

# Offshore Hydrocarbon Activities in the Republic of Cyprus



**Solon Kassinis**

**Energy Service Director**

**Ministry of Commerce, Industry and Tourism**

**Republic of Cyprus**

***3<sup>rd</sup> South East Europe Energy Dialogue  
IENE***

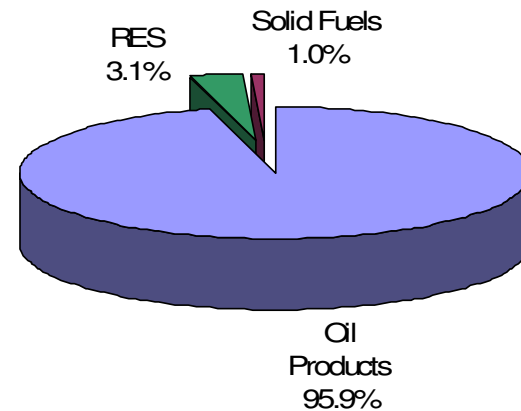
***Thessaloniki, June 19<sup>th</sup>, 2009***

# Cyprus – The Importance of Domestic Energy

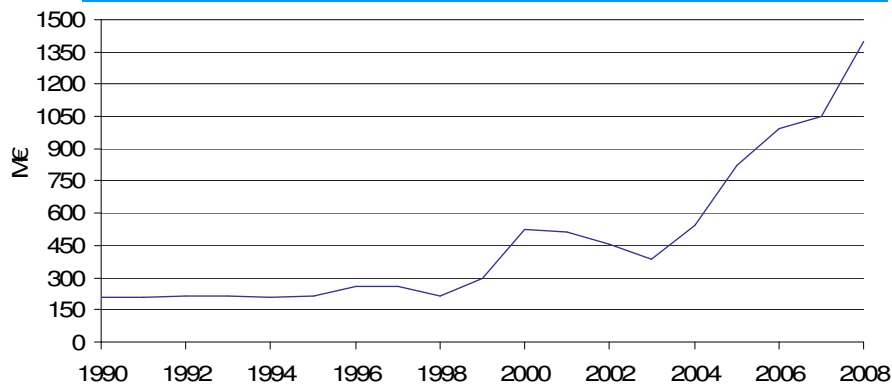
- Isolated Energy System
- High Energy Dependence
- High Cost of Energy Supply

- > Energy is of vital importance to the island's economy
- > The cost of imported energy is a burden on the development of the country

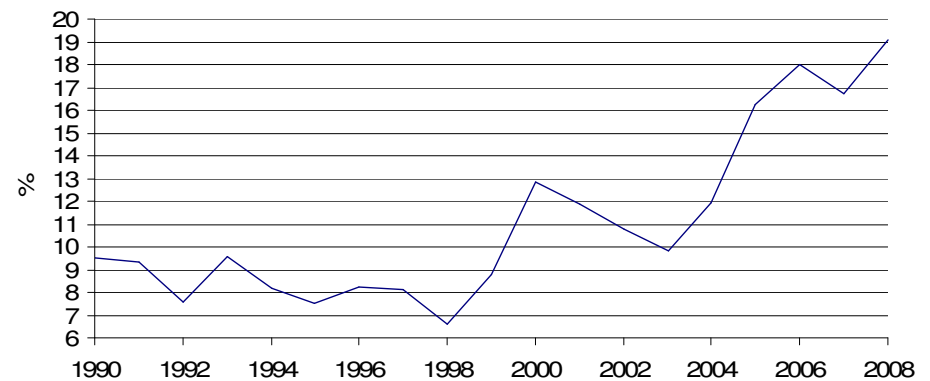
Primary Energy Consumption – 2008



Cost of Oil Products Import

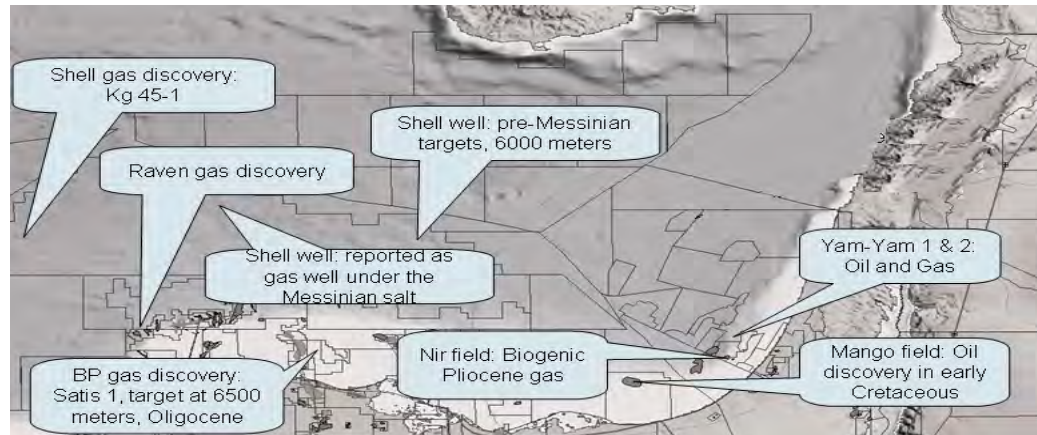


Cost – Oil Product Imports / Country's Imports

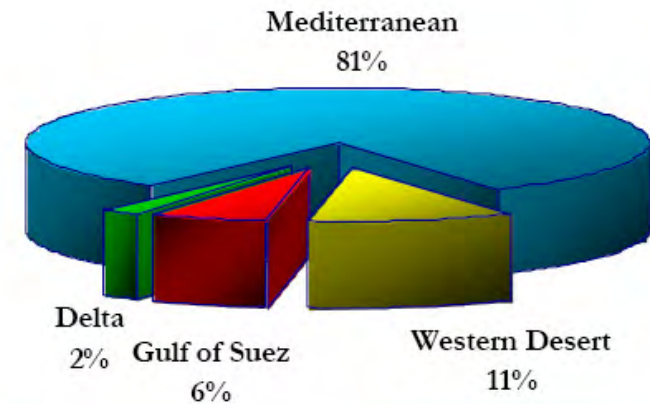


# Offshore Cyprus – A Prospective Area?

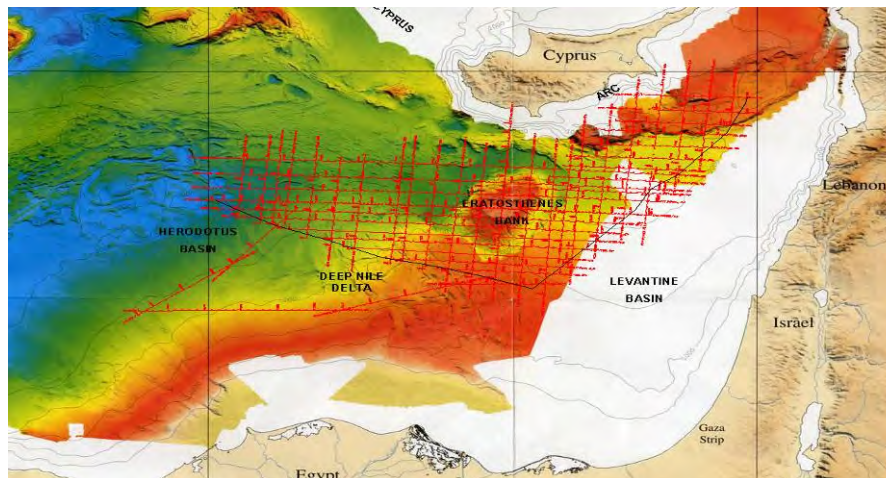
## Hydrocarbons Discoveries in the Vicinity (Egypt, Israel, Gaza)



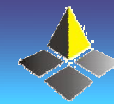
## Egypt – Hydrocarbons Production



## Promising Regional Geological Background



Republic of Cyprus



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# Cyprus – Explore the Unexplored

The Republic of Cyprus:

- The third largest island in the Mediterranean Sea
- An island at the crossroad of big international energy routes
- A strategic hub for business activities in the region
- A member of the European Union
- A bridge between Europe and Middle East



**Considers that the time has come to embark on hydrocarbon exploration in its Exclusive Economic Zone and to...**  
***Explore the Unexplored***



# International Agreements

## Arab Republic of Egypt

- Delimitation of the EEZ - Ratified by Law (2003)
- Framework Agreement concerning the development of cross-median line Hydrocarbon resources (2006)
- Confidentiality Agreement (2006)



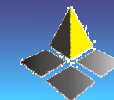
## Republic of Lebanon

- Delimitation of the EEZ (2007)



## Syria / Israel

- Negotiations under way with Israel and Syria



# Legal Framework

- The Contiguous Zone Law (2004)
- The Declaration of the EEZ Law (2004)
- Harmonization with Directive 94/22/EC of the European Parliament and Council concerning the Hydrocarbon prospecting, exploration and production activities
- The Hydrocarbons (Prospecting, Exploration and Exploitation) Law (2007)
- The Hydrocarbons (Prospecting, Exploration and Exploitation) Regulations (2007)
- Model Production Sharing Contract (PSC)



# Legal Framework

## Model Production Sharing Agreement

- Minimum exploration work program (2D/3D seismic surveys, number of exploration wells, depth, etc)
- Cost Oil/Gas Recovery (up to a maximum %)
- Profit Oil/Gas Sharing % (for oil according to production tiers and price; for natural gas according to production tiers)
- Signature and Production Bonus
- Minimum annual training budget
- Annual Surface Fees
- Performance Guarantee





# Exploration License Applications

## Application for an Exploitation License includes

- The designated development area applied for
- The Development and Production plan
- The Environmental Impact Assessment study

## Main Evaluation Criteria

- Technical and financial ability of the applicant
- Ways in which activities will be carried out
- Offered financial consideration
- Efficiency and responsibility (previous license)

***National security and public interest will also be taken into consideration***

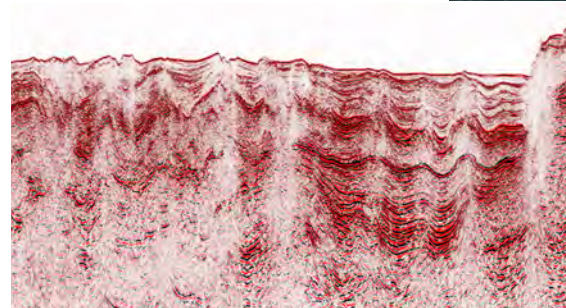
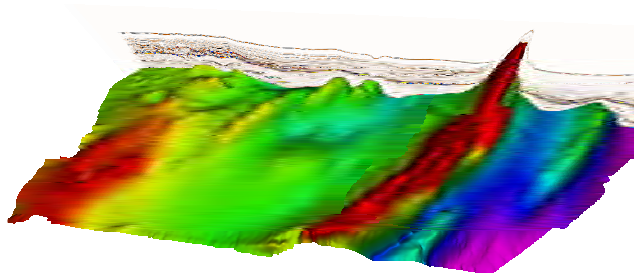
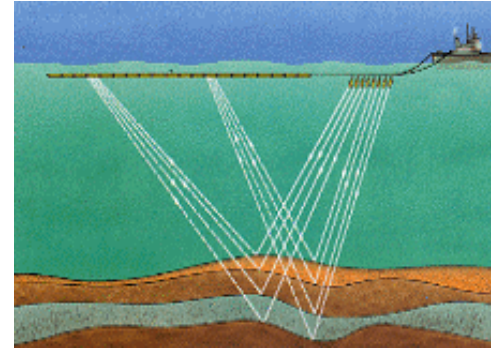




# Legal Framework – Types of Licenses

## Hydrocarbon Prospecting Licensing

- Granted for up to 1 year
- For a gross evaluation of the Hydrocarbon potential of the island by identifying geological structures
- Includes geophysical surveys, but no drilling



# Legal Framework – Types of Licenses

## Hydrocarbon Exploration Licensing

- Granted initially for up to 3 years; ability for two renewals of 2 years each (maximum 7 years)
- Includes gravity and magnetic surveys, 2D/3D seismic surveys, as well as exploration drilling
- On each renewal, at least 25% of the initial licensed area is relinquished
- In case of a discovery the licensee has the right to be granted an exploitation license for that discovery



# Legal Framework – Types of Licenses

## Hydrocarbon Exploitation Licensing

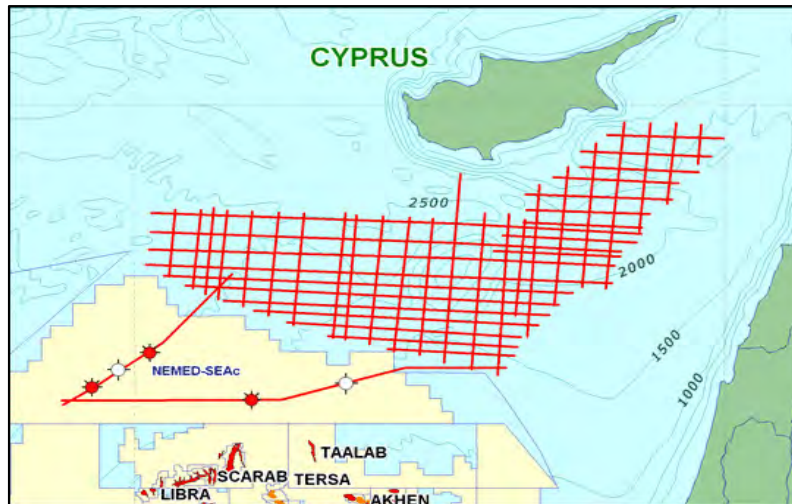
- Granted for an initial period of up to 25 years; ability for one renewal of up to 10 years
- During decommissioning, some production facilities (e.g. pipelines) may remain in place and can create an “artificial reef effect”, considered to be a beneficial impact



# Offshore Seismic Survey – 2006



## MC2D – CYP2006



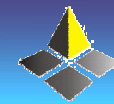
- Norway's PGS Geophysical acquired a multi-client 2-D survey consisting of 6,770 line-km of 2-D seismic in 2006
- The survey was acquired with the vessel M/V Falcon Explorer in an area of approximately 51,000 km<sup>2</sup> within the Exclusive Economic Zone of the Republic of Cyprus
- The survey provides high-resolution deep imaging (sub-salt) as well as ties to key wells in the NEMED Block (Egypt)
- 20 x 20 km 2D seismic grid





# Offshore Seismic Survey - 2006

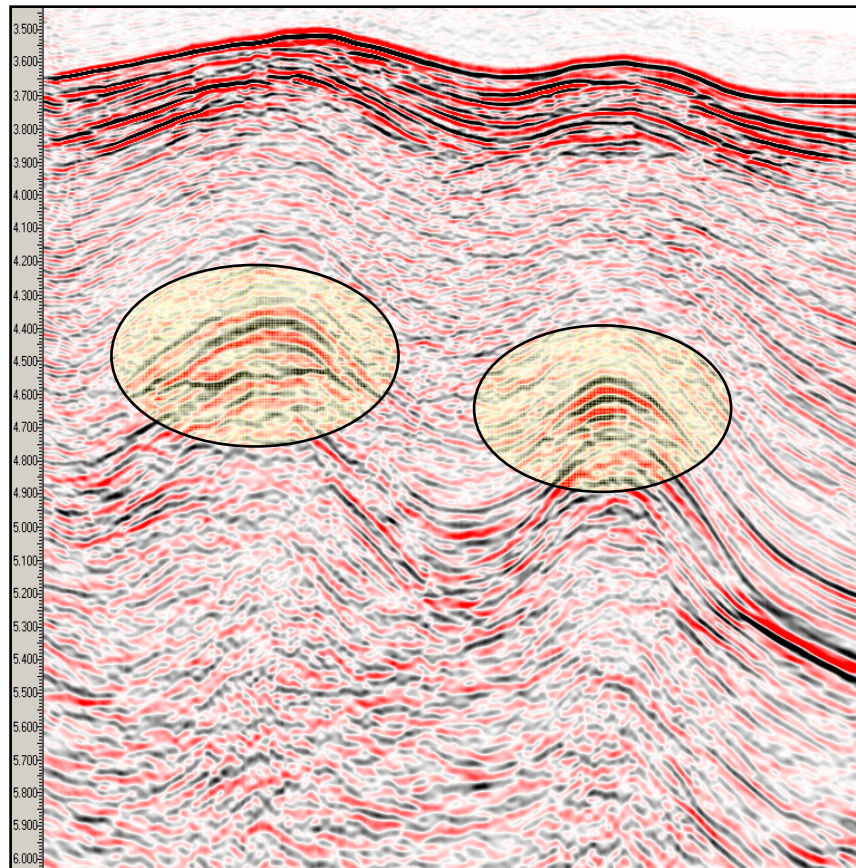
- Interpretation Report: “New Exploration Opportunities Offshore Cyprus: A Geological Interpretation Based on a New Regional 2D Seismic Survey (PGS, MC2D-CYP2006)”
- Prepared by Beicip-Franlab
- Part of the data package required to be purchased by companies interested in participating in the 1st Licensing Round Offshore Cyprus
- 4 volumes, 179 Figures, 37 Maps



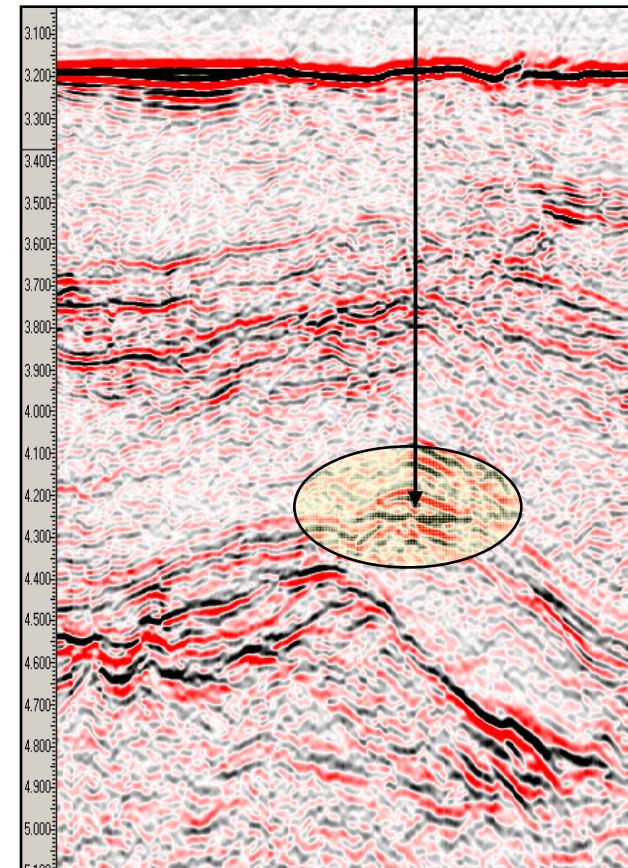
# MC2D-2006CYP

2D image: anticline structures with flat spots

Herodotus Basin (post-Messinian)



Shell discovery in NEMED block





# Strategic Environmental Assessment

- Republic of Cyprus has carried out a Strategic Environmental Assessment (SEA) to identify, describe and evaluate the likely significant effects on the environmental effects of implementing hydrocarbon exploration and exploitation activities
- Applicants are bound to follow and comply with the results and recommendations of the SEA

## Environmental Report

Strategic Environmental Assessment (SEA)  
Concerning Hydrocarbon Activities within the  
Exclusive Economic Zone of the Republic of Cyprus

26 September 2008



Republic of Cyprus

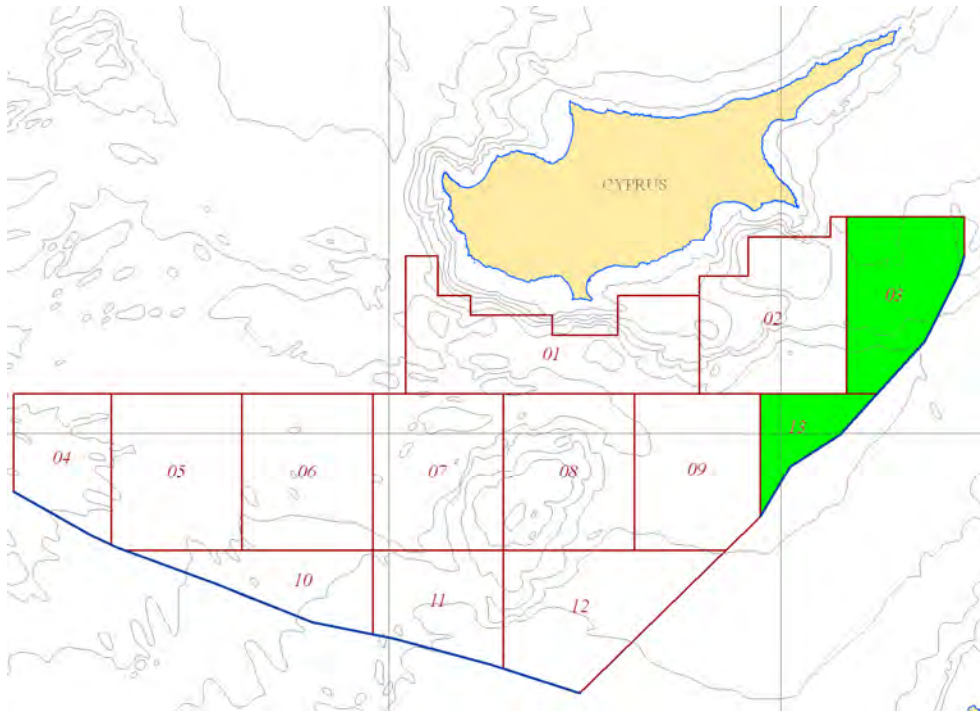


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# 1<sup>st</sup> Offshore Licensing Round

## Hydrocarbon Exploration Blocks

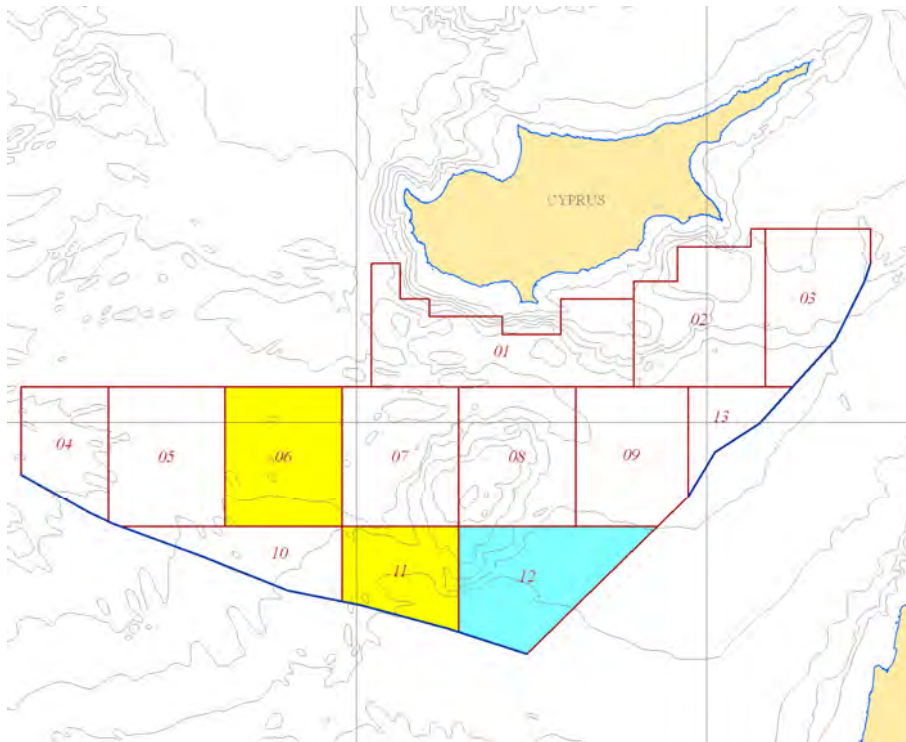


- Official opening: 15 February 2007
  - Closed: 16 August 2007
  - 11 Blocks (46,000 km<sup>2</sup>) were offered
  - Blocks 3 and 13 were excluded
  - MC2D seismic survey was conducted covering all Blocks (6,770 line-km)
- 
- Cumulatively, 40,000 line-km of 2-D seismic data were purchased by interested parties



# 1<sup>st</sup> Offshore Licensing Round – Results

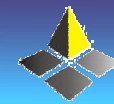
## Hydrocarbon Exploration Blocks



- Three applications were submitted (Blocks 6, 11 and 12)
- One from a company from the USA
- Two from a consortium of companies from the UK and the UAE

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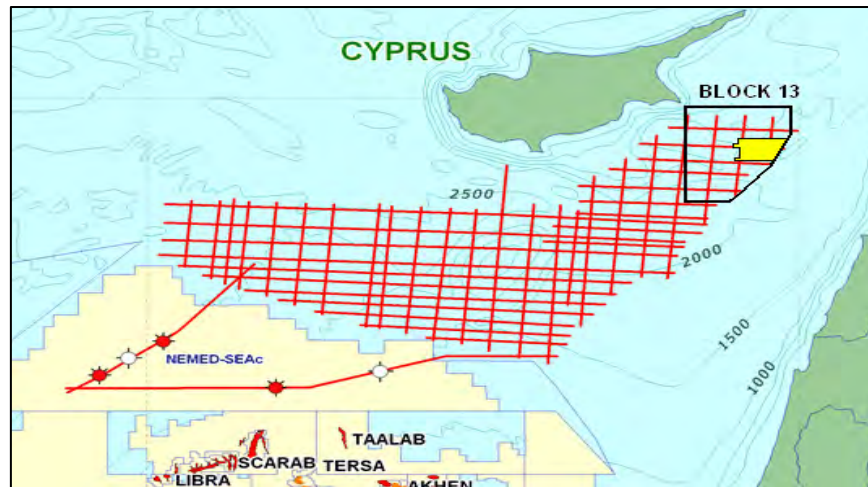
- A Hydrocarbon Exploration Licence was granted on October 2008 to Noble Energy International Ltd for Exploration Block No. 12 for an initial term of three years



# Offshore Seismic Survey – 2007



## MC3D – CYP2007



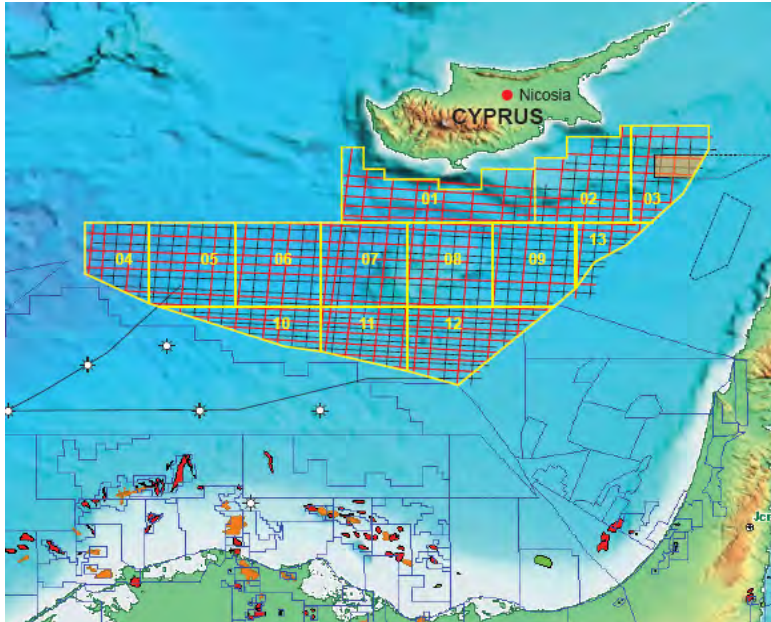
- PGS Geophysical acquired a multi-client 3-D in 2007 in offshore Cyprus: 659 km<sup>2</sup>
- The survey which was acquired with the vessel M/V Atlantic Explorer:
  - ✓ Identified several hydrocarbon indicators such as flat spots, bright spots and amplitude anomalies
  - ✓ Gave better understanding of intra Messinian and pre Messinian structures
  - ✓ Mapped out extremely well the Pre Messinian fault systems
- An Interpretation Report has been prepared by Beicip-Franlab



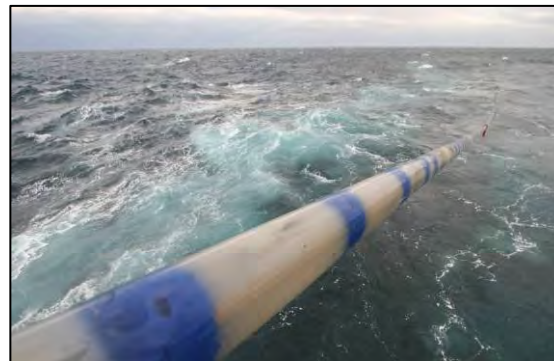
# Offshore Seismic Survey – 2008



## MC2D – CYP2008

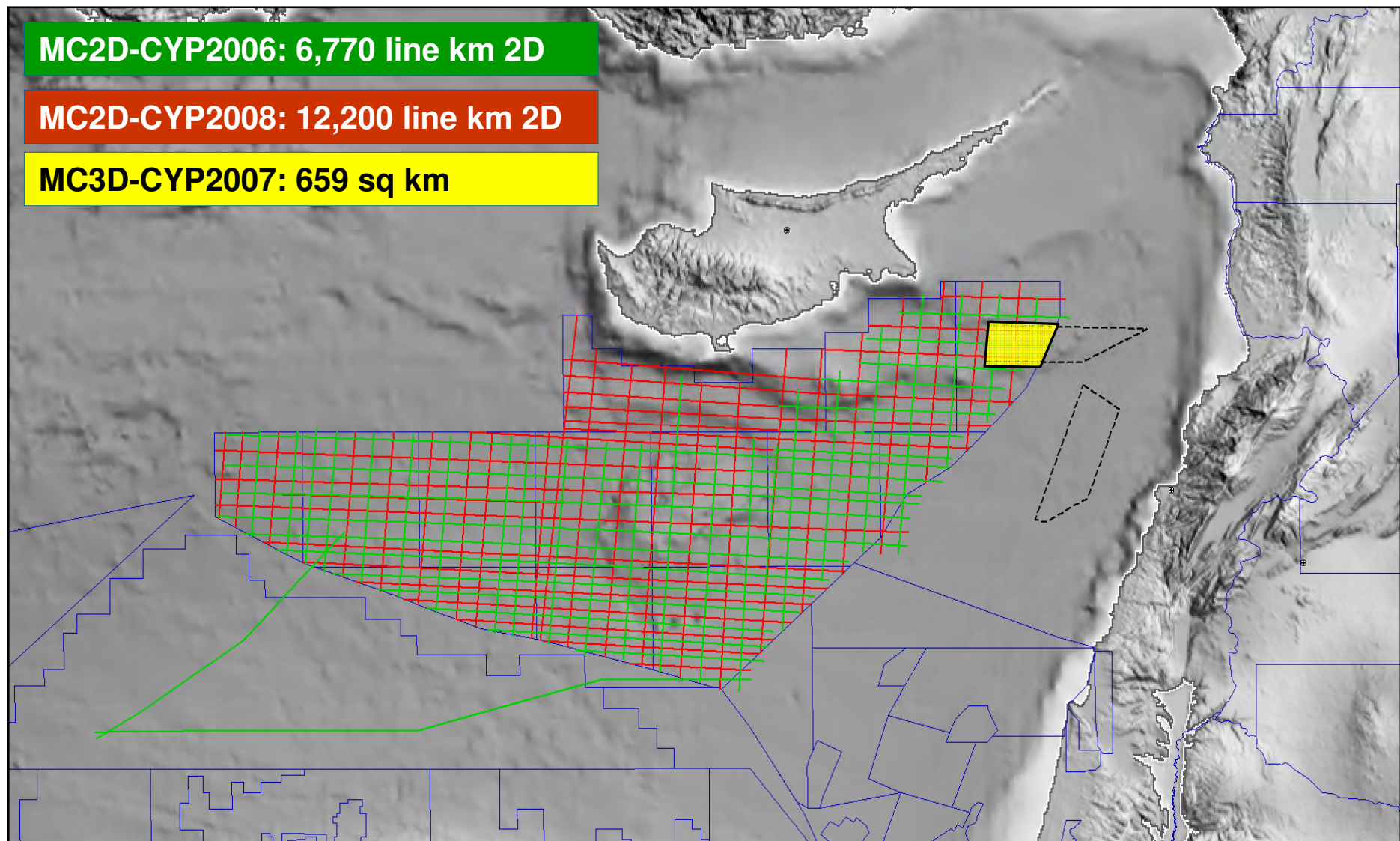


- About 12,200 line-km of 2-D seismic data with the vessel M/V Harrier Explorer
- New GeoStreamer® technology by PGS
- First biggest multi-client survey to use the GeoStreamer® technology
- Enhanced resolution
- Better penetration revealing deeper targets
- Improved operational efficiency
- 10 x 10 km seismic grid



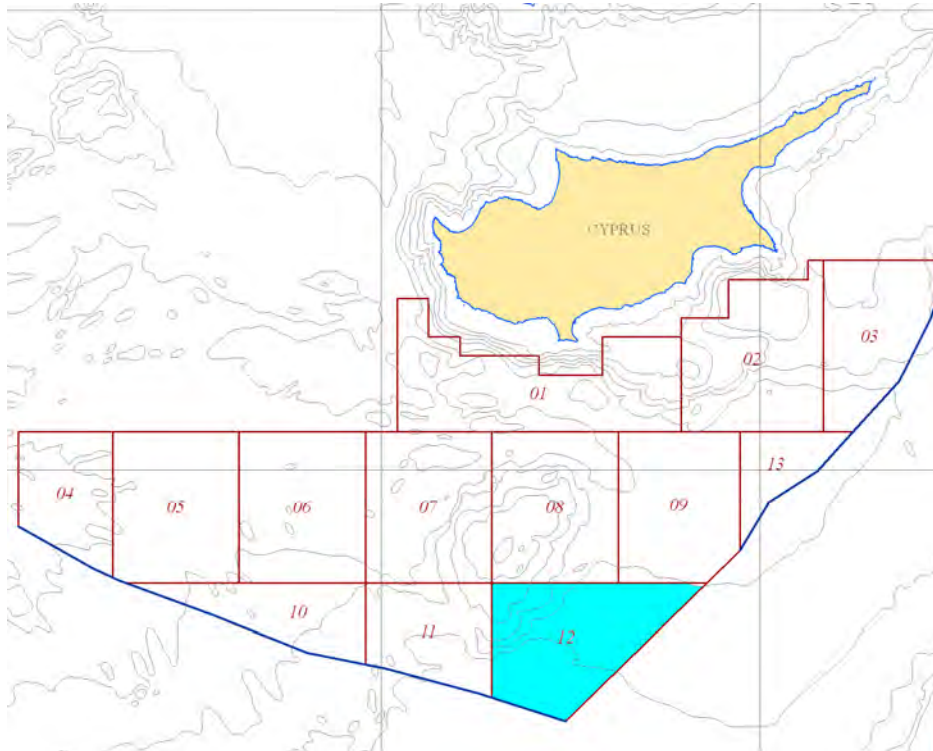


# Seismic Data Offshore Cyprus



# 2<sup>nd</sup> Offshore Licensing Round

## 2<sup>nd</sup> Licensing Round – 12 Blocks

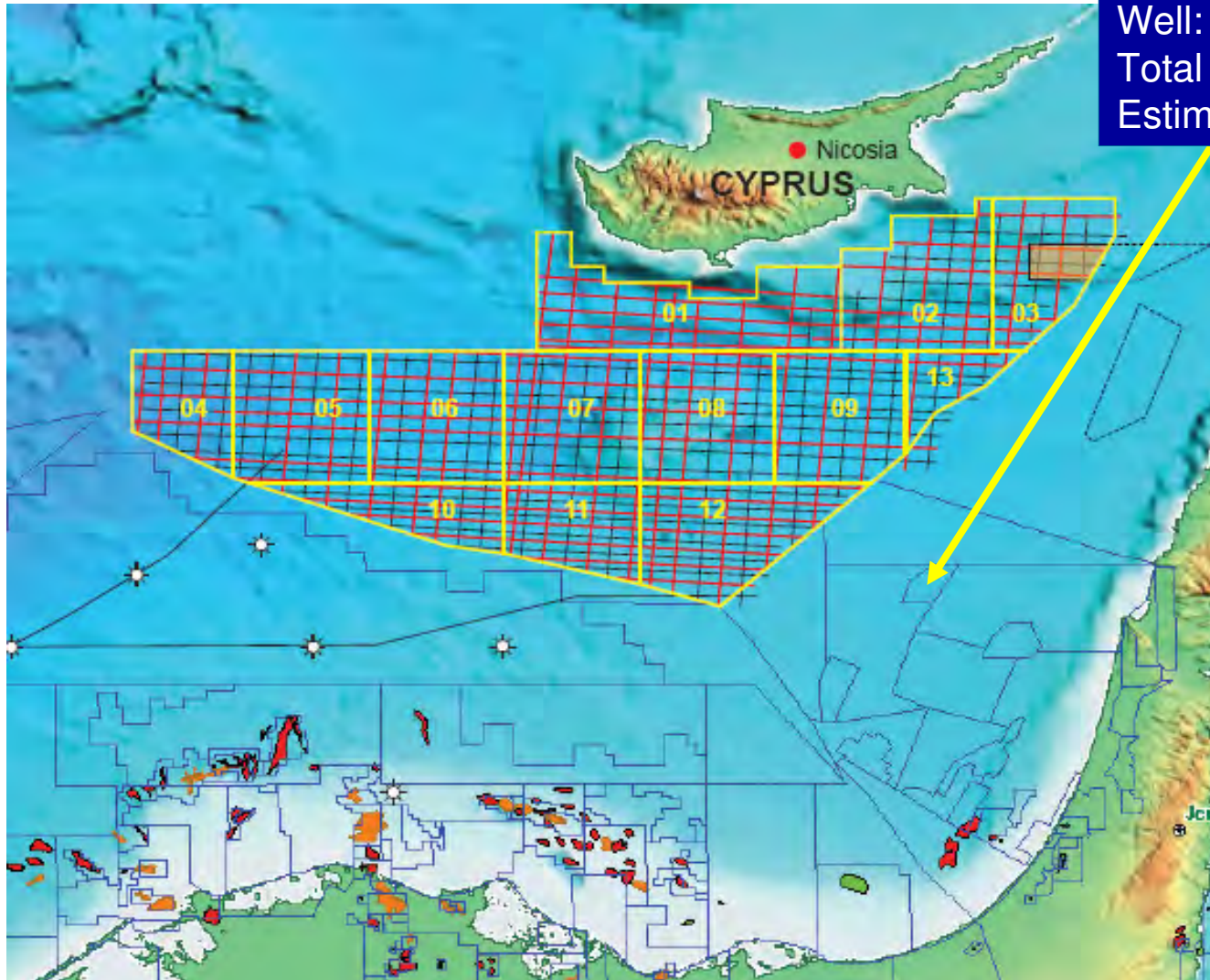


- The 2<sup>nd</sup> Licensing Round is envisaged to take place at the end of year 2009 / beginning of 2010
- Available data:
  - ✓ MC2D-CYP2006 survey data comprising 6,770 line-km
  - ✓ MC3D-CYP2007 survey data in Block 3 covering 659 km<sup>2</sup>
  - ✓ New MC2D-CYP2008 survey data comprising further 12,200 line-km
  - ✓ New 2D Interpretation Report
  - ✓ 3D Interpretation Report



# Noble's Discovery in Israel

Block: Matan (309)  
Well: Tamar  
Total depth: 16,076 feet  
Estimation: 7.5 TCF





# Noble's Discovery in Israel

Upstream, 23 January 2009

news

## Noble hits major Israeli pay zone

Deep-water gas strike rated as the biggest find for US explorer

WAIN ESALJ  
London

US INDEPENDENT Noble Energy has made what is a major play opening multi-trillion cubic feet gas discovery off Israel with its deep-water Tamar-1 wildcard. Tamar-1, identified in more than 400 feet of net pay in three high-quality Lower Miocene reservoirs, according to operator Noble.

It pointed out that "the thickness and quality of the reservoirs encountered were greater than anticipated at the well location". Noble said the gas reserves identified in the spill are substantial, at least equal to the pre-drill estimated gross mean resources of about 3.4 trillion cubic feet, which would make Tamar Noble's largest discovery to date.

A production test will be carried out once the sub-salt well, located in the Matan block that BG Group used to operate, has been completed.

Noble and its partners are also considering whether to retain the semi-submersible rig Amstar Hunter to drill up to two additional wells in the frontier Levantine basin where the nearest well control point is 97 kilometres away.

Delek Group, one of Noble's Israeli partners in the Tamar-1 wildcard, said the flow test is due to be completed early next month at a cost of about \$20 million.

If Tamar-1's test results are positive, then one of the follow-up probes could be an appraisal well.

The partners are also considering drilling a second sub-salt, Lower Miocene prospect.

A Noble spokesman said this proposed prospect does not lie in the Matan license but did not identify the specific block.

Tamar lies in about 5500 feet of water and was drilled to a total depth of 16,050 feet.

Commenting on the well results, Noble's chief executive Chuck Davidson said: "Tamar represents our first exploration well off Israel in more than five years, and we are extremely excited by the results. This is one of the most significant prospects that we have ever tested and appears to be the largest discovery in the company's history."

He said that Tamar's resource estimate could increase beyond 3.4 Tcf.

"We were also very pleased with the drilling operations of this well, despite the uncertain conditions that exist when drilling in a highly underexplored area," Davidson added.

Gideon Tadmor, chief executive of Delek Energy, the oil and

**TAMAR DISCOVERY**

**Spars and TLPs touted for Tamar development**

GAS from Noble's Tamar discovery, assuming it is commercial, will likely be piped to a landfall site about 90 kilometres distant in Israel, reports Wain Esalaj.

A Noble Energy spokesman said possible development options would draw on the company's experience in the Gulf of Mexico and West Africa.

He suggested that spars and tension-leg platforms could be considered as a potential host facility.

Another option would be to exploit Tamar via a batch of subsea wells tied back to a shallow-water host platform or direct to shore, similar to schemes employed by operators to exploit deep-water gas finds off Brazil's Sula Delta.

A research note from Houston-based investment house Tudor PricewaterhouseCoopers suggested the most likely development route would involve up to six subsea wells producing 300 million cubic feet per day to a shallow-water platform. It estimated the cost of this scenario at about \$1 billion.

Aviel Mor, chief executive of Israel-based consultancy Eico Energy, said the Tamar discovery will enhance Israel's security of energy supply.

Coal currently meets about 70% of Israel's energy demand with gas catering for the remainder. However, the Israeli government wants to boost the market share of gas to between 40% and 45% by 2020.

Eico Energy estimates that Tamar could meet about one-third of domestic gas demand through to 2020 with the remainder met by similar schemes to be developed in the future, mainly gas imports, production from domestic fields and the Yam Thetis and possibly gas from BG Group's long-dormant discovery off Gaza.

Israel is currently facing a gas shortage because Egypt is only supplying half of the 1.7 billion to 2.2 billion cubic metres per year that it is supposed to, said Mor.

rest in the Matan acreage and participated by domestic Israeli companies Enramco (at 26.75%), Delek Group (with 30.20%) and Bar Gas Exploration, a subsidiary of Aron Israel Gas, (at 4%).

Upstreamonline.com

Search the archive:

Israel finds

Upstream News: 23 January 2009

Noble's spokesman said the discovery of gas at Tamar has implications for gas potential off Cyprus where the US player has been awarded operation ship of Block 12. "We believe the play concept extends into Cypriot waters" said the spokesman.

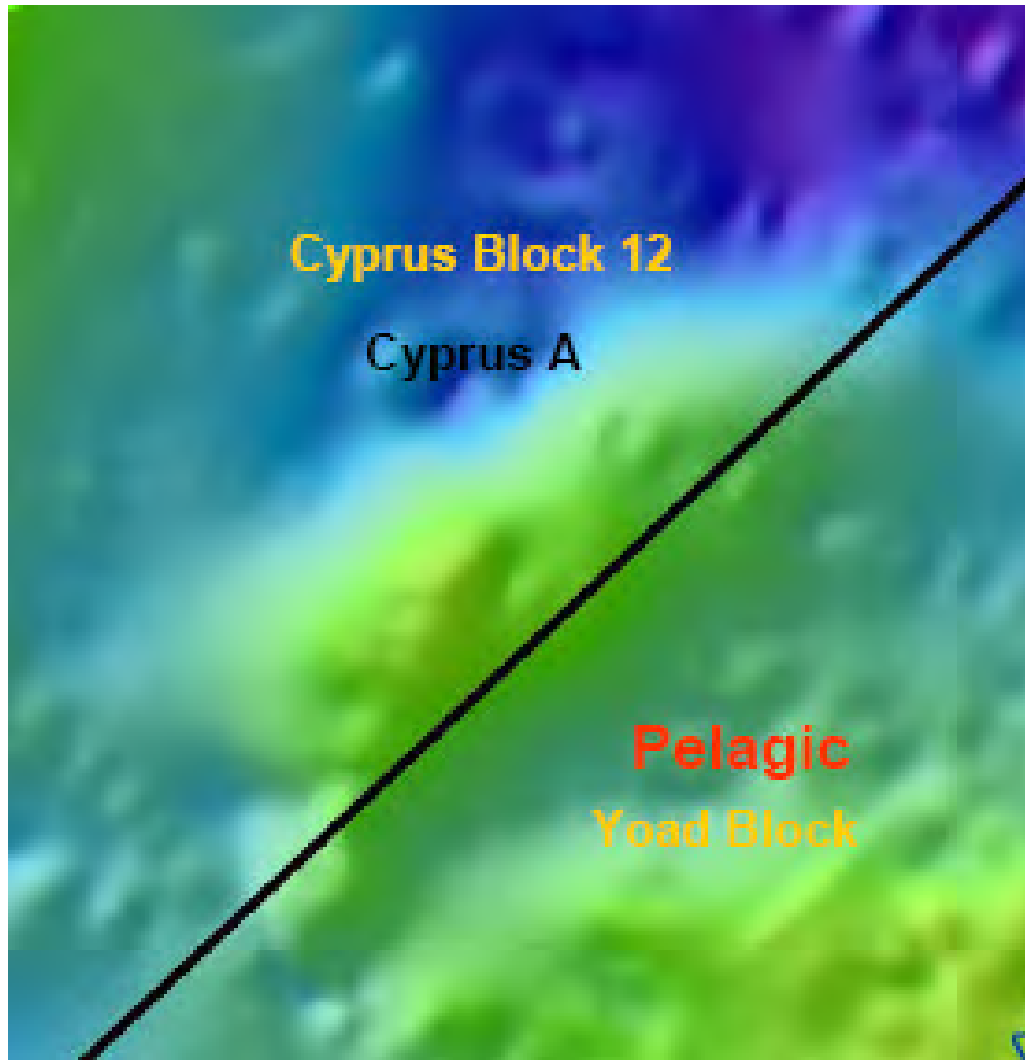


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# Cyprus Block 12



- Similar to Tamar in timing and structural style
- Large potential but needs 3D seismic to make drill ready



# Offshore Hydrocarbon Activities – Promotion



**North American Prospect Expo**

**Petroleum Exploration Conference & Exhibition**

**Society of Exploration Geophysicists Conference**

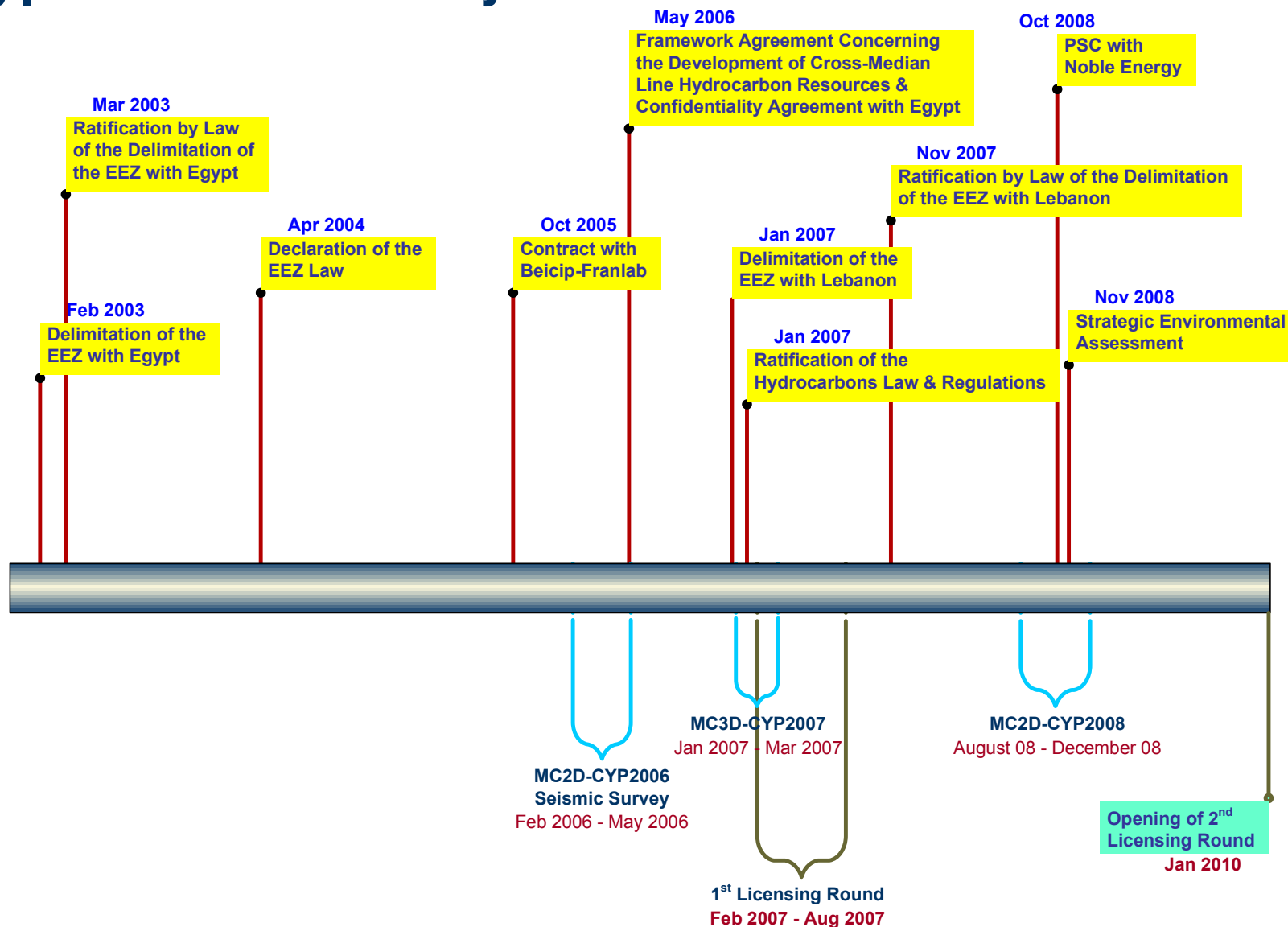


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# Cyprus Offshore Hydrocarbon Activities – Timeline



***Thank you for your attention !***



***Offshore Cyprus: A New Promising Area for Exploration***



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