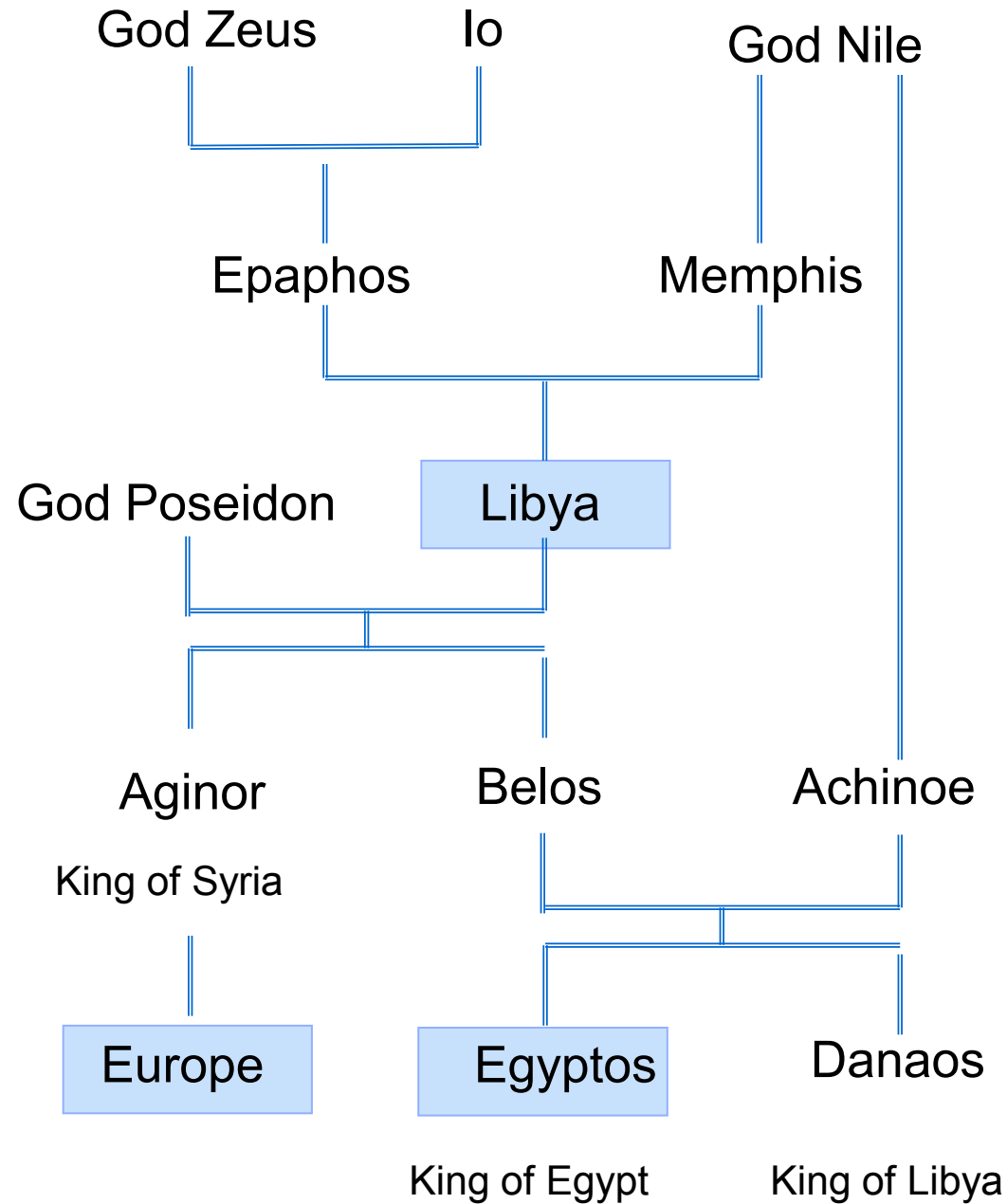
***HERA sent a  
HORSE FLY  
to bother IO***



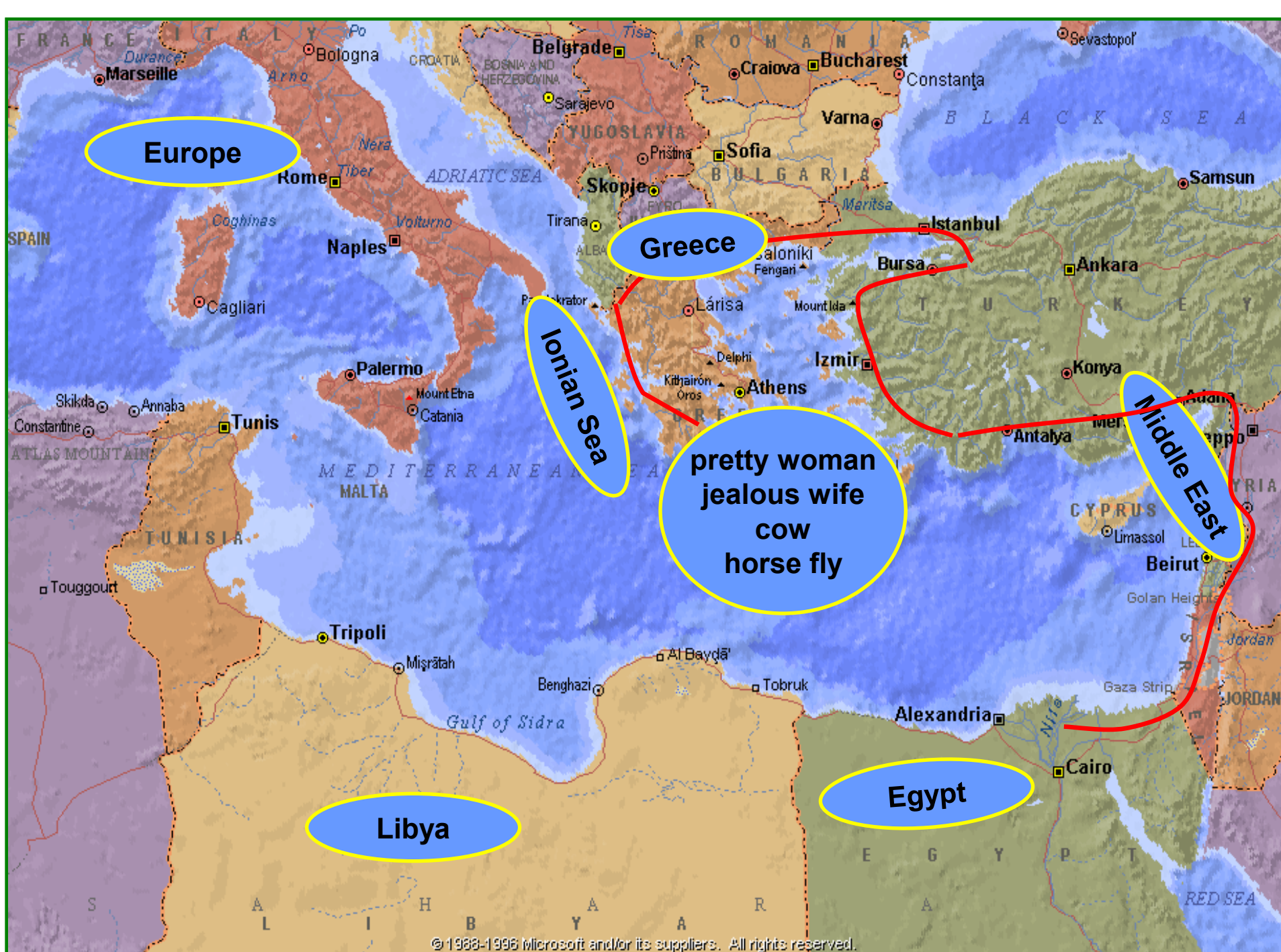




# Genealogy







## Lesson learnt by the myth

*... connecting people,  
interests, culture ...*

*... is an efficient way  
of open - mind  
creative  
strategic thinking ...*



*... this is the approach,  
that we,  
in Hellenic Petroleum,  
are following  
to establish  
commercial relations  
with our partners...*

**Thank you  
for your  
attendance**