Recent Developments in Exploration and Production of Hydrocarbons in Greece and Cyprus

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Exploration Activity in Greece - Current Status

- After 15 years of inactivity, re-establishment of the Hellenic Hydrocarbons Management Company S.A, 2011
- Tender for non-exclusive seismic surveys. Eight proposals have been submitted. Decision is expected within the 2-ond Quarter of 2012
- Tender for 3 areas using open door procedures
MAIN ISSUES NEED ANSWERS for Greece

• Are there proven or possible petroleum systems?
• Are there any credible analogues?
• Are fiscal terms and conditions attractive for Oil companies?
• Is the time enough to promote the "open door" tender?
• Is the business environment the proper?

If the answers are positive then Greece has a chance to discover additional oil and gas.
SEDIMENTARY BASINS of GREECE,
Hydrocarbon Occurrences and infrastructures

Western Thrace basin
Prinos-East Thassos basin
Thermaikos-Epanomi basins
Western Greece basins
Grevena basin
Main Tertiary basins of Eastern Greece
The answer to the question whether or not Greece has any exploration and production potential for H/C, is definitely positive. This because there are proven and active petroleum systems in the alpine and Post-alpine basins of Western Greece, as well as, in the molassic and post-alpine tertiary basins of Eastern Greece, where source rocks, reservoirs, cap rocks, traps and proper geological and migration time co exist. The active hydrocarbon seeps and shows and hydrocarbon discoveries, found in both Western and Eastern Greece, attest to the existence of active hydrocarbon systems. Commercial exploitation of hydrocarbon accumulations in the Thracian Sea and in analogues systems to the ones of Greece, such as in Italy, Albania, Croatia, as well as discoveries in East Thrace in Turkey, all advocate to high hydrocarbon potential of the similar sedimentary basins of Greece.
Oil Shows and seeps in Greece

ZAKYNTHOS
HERODOTUS, 480 bc

KATAKOLON “Volcano” 1976

KATAKOLON “Volcano” 2004

DRAGOPSA - EPIRUS
SMOLITSAS - EPIRUS

Bouie - Epirus

LOUTRA KYLLINIS
GR: HYDROCARBON FIELDS & DISCOVERIES

- PRINOS (oil field) Thracian Sea
- SOUTH KAVALA (gas field) - Thracian Sea
- NORTH PRINOS (oil field) - Thracian Sea
- EPSILON (oil field) - Thracian Sea
- EPANOMI (gas field) - Chalkidiki
- WEST KATAKOLON (oil field) - Ionian Sea

- ALYKES (Asphalt discovery) – Zakynthos
- Athos (oil discovery) - Thracian Sea
- AMMODIS (Heavy Oil Discovery) - Thracian Sea
- EAST THASSOS (Heavy Oil Discovery) - Thracian Sea

- Interesting biogenic gas accumulations were discovered while drilling Neogene layers.

- More than 200 oil / gas shows on the surface or in wells
HYDROCARBON DISCOVERIES IN GREECE

Prinos arbitrary seismic line

Prinos Location Map

Prinos Platforms

D.S.T. W.KATAKOLO – 1A

D.S.T. W.KATAKOLO – 2

DST EPANOMI - 1
Analogues
H-C Discoveries in East Thrace Basin in Turkey
H-C fields in Italy and Albania

M.Alpi trend

Tempa Rossa (Monte Grosso) trend
TECTONIC SKETCH OF EASTERN MEDITERRANEAN

NORTH IONIAN SEA
(SOUTH ADRIATIC/APULIAN PLATFORM)

CENTRAL IONIAN SEA
(KATAKOLON - PATRAIKOS GULF)

SOUTH IONIAN and SOUTH CRETE AREA
???
ISRAEL: Offshore Discoveries in Levantine Basin

Egypt: Offshore discoveries in Eastern Mediterranean

Cyprus A
≈ 7 + Tcf

Leviathan
≈ 16 + Tcf

Tamar
≈ 8+ Tcf

Dalit
≈ 0.5 Tcf

Seismic Section and Discoveries from Cyprus to Israel
Greece: Exploration Potentiality of Southern Crete

General Geological Model

Prospective Area

Huguen et al (2001)
Exploration & Production - Business Environment

1. On institutional and legislative level
   • Absence of stable, enduring and credible interlocutor of the State
   • *Deficit* at the level of mechanism, mentality and of course human resources
   • Lack of experience, knowledge and significant "gaps" in the flow of
     administrative practices. Institutional bodies hardly work in a modern and fast
     pace producing outcome.
   • Rigid labor laws
   • Endless bureaucracy
   • Lack of understanding of business time and risk
   • Widespread corruption
   • Lack of a clear environmental policy.

2. On the political level
   • Absence of delimitation of exclusive economic zones
   • High political uncertainty
   • Governmental instability
   • Great economical crisis, tremendous public dept and high deficit,

Uncertain political and business environment !!!
CYPRUS: Afrodite Discovery

Exploratory Well in Block 12

- Natural Gas Discovery 28 Dec. 2011
- 7 tcf gross mean estimated resources
- 310 feet net natural gas pay (Miocene sand intervals)
- 5,860m total depth
- 1,688m water depth
Delimitation of the EEZ

Arab Republic of Egypt
- Delimitation of the EEZ (2003)
- Framework Agreement concerning the development of cross-median line hydrocarbon resources (2006)

Lebanon
Delimitation of the EEZ (2007)

Israel
Delimitation of the EEZ (2010)

2-ond Exploration Round: May 11, 2012
33 bids, from 5 companies and 10 consortiums, Total 29 comp. from 15 countries: Canada, US, Israel, France, Russia, UK, Malaysia, Italy, Australia, Korea, Norway, Netherlands, Lebanon, Cyprus and Indonesia,
No bid for Blocks 1, 4, 13
Most popular No 9 and 2
Offshore Cyprus: 14 Recognized Hydrocarbon Plays