

BETWEEN THE DRILL & THE DEEP BLUE SEA : AN UPDATE ON DEEPWATER DEVELOPMENT IN MALAYSIA



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**5th PetroMin Deepwater, Subsea and Underwater Technology Conference
Kuala Lumpur
29th – 30th October 2007**

Presentation outline

- Overview of the Malaysian oil and gas (O&G) sector
- Malaysia's deepwater : Features and developments.
- Challenges ahead
- Crystal gazing : Beyond the deepwater horizon

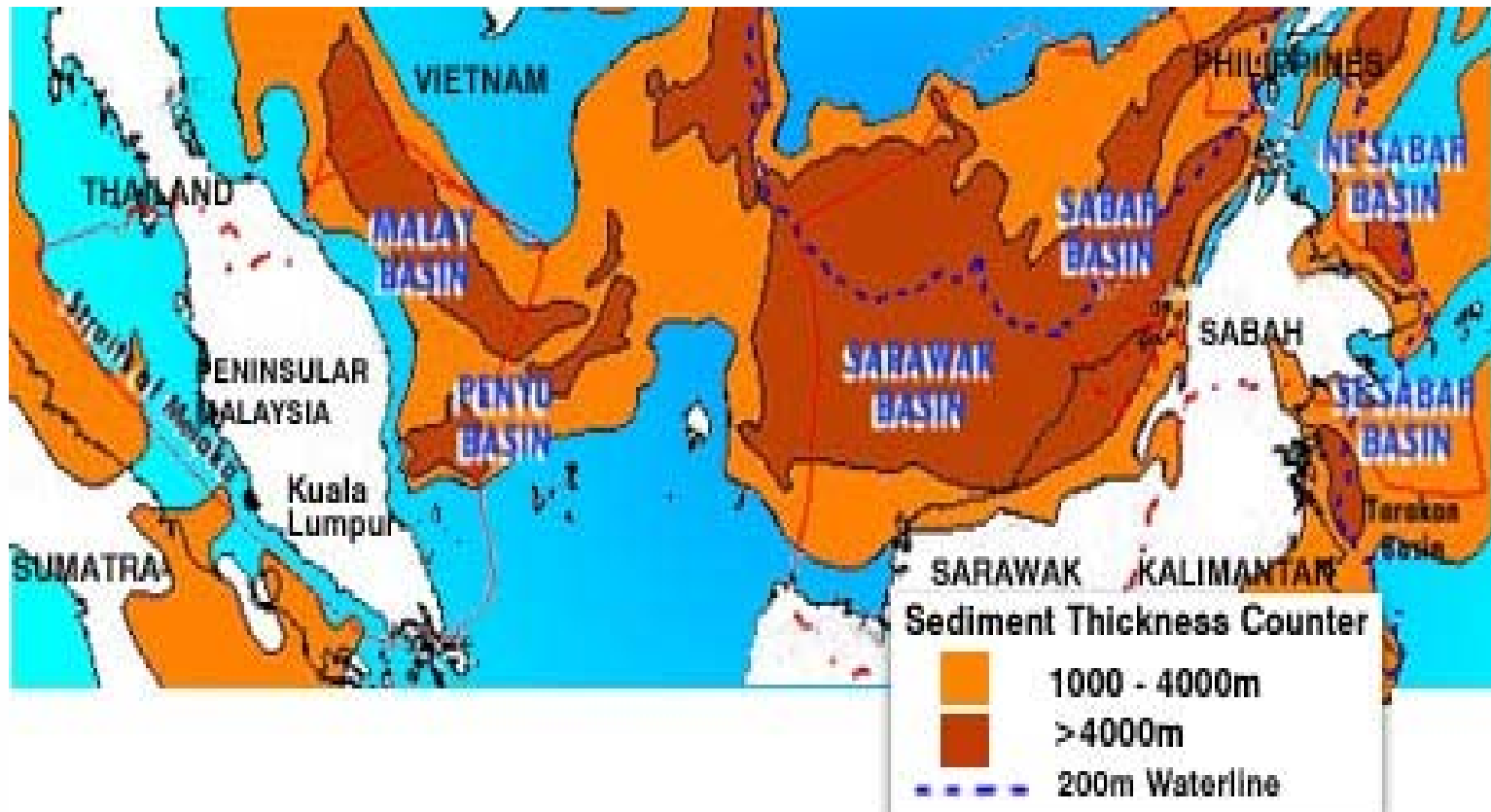
Malaysia's energy riches

- 24th largest producer of oil and 14th of gas (IEA ranking, 2004).
- Offshore exploration area : 565,555 sq km / 60 blocks.
- A net oil exporting country. O&G reserves of 20.18 bil. boe (domestic) & 6.31 bil. boe (int'l) in 2007.
- Oil reserves 2007 : 3.9 bil. boe (deepwater), 1.46 bil. boe (shallow waters).

Petronas – the national oil company

- A global brand & a Fortune 500 company.
- Founded 1974, vested with the nation's O&G resources.
- Engaged in upstream & downstream O&G activities. Presence in >30 countries.
- Estimated to contribute $\frac{1}{4}$ to the nation's treasury annually.
- Avg. total production : 1.71 mil. boe/day
- 3 local refineries processing 362,500 bpd.

Malaysia's sedimentary basin



Malaysia's offshore sites

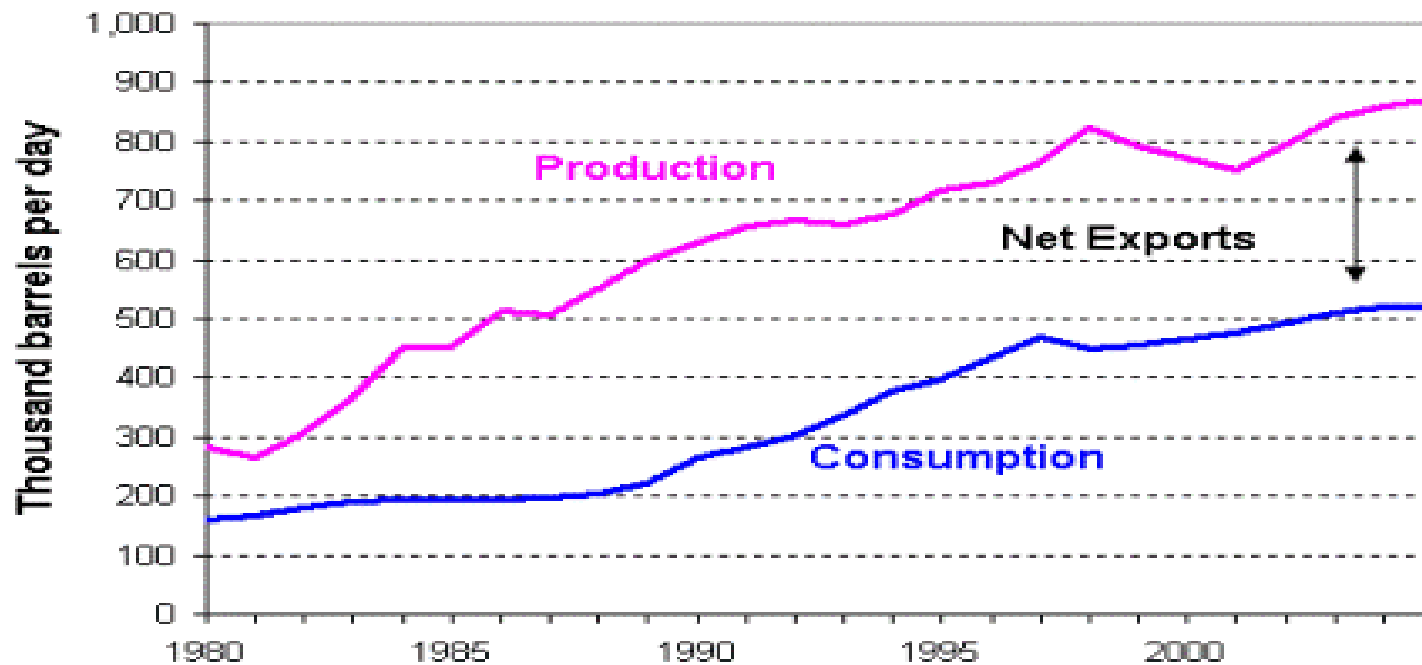


Malaysia's offshore features

- 6 basins in continental shelf - hydrocarbon found in Malay, Sabah & Sarawak Basins.
- Deepwater E&P being undertaken in Sabah & Sarawak Basins'.
- Deepwater (>200m) is 15% of its offshore territory, estimated to contain 1bil. barrels of oil & 6 tcf of gas.

Malaysia's oil production / consumption 1980-2005

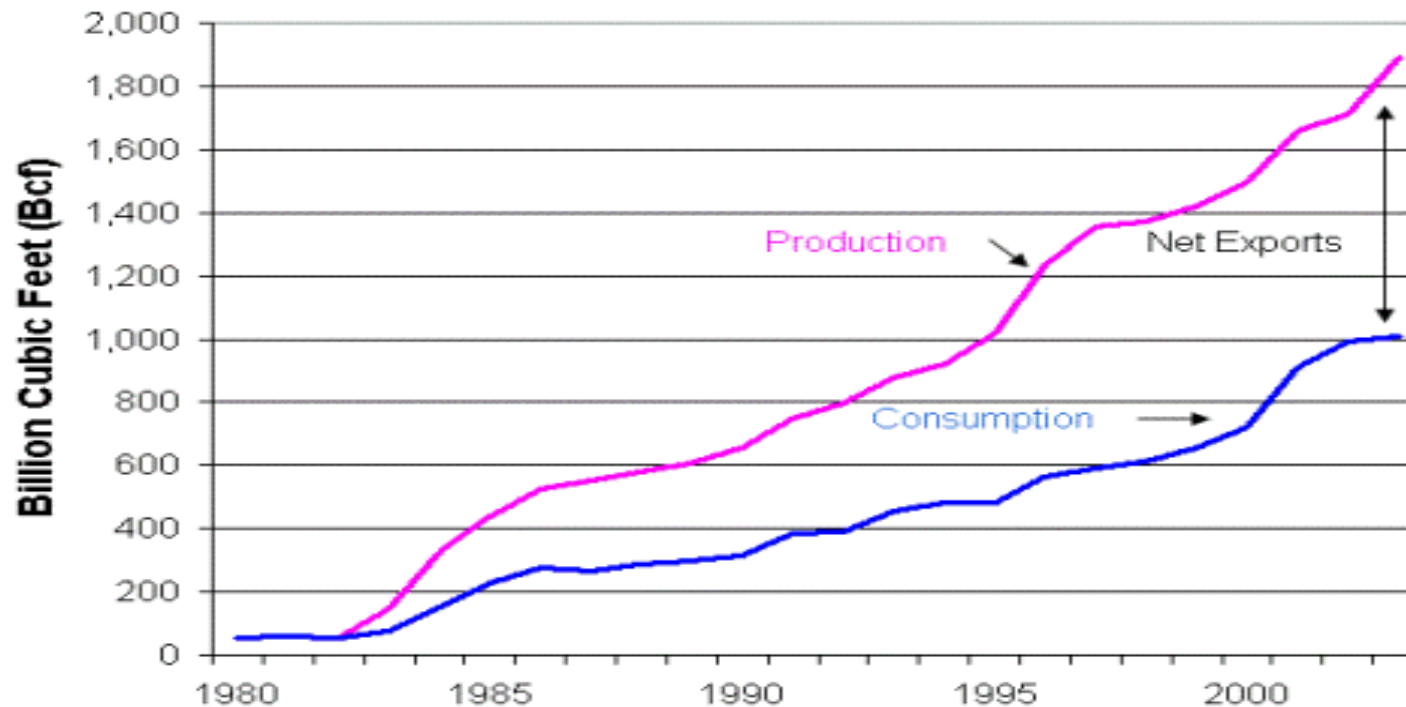
Malaysia's Oil Production and Consumption, 1980-2005



source: EIA.

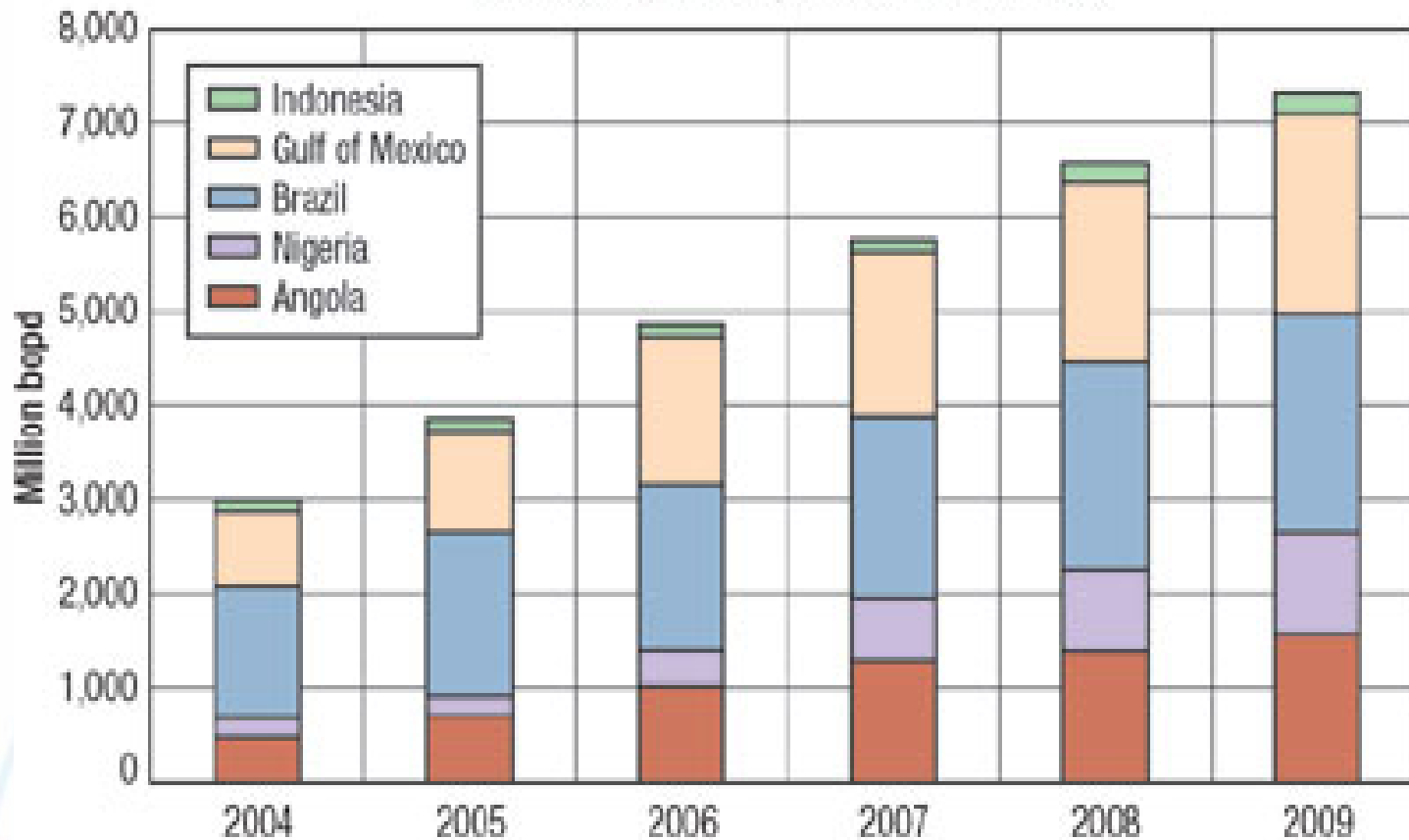
Malaysia's gas production / consumption 1980-2003

Malaysia's Natural Gas Production and Consumption, 1980-2003



World deepwater production forecast

Global deepwater production forecast



Factors driving deepwater quest

- Growing global demand for energy.
- Traditional fields fast exhausting.
- Declining production & reserves.
- Oil supply jitters.
- Pressure to diversify supply.
- Energy economics.
- Technological advent.

Deepwater development chronology

- Exploration in Malaysia's shallow waters started in 1960s, deepwater in 1990s.
- First discovery : Kikeh in 2002 (est. 500 mil. barrels), followed by Gumusut, Kakap, Senangin, Mailikai in 2004.
- Kikeh commissioned work in Aug 2007.
- Over 40 deepwater wells planned for drilling in the next 3 yrs.

Going deeper for more

- Petronas focusing on deepwater E&P with 21 exploration blocks covering over 140,000 sq. km.
- Govt. plans to turn Malaysia into regional deepwater hub.
- Spate of deepwater discoveries since 2002 estimated to contain 1.3bil barrels.
- Deepwater E&P have benefited local O&G support services companies.

Deepwater-related activities

- Feasibility study/surveying/prospecting
- Support structure engineering (topside / hull design)
- Fabrication (rigs, jackets, platforms)
- Manufacturing (pipes, subsea module & equipment, OSV, FPSO, FSO)
- Management services (fluid, waste)
- Installation (rigs, pipelines)
- Decommissioning of structures

Current deepwater blocks

Block	Site	Contractors
C	Offshore Sarawak	Newfield/PCSB
E	Offshore Sarawak	Shell/PCSB
F	Offshore Sarawak	Amerada/Total/ Elf/PCSB
G, J	Gumusut, Malikai, Ubah, Limbayung, Ubah, Keabangan	Shell/ Conoco/PCSB
K	Kikeh, Todak, Senangin, Kakap	Murphy/PCSB
H, L, M	Offshore Sabah	Murphy/PCSB
N, Q	Offshore Sabah	BHP Billiton/PCSB

Petronas, Aseambankers

Petronas' foreign deepwater forays

- Indus Block G&H, Pakistan
- Melut Basin, Sudan
- Block B-17-01, Thailand
- Rabat-Sale Haute Mer block, Morocco
- North East Mediterranean, Egypt
- Block 24, Angola
- NE Madura, Indonesia
- Phu Khanh Basin, Vietnam

Technology as a driver of Malaysian deepwater projects

- Deeper water = greater challenges, hence better technologies in design, production, operations etc. needed.
- Technology also plays a major role in forecasting reservoir performance.
- Some groundbreaking technologies have been used in M'sian deepwaters.

Challenges in Malaysian deepwater

- Technological and geological challenges must be overcome.
- Adequate support base must be in place to ensure deepwater E&P success.
- Huge capital outlay required.
- More effective solutions needed to shorten production and delivery time.
- More greensites need to be explored.

Crystal gazing : Deepwater development beyond the horizon

- Competition for market share among oil majors impacting deepwater investment.
- Environmental issues.
- Human dimension issues.
- Deepwater exploration of gas as an alternative energy source.
- Harnessing local expertise.

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