

ΕΛΛΗΝΙΚΟΙ ΥΔΡΟΓΟΝΑΝΘΡΑΚΕΣ

Η Πορεία προς το Άνοιγμα της Πετρελαϊκής Αγοράς

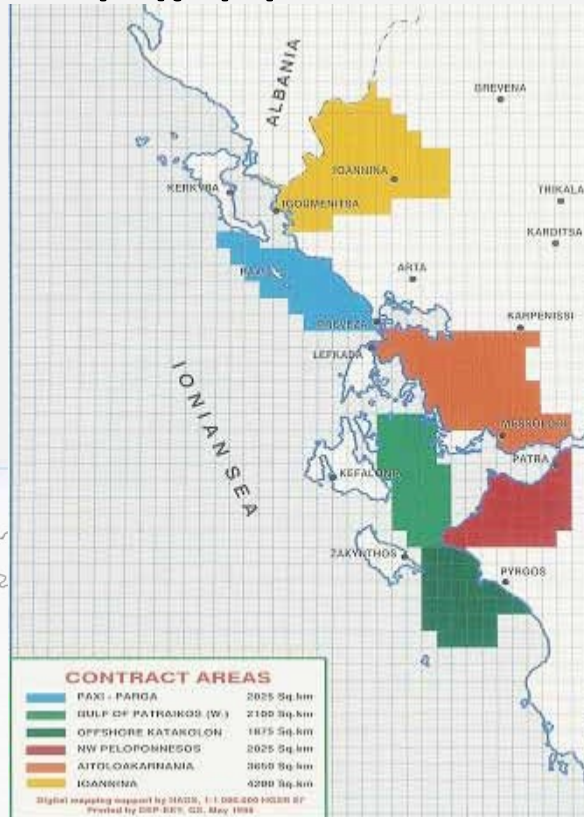
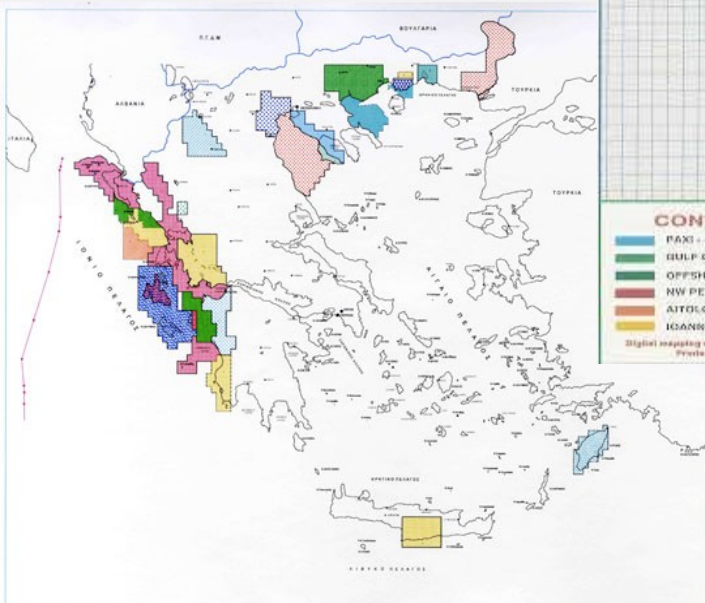


Σοφία Σταματάκη
Καθηγήτρια ΕΜΠ

Ιστορικό

1ος Γύρος Παραχωρήσεων 1996

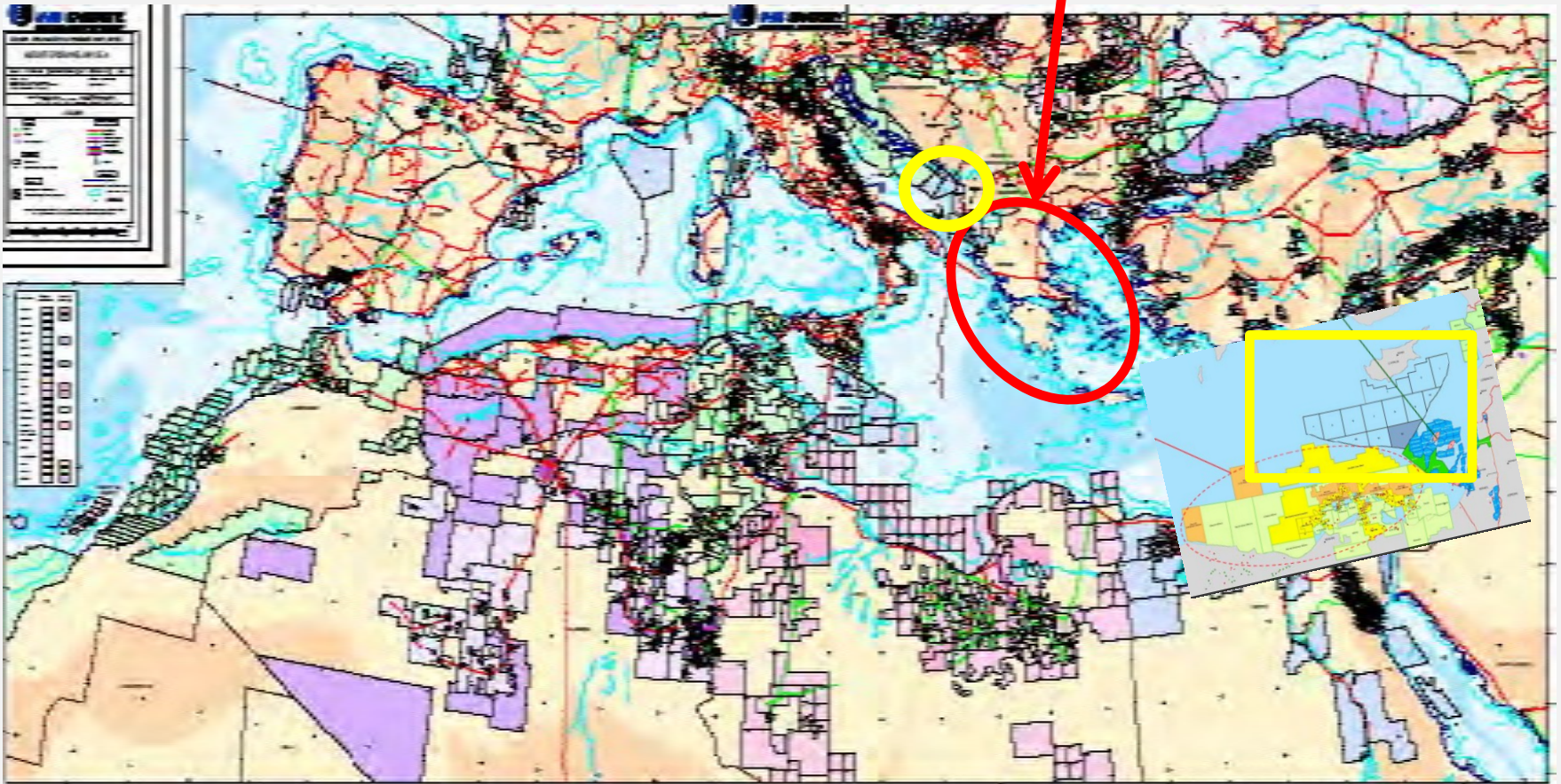
Παραχωρήσεις ΔΕΠ-ΔΕΠ-ΕΚΥ



Ανακαλύψεις-
Πιστοποίηση ενεργών
πετρελαϊκών
συστημάτων

1996-2011

Ανενεργή
δραστηριότητα



Source: IHS Report

Άνοιγμα Πετρελαϊκής Αγοράς

Α. Άνοιγμα Αγοράς (Απαιτήσεις & Προϋποθέσεις)

Νομικό-
Κανονιστικό -
Οικονομικό
Πλαίσιο

- ✓ Μακροοικονομική και δημοσιονομική **σταθερότητα**
- ✓ Διαφάνεια και κράτος δικαίου
- ✓ **Σταθερότητα** συμβάσεων αδειοδότησης
- ✓ Εφαρμογή σαφών κανόνων διαχείρισης & ελέγχου
- ✓ Ελαχιστοποίηση στρεβλώσεων του συστήματος
- ✓ Συμμόρφωση/ενσωμάτωση σχετικών διεθνών συμβάσεων

Θεσμούς
διαχείρισης

- ✓ **Συνέπεια και συνέχεια** στους αναπτυξιακούς στόχους
- ✓ Διαφάνεια & Αξιοκρατία διαγωνιστικών διαδικασιών
- ✓ Αποτελεσματική Εποπτεία & Έλεγχο συμβατικών υποχρεώσεων
- ✓ Ταχύτητα στην εξέλιξη εργασιών, στη διασφάλιση σχετικών αδειών, συντονισμό συναρμόδιων υπηρεσιών

Δράσεις

- ✓ Δημιουργία επενδυτικών ευκαιριών
- ✓ **Συνεχής διατήρηση** πετρελαϊκού ενδιαφέροντος- **Σταθερή χρονική** εξέλιξη δράσεων
- ✓ Διασφάλιση υψηλής ποιότητας δεδομένων
- ✓ **Συνεχής προώθηση** και αναβάθμιση των δυνατοτήτων της Χώρας

Αποτελέσματα

- ✓ Χορήγηση Αδειών Ε&Π (blocks)
- ✓ Χορήγηση Αδειών Αναζήτησης σε νέες περιοχές
- ✓ Επαύξηση ποιότητας και ποσότητας διαθέσιμης πληροφορίας σε συγκεκριμένες περιοχές ενδιαφέροντος

Άνοιγμα Αγοράς

Νομικό-
Κανονιστικό -
Οικονομικό
Πλαίσιο

Θεσμοί Διαχείρισης

Επεξεργασία
επικαιροποίησης
Νομικού πλαισίου

Επεξεργασία νόμου
ίδρυσης ΕΔΕΥ

Ολοκλήρωση

Ψήφιση ν. 4001

Δράσεις

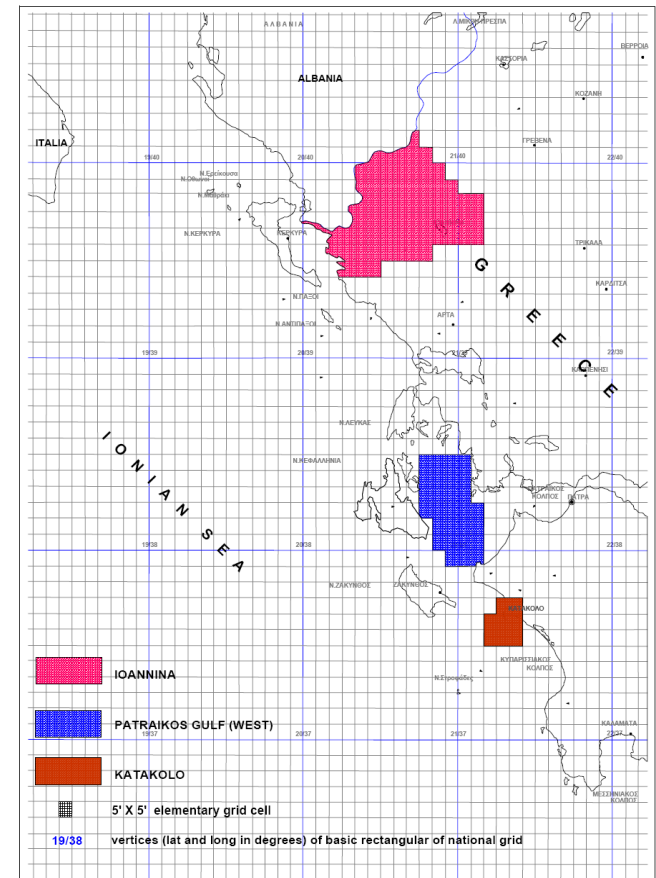
1. Σεισμικές έρευνες
Δ. Ελλάδα, Ν. Κρήτη

Δράσεις

2. Παραχώρηση
δικαιωμάτων Ε&Π
“Open Door”



AREAS UNDER CONCESSION IN WESTERN GREECE



Άνοιγμα Αγοράς

Δράσεις

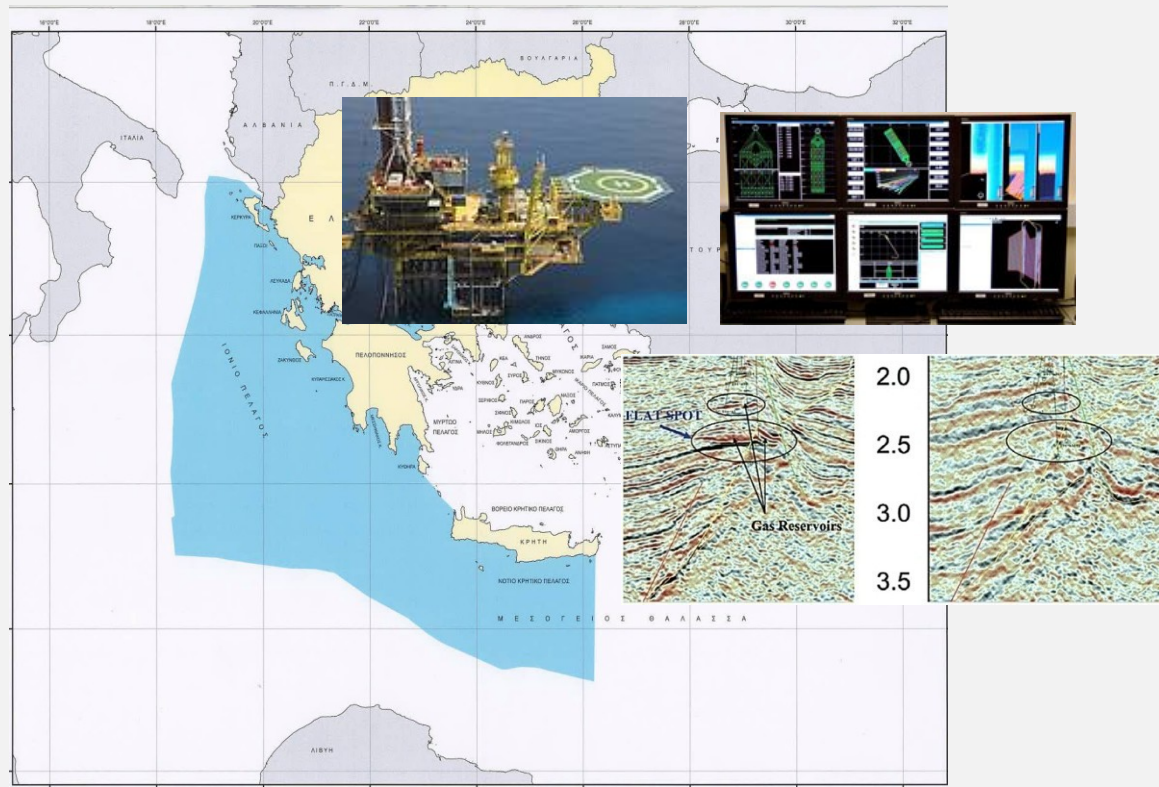
3. Παραχώρηση δικαιωμάτων Ε&Π “Θερμαϊκός” & “Ορφανός”

application submitted by Energean Oil and Gas SA and Ratio Oil Exploration Ltd for E&P (2.9.2013) has been accepted, leading to the opening of those areas to a licensing round.



Δράσεις

4. Προετοιμασία Γύρου Παραχωρήσεων Δ. Ελλάδα, Ν. Κρήτη



Άνοιγμα Αγοράς

Αποτελέσματα

1. Κατάρτιση/Υπογραφή συμβάσεων
2. Άμεσο Δημόσιο όφελος από αντάλλαγμα υπογραφής

Αποτελέσματα

5. Ολοκληρωμένο Σύστημα πληροφοριών για Δ. Ελλάδα & Ν. Κρήτη

Αποτελέσματα

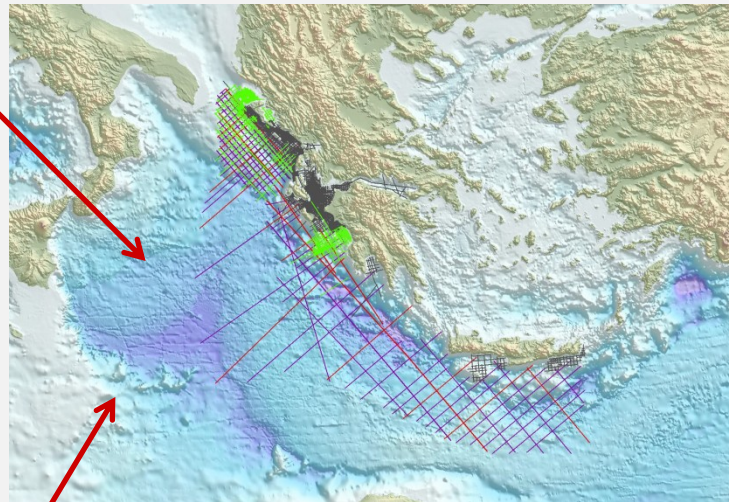
6. Άμεσο Δημόσιο όφελος από τα έσοδα διανομής των ερευνητικών δεδομένων

Αποτελέσματα

3. Νέα δεδομένα υψηλής ποιότητας σε Δ. Ελλάδα & Ν. Κρήτη

Αποτελέσματα

4. Παλαιά δεδομένα σε συμβατή μορφή στη Δ. Ελλάδα & Ν. Κρήτη



$$\% \text{ revenues} = f(\text{sales number})$$

Χρονική εξέλιξη δράσεων

ΘΕΜΑ	2011												2012												2013											
	Φεβ	Μαρ	Απρ	Μα	Ιουν	Ιουλ	Αυγ	Σεπτ	Οκτ	Νοε	Δεκ	Ιαν	Φεβ	Μαρ	Απρ	Μα	Ιουν	Ιουλ	Αυγ	Σεπτ	Οκτ	Νοε	Δεκ	Ιαν	Φεβ	Μαρ	Απρ	Μα	Ιουν	Ιουλ	Αυγ	Σεπτ	Οκτ	Νοε		
1.Επικαιροποίηση Νομικού-Κανονιστικού πλαισίου																																				
1.1. Μελέτη																																				
1.2 Προώθηση στη Βουλή- Ψήφισα ν. 4001																																				
2. Θεσμοί Διαχείρισης																																				
2.1. Μελέτη																																				
2.2 Προώθηση στη Βουλή- Ψήφισα ν. 4001																																				
3. Δράσεις																																				
3.1. Σεισμικές Ερευνες Δ. Ελλάδα, Ν. Κρήτη																																				
3.1.1. Προετοιμασία προκήρυξης διαγωνισμού																																				
3.1.2. Δημοσίευση ΕΕ																																				
3.1.3. Κατάθεση Προσφορών																																				
3.1.4. Αξιολόγηση Προσφορών-Διαπραγμάτευση																																				
3.1.5. Κατάρτιση σύμβασης																																				
3.1.6. Υπογραφή σύμβασης																																				
3.1.7. Οργάνωση εργασιών																																				
3.1.8. Παρακολούθηση λήψης δεδομένων																																				
3.1.9. Παρακολούθηση επεξεργασίας δεδομένων																																				
3.2. Διαγωνισμός "Open Door"																																				
3.2.1. Προετοιμασία προκήρυξης διαγωνισμού																																				
3.2.2. Προετοιμασία πακέτων δεδομένων																																				
3.2.3. Δημοσίευση ΕΕ																																				
3.2.4. Προώθηση περιοχών-Επαφές με εταιρείες																																				
3.2.5.Στρατηγική Μελέτη Περ. Επιπ.																																				
3.2.6. Κατάθεση Προσφορών																																				
3.2.7. Αξιολόγηση Προσφορών																																				
3.2.8. Διαπραγμάτευση																																				
3.2.9. Ανακοίνωση προτιμητέων αναδόχων																																				
3.2.10. Κατάρτιση τελικής σύμβασης																																				
3.2.11. Υπογραφή σύμβασης																																				
3.3. Διαγωνισμός για "Θερμαικό" & "Ορφανό"																																				
3.3.1. Εκδήλωση ενδιαφέροντος																																				
3.3.2. Αποδοχή ενδιαφέροντος																																				
3.3.3. Προετοιμασία πακέτων δεδομένων																																				
3.3.4. Προετοιμασία προκήρυξης διαγωνισμού																																				
3.4. Προετοιμασία Γύρου Παραχωρήσεων																																				

Συνέχεια-Συνέπεια-Σταθερότητα

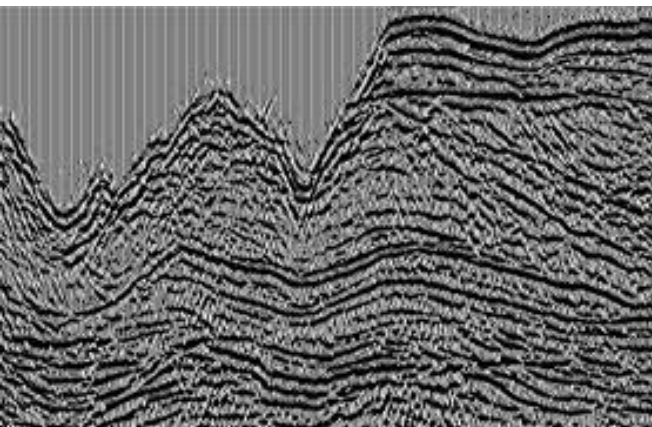
Συνέχεια-Συνέπεια-Σταθερότητα

Β. Οργάνωση Γύρου Παραχωρήσεων

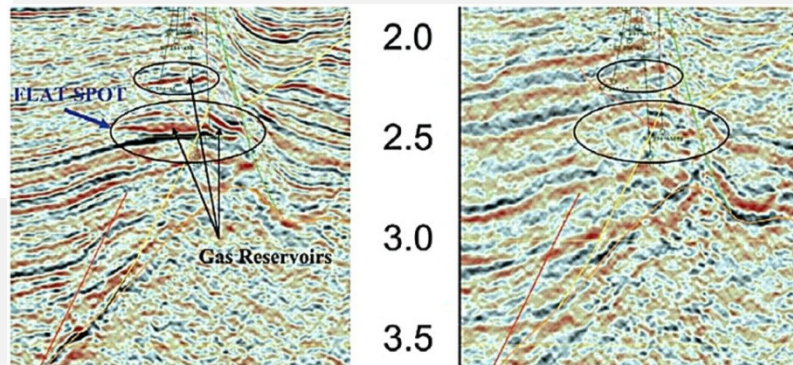
Οργάνωση Γύρου Παραχωρήσεων



Data processing
and technology

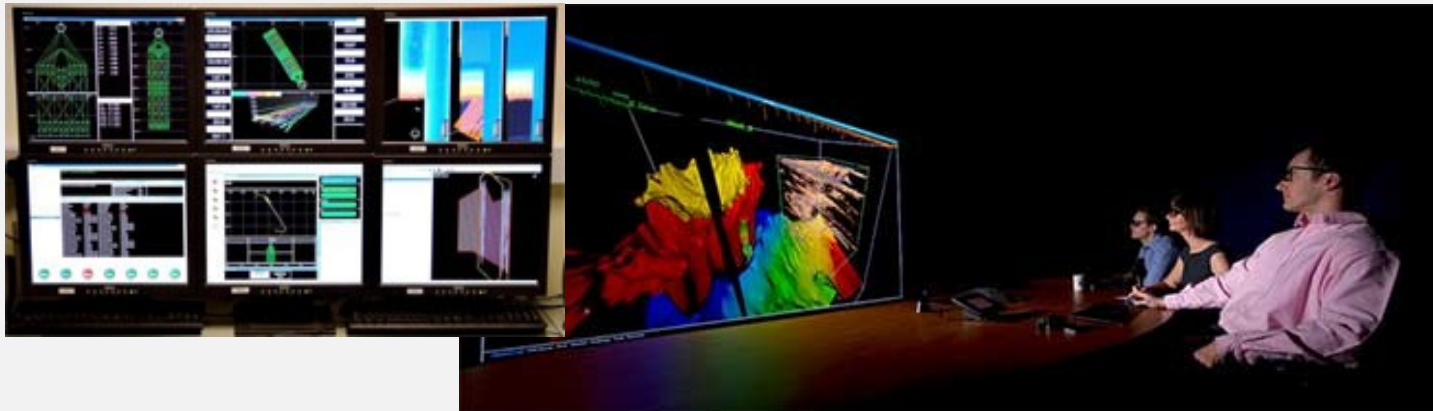


- Ολοκλήρωση επεξεργασίας νέων δεδομένων
- Επανεπεξεργασία 9.000 χιλ. παλαιών σεισμικών γραμμών
- Ολοκληρωμένο Σύστημα Δεδομένων (Παλαιών + Νέων)-**Greece Mega Project**
- Ολοκλήρωση ερμηνείας νέων δεδομένων
- Εκπόνηση μελέτης εκτίμησης πετρελαιοδυναμικότητας (petroleum assessment) της περιοχής

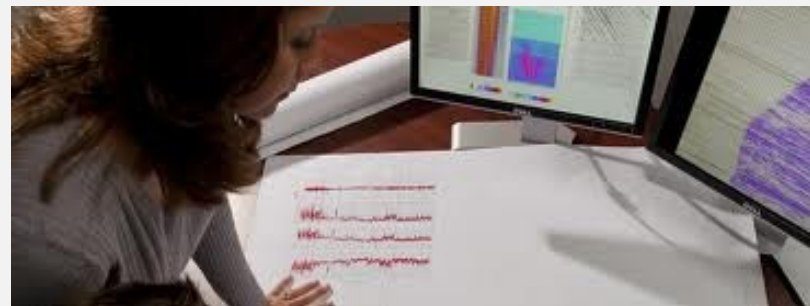


● Εγκατάσταση εξοπλισμού και Λειτουργία Data Room στο ΥΠΕΚΑ

- Απευθείας σύνδεση και συνεχής μεταφορά δεδομένων από Όσλο και Χιούστον



- Διαμόρφωση κανόνων πρόσβασης στο Data Room

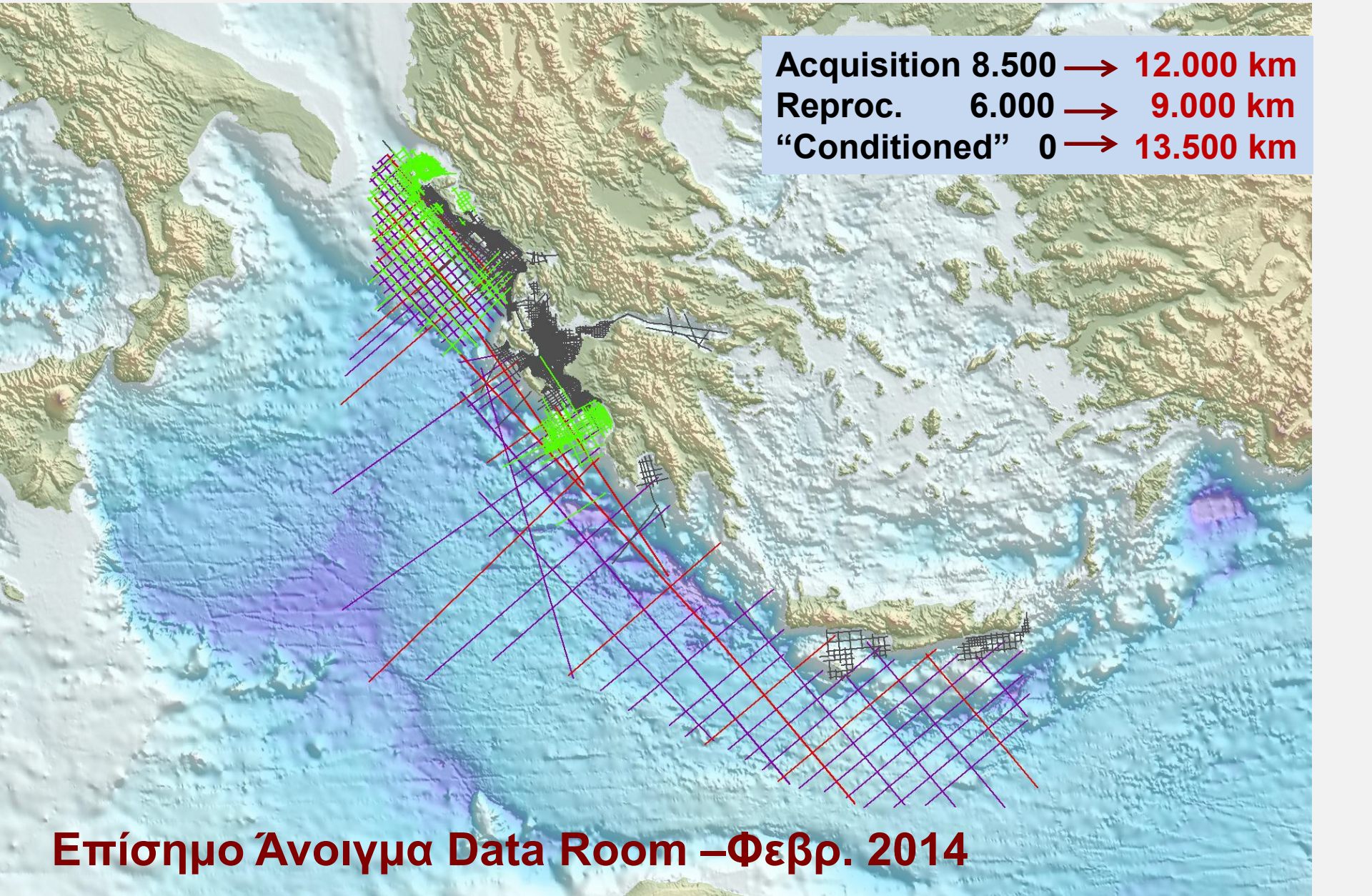


● Λειτουργία Data Room σε Χιούστον και Λονδίνο



Οργάνωση Γύρου Παραχωρήσεων

Greece Mega Project (34.500 km seismic lines)



The map shows the Greek archipelago and the surrounding Aegean and Ionian Seas. Numerous seismic survey lines are overlaid on the map, primarily concentrated in the Aegean Sea and around the islands of Crete and Rhodes. The lines are color-coded: red for acquisition, green for reprocessing, and purple for conditioned data. The lines form a dense grid in some areas, particularly around the islands of Crete and Rhodes, and are more sparse in other areas.

Acquisition	8.500	→	12.000 km
Reproc.	6.000	→	9.000 km
“Conditioned”	0	→	13.500 km

Επίσημο Άνοιγμα Data Room –Φεβρ. 2014

Οργάνωση Γύρου Παραχωρήσεων

● Εμπορία δεδομένων



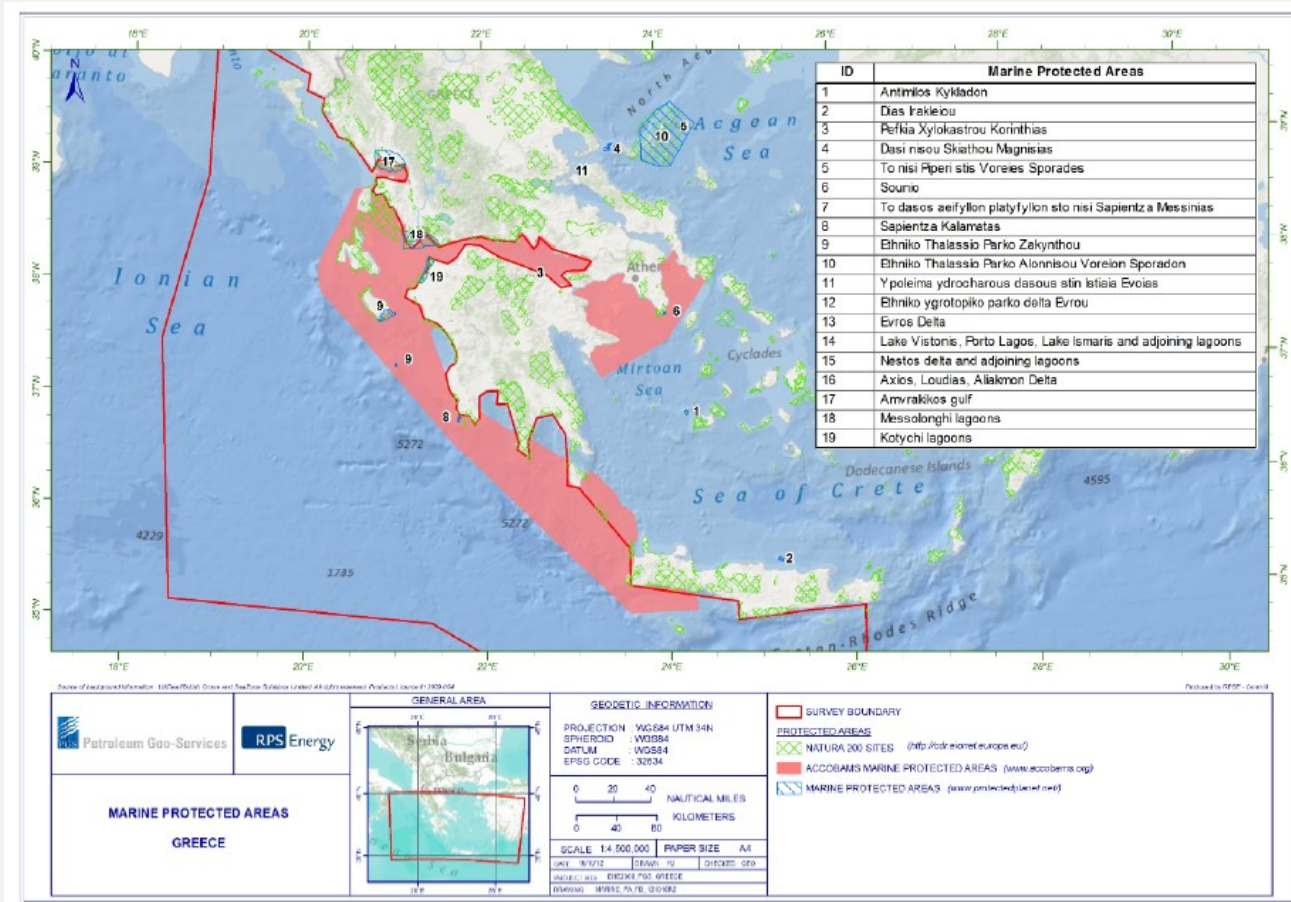
PGS office at Houston



PGS office at Oslo

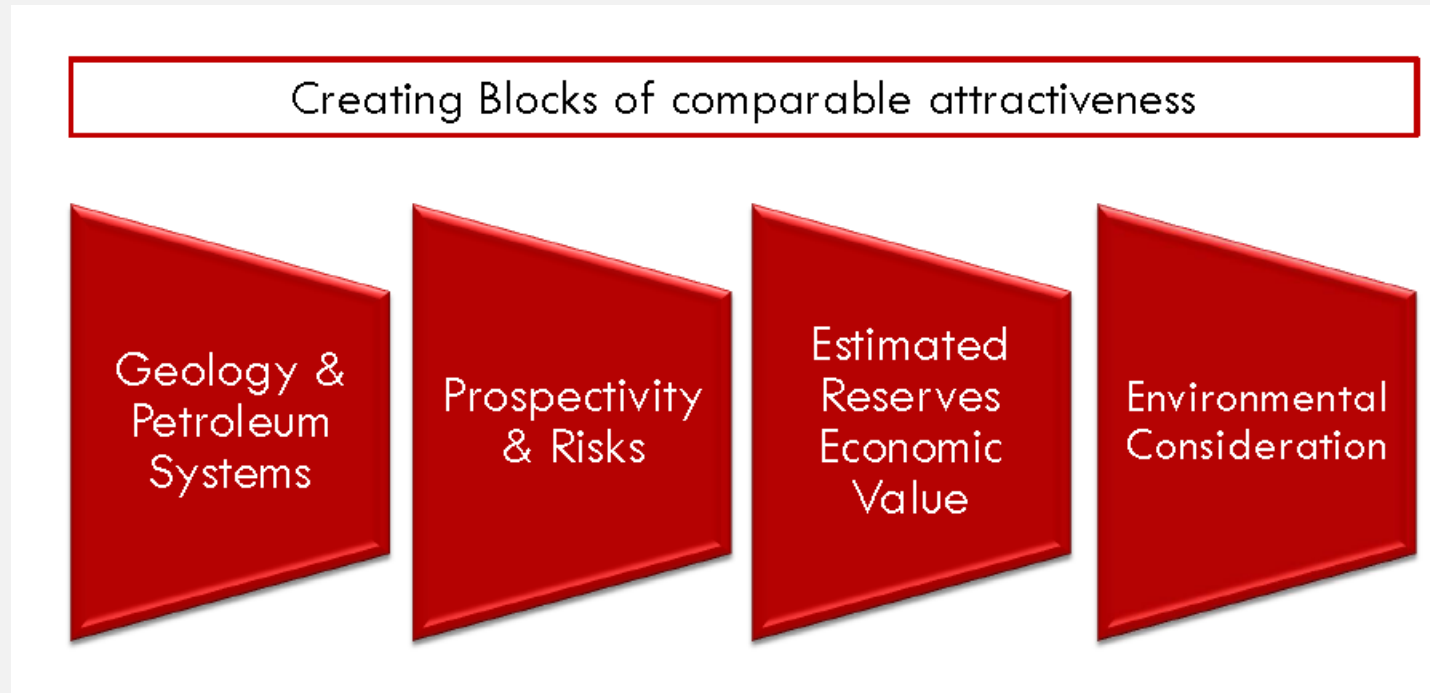


Εκπόνηση Στρατηγικής Μελέτης Περιβαλλοντικών Επιπτώσεων – Προσδιορισμός ευάλωτων περιοχών



Ενσωμάτωση Κοινοτικής Οδηγίας για ασφάλεια υπεράκτιων δραστηριοτήτων στην εθνική νομοθεσία

● Οριοθέτηση των blocks



● Διακήρυξη (κριτήρια συμμετοχής, όροι, προϋποθέσεις, ανταγωνιστικά σημεία, διαδικασία αξιολόγησης)

Οργάνωση Γύρου Παραχωρήσεων

Πρωώθηση Γύρου Παραχωρήσεων (events to participate or to organize)

Shell, Total, Chevron, ENI, EON , Exxon, Noble, Repsol, OMV.....



Apex Regional 2013 - Athens, Greece



Apex Regional 2013 - Athens, Greece



The 2014 Licensing Round

Why is that worth your time and money?

The 2014 Licensing Round focuses on frontier offshore areas of Western Greece and South of Crete. Known oil and gas discoveries in related geological formations in Italy, SE Adriatic and Albania meet with convincing structural and stratigraphic analogues, oil shows, seeps and the Karakiston discovery in Western Greece. The Ionian zone and the Paxi zone (regarded as the east Apulian margin) with working oil systems, create an eye-catching investment opportunity for oil and gas exploration and production. The area South of Crete also presents with evidence and clues of promising opportunities for upstream E & P.

Available Data

12,500 km of new 2D Geostreamer GS seismic data (MultiClient PGS)
12,500 km of new Grav/Mag data (MultiClient PGS)
6,000 km minimum legacy seismic lines (reprocessed through PGS)
Reconditioned legacy seismic lines (Hellenic Hydrocarbons Archive)
Well data (Hellenic Hydrocarbons Archive)

Time Schedule

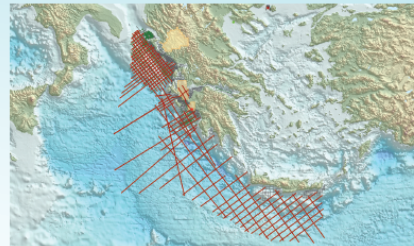
Acquisition of new data completed in March 2012.
Processing and reprocessing to be completed by end of 2013.
Interpretation of data will be completed by end of March 2014.
Notification to the EU Gazette is scheduled for June 2014
Launch of the Round in the Q3 of 2014.

A dedicated Data Room will open in Athens and London in Q1 2014

For updates and more, log in : www.apex.gr (see section energy + hydrocarbons)
Contact persons : athens@apex.gr / athens@apex.gr / athens@apex.gr
georgia.levridou@apex.gr

Compiled by Dr. G. Tefenklidis & Dr. S. Bekas (2013)

New Horizons to Hydrocarbons Exploration



Dear APPEX Participant,

Upgrading Greece's upstream and midstream hydrocarbon sector is a main priority for our Government. The Ministry of Environment, Energy & Climate Change has been working hard to create a modern and transparent framework for mutually beneficial investment opportunities.

12,500 km of new multi-client 2D seismic data acquired by PGS in 2013 in offshore Western Greece and South of Crete, the successful Open Door E & P tender for 3 blocks in offshore and onshore Western Greece, the initiation of a tender procedure for offshore areas in Thessaloniki and Orfanos Gulfs in Northern Greece and the expression of interest by large oil companies are a clear vote of confidence to our oil & gas potential and policies.

I call you to join us in the exploration and exploitation of the hydrocarbon potential of Greece and I invite you to participate in the Official Licensing Round in offshore Western Greece and South of Crete which will be announced by the mid 2014.



We are fully committed.

The Minister
Prof. Yannis Maniatis

Greece Oil and Gas Exploration and Production Prospects

The Oil and Gas Past in Greece

Oil Exploration in Greece goes back to the late '30s. In the '60s the Greek State and its advisor I.F.P. conducted geologic studies and exploratory wells. More exploration work in the '70s led to Pirinos oil & gas field and in the '80s to the Iakentia oil and 'Epanomi' gas discoveries. In 1993 the first Licensing Round was launched while further exploration work and surveys continued up to 2000. Pirinos is till today a producing oil field.

Current Oil & Gas Framework

Since 2010 a new chapter in oil and gas E & P commenced. The 1993 hydrocarbons law (Law 2289) that adopted EU directive 94/22/EC, was extensively modernized in 2011 (Law 4001). The new framework offers an investment friendly platform, incorporates developments & international best practices and introduced the competent state authority for upstream licensing (Hellenic Hydrocarbons Resources Management S.A. or HHRM SA). HHRM will assume full function in the very near future.

The adopted Concession scheme is royalty – tax based, with R factor ranging from 2% to 20% and corporate tax rate at 20% plus 3% regional tax. Lease agreements are 23 years long with optional 3 + 5 year long extensions.

The oil and gas block tender procedures take the form of a Licensing Round, Open Door invitation and Accepted Individual Initiative.

HSE Obligations

Greece is committed to all relevant international protocols, agreements and EU legislation, actively encouraging best oil practices and adopting the 2013/30/EC Off Shore Safety Directive. The protection of the tourist, product and unique environmental heritage is a common goal to positively involve the local communities.

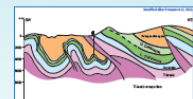
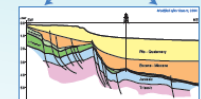
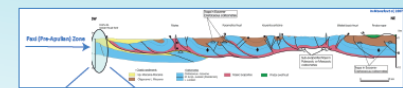
The 2012 Open Door Tender

The 2012 Open Door tender procedure brought international E & P experts convinced on Greece's oil and gas potential. The Ionian onshore, West Peloponnese and Iakentia offshore tendered blocks' preferred bidders are on course to signing Lease Agreements (LoA).

News Flash

The Ministry accepted in October 2013 an application for offshore areas in Thessaloniki and Orfanos gulfs (Northern Greece – Central Macedonia Region) leading to a new tender. Log in for more info.

Geology of Offshore Western Greece

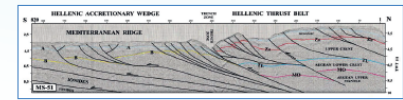


Ionian analogue, Apulian west, Apulia Field

W. Greece belongs to the Alpine-Mediterranean Orogenic belt (Alps, Dinarides, Albanides, Hellenides). The External Hellenides are part of this thrust and fold belt system.

Analogue from S. Albanian Ionian zone, Odrina Field

Play types are controlled by thrust belt tectonics and related foreland basins in the NW and W part, while the accretionary prism and Mediterranean ridge of the Hellenic subduction zone dominate to the S and SW Greece.



Οργάνωση Γύρου Παραχωρήσεων

● Προώθηση Γύρου Παραχωρήσεων (events to participate or to organize)



Μάρτιος 2014



Απρίλιος 2014



Απρίλιος 2014



Greek Oil & Gas Pavilion
Λονδίνο, Χιούστον
Μάιος 2014

Σεπτ. 2014



EXPLORATION

A Fresh Look: Exploring the Oil and Gas Potential of GREECE

ØYSTEIN LIE, JÖRN FÜRSTENAU
Petroleum Geo-Services (PGS), and
SPYRIDON BELLAS, GEORGIOS TSIFOUTIDIS
Greek Ministry of Environment, Energy and Climate Change

Greece is preparing for a new offshore license round. The nearby Italian and Albanian discoveries and fields may be valid analogues since they share much of their geological history with offshore Greece.

Exploration Activity in Greece

Exploration work in Greece began in the late 1930s. In the 1960s, the Greek State and its advisor I.F.F. conducted geologic studies that resulted in the drilling of two exploratory wells targeting the top carbonates and the pre-Triassic evaporite sequence (IGRS-IFP, 1966). In the late 1970s the Prinos oil and gas field was discovered and then in the 1980s more exploration work carried out by the Public Petroleum Corporation of Greece (DEP, DEP-SKY) led to the Katakolon and Epanomi oil and gas discoveries. In 1995 the first Licensing Round was launched with further onshore and offshore exploration work and surveys in four concession areas continuing until 2000. The 2012 'Open Door Invitation' for blocks onshore Ioannina, offshore West Patraikos Gulf and Katakolon in Western Greece attracted several international and domestic operators and partners. Currently, Greece has offshore oil and gas production in the Kavala and Prinos fields in the Northern Aegean Sea.

Geological Overview and Petroleum Systems

Western Greece belongs to the Hellenides, part of the Alpine Mediterranean Orogenic Belt (Alpes, Dinarides, Albanides, and Hellenides). The External Hellenides consist of north-north-west to south-south-east trending geotectonic zones that are part of the fold and thrust belt system of Western Greece (Marnett et al., 2007). After vast deposition

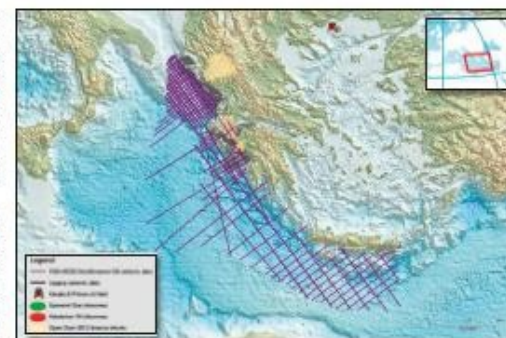
of Triassic evaporites and platform carbonates, basin development began in the Early Jurassic due to crustal extension affecting the southern Tethyan margin. To the west, play types are controlled by thrust belt tectonics and related foreland basins, while to the south and south-western offshore play types are controlled by the Hellenic accretionary prism, including the forearc and Mediterranean ridge of the Hellenic subduction zone.

Petroleum Geo-Services (PGS) in collaboration with the Greek Ministry of Environment, Energy and Climate Change conducted a 12,500 line km offshore 2D MultiClient GeoStreamer GS™ seismic survey during late 2012 to early 2013 which included the Ionian Sea, West Peloponnese, and South of Crete with total area coverage of 225,000 km². GeoStreamer GS acquisition technology increases data bandwidth and improves illumination of deeper targets. Marine gravity and magnetic data were also acquired and will be integrated into the interpretation work.

At least 6,000 km of key legacy data lines are being reprocessed to complement and enhance the new seismic coverage in shallow/coastal areas and deep/offshore stratigraphy. Seismic data processing of the PGS data continues with the PSTM stacks available by the end of 2013. All of the data, including vintage 2D data, will be conditioned and matched into the Greece MegaProject which will form the basis for the seismic interpretation and data packages for the 2014 bid round.

The Ionian geotectonic zone is the outermost deformed part of the External Hellenides fold and thrust belt. It comprises three stratigraphic sequences documenting the evolution of the Ionian from a neritic carbonate platform environment to a pelagic basin that are attributed to pre-, syn-, and post-rift stages (Karakostas, 2003). The lowermost sequence consists of a thick Triassic evaporite series. In parts brecciated, overlain by Upper Triassic to Lower Jurassic shallow-water limestones. The syn-rift sequence reflects a general deepening of the area, i.e. the formation of the Ionian Basin, with shales (Posidonia) and limestones being deposited into differentiated basins with half-graben geometries and subject to differential subsidence. The post-rift sequence consists of Lower Cretaceous to Eocene basinal limestones and paleo-marginward thickening brecciated limestones overlain by a clastic succession of uppermost Eocene to Lower Miocene (Flysch deposits, Bellas et al., 1995; Bellas, 1997), a Mid-Miocene molassic series and younger sediment cover.

The Katakolon oil discovery located in Upper Cretaceous to Paleocene/Eocene carbonate reservoirs of the Ionian Zone is sealed by Plio-Quaternary shales. The Albanian Marinze discovery may serve as an analogue here, extending the area of interest from Western Peloponnese in the South up to the Northern tip of Western Greece. North-west Greece offers folded and well-sealed anticlines. Similarities are seen in the Albanian Delina gas condensate discovery in Cretaceous-Paleogene carbonate reservoirs, which are trapped in Oligocene Flysch sealed fold-belt anticline structures. The Apulian geotectonic zone, including the Apulian Platform and the Paxi (or Pre-Apulian) zone, is the westernmost undeformed part of the External Hellenides and is being overthrust by the Ionian geotectonic zone to the east. The Paxi zone on the Eastern margin of the Apulian carbonate platform is composed of three primary packages. The first is alternating strata of Upper Triassic to Middle Jurassic dolomite, limestone and anhydrite deposits overlain by Upper Jurassic to Lower Cretaceous slightly cherty and marly limestones deposited contemporaneously with the Ionian Basin development (Figure 5). The second is Cretaceous through Paleogene to Lowermost Miocene locally brecciated shallow-water carbonates with slope and basinal marlstones, sands, and shales. The third package consists of Langhian to Recent molassic sediments which are alternating marl, sand, and shale. Main tectonics occurred at the



A map of Greece illustrating the 2D GeoStreamer GS™ seismic data (purple), the legacy data (grey), the 'Open Door Invitation' blocks (orange), in addition to oil and gas discoveries and the producing field.

Miocene/Pliocene base. The Apulian Platform and its marginal areas offshore Northwest Greece offers several targets. Further to the North of the platform the Italian Rospo Mare heavy oil discovery is found in karstified limestones of the actual platform and the Italian Aquila oil discovery is structurally trapped in redeposited carbonates off the Apulian platform margin.

The south of Crete is a frontier area exhibiting the complete

A stratigraphic column of the Western Greece, Ionian zone. (After Bellas et al., 2012)

Geologic time	Geology/Formation	Source	Reservoir	Seal
Pre-Pliocene	Clays/Sandstones/Coaglomerates			X
L. Miocene - E. Pliocene	Mud/Clay/Sandstones		●	X
E. Miocene	Shales/Sandstones	◆		X
Oligocene	Flysch (Claystones prevail/Silt Sandstones alternations)			X
L. Cretaceous - Eocene	Braccas Limestone		●	
E. Cretaceous	Pelagic limestones with intercalations of cherts & marls (VGLA)	◆		
M. C. - Jurassic	Posidonia Shales	◆		
E. Jurassic	Shallow-water carbonates		●	
L. Triassic	Evaporites - Braccas (Anhydrite and salt with intercalations of Dolomite, limestone & shale)	◆	●	X

Οργάνωση Γύρου Παραχωρήσεων

Χρονοδιάγραμμα εργασιών

[illegible]

Γ. Οργάνωση & Λειτουργία Ελληνικής Διαχειριστικής Εταιρείας Υδρογονανθράκων (ΕΔΕΥ Α.Ε)

Οργάνωση & Λειτουργία Ελληνικής Διαχειριστικής Εταιρείας Υδρογονανθράκων (ΕΔΕΥ Α.Ε)

● Νομική σύσταση,
Οικονομική λειτουργία
Κανονισμός εσωτερικής λειτουργίας,
Κανονισμός προμηθειών & υπηρεσιών

● Στέγαση, βασική υποδομή & εξοπλισμός

● Ορθολογική στελέχωση

● Μεταφορά και οργάνωση εθνικού αρχείου υδρογονανθράκων

● Σύστημα επίβλεψης συμβάσεων

- Τεχνική
- Λογιστική
- Περιβαλλοντική

● Προτυποποίηση εγγράφων υποβολής στοιχείων, εκθέσεων
(ενιαίος τρόπος επικοινωνίας, ελέγχου & συγκριτικής αξιολόγησης)

