

MARITIME INSTITUTE OF MALAYSIA

DEEPWATER VENTURES IN MALAYSIA : RECENT DEVELOPMENTS, PROSPECTS AND CHALLENGES

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Advancing the Frontier of Maritime Knowledge



Presentation outline



- Quest for energy in deeper waters.
- Global state of play.
- Malaysia's deepwater : Features and development.
- Petronas : At the forefront of deepwater E&P.
- Challenges and the road ahead.

Searching deeper for more



- World's oil need : 82 mil. barrels/day.
- IEA projected this to double by 2030.
- Current reserves : 1.93 tril. barrels.
- Production depletion rate : 1 mil./day.
- Peak oil : no longer a myth?
- Imbalance in production / consumption and instability in oil-producing nations causing jitters.

Developing deepwater



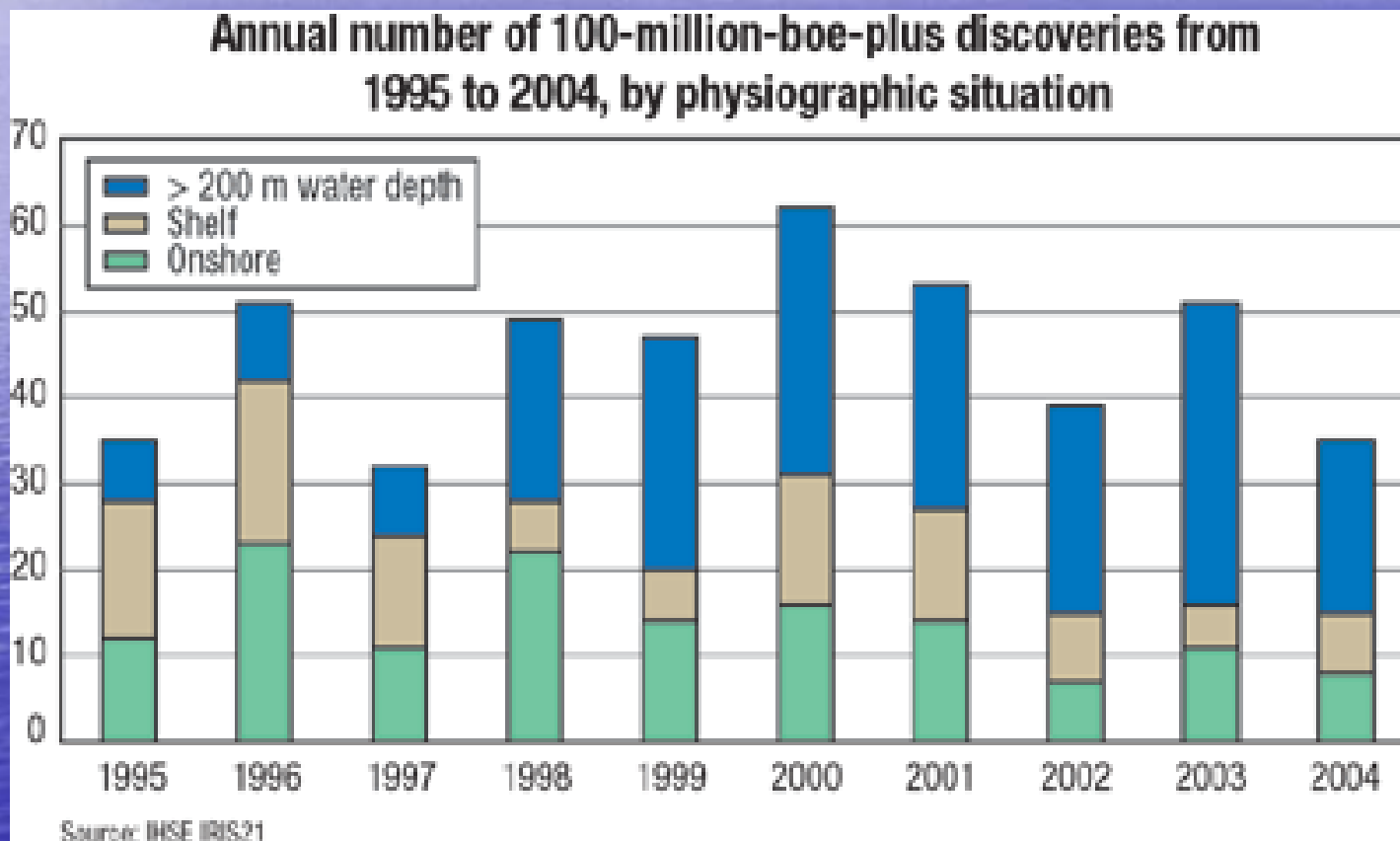
- New mantra : Diversify supply. This has led to exploring new frontiers.
- Quest for O&G goes further, deeper.
- Deepwater definition will change as deeper frontiers are explored.
- Cost to drill a well : US\$30-50m.
- Cost to develop a single field : US\$1b.

Factors driving deepwater development



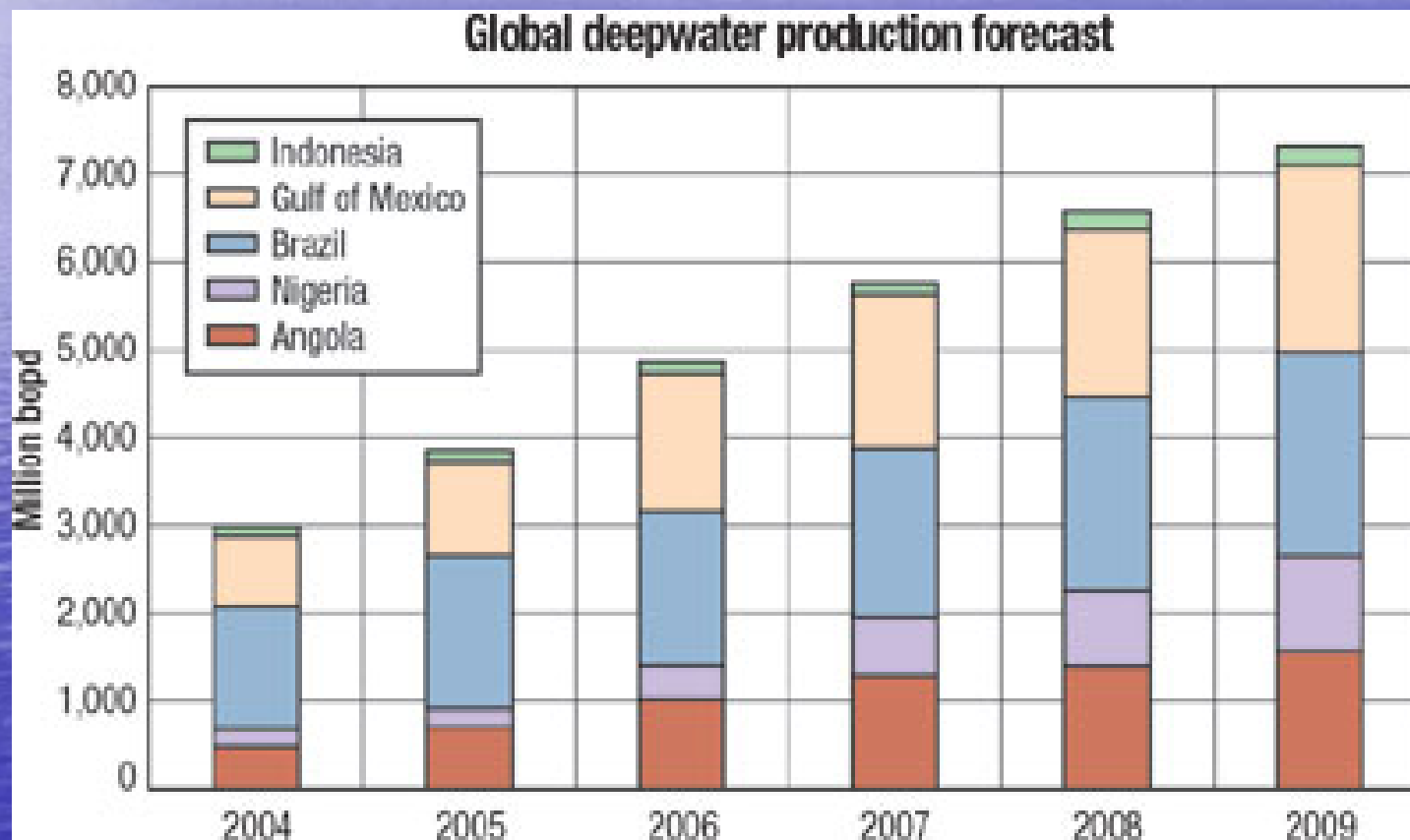
- Traditional fields fast exhausting.
- Rising world energy demand, propelled by developing countries.
- Bullish forecast of deepwater reserves.
- Availability of E&P technologies and strong support services.
- Jitters over oil supply.

Global 100 mil. boe discoveries 1999-2004



[Source : www.worldoil.com](http://www.worldoil.com)

Global deepwater production forecast



Global deepwater development trends



- Active areas : Mexican Gulf; S China Sea; mid-Atlantic; off. UK Brazil, NW Australia, W Africa, Norway, Egypt.
- Deepwater sources added 4 bil. bpd to global reserves b/w 1994-2004.
- Will supply 10% of global oil by 2010.
- Oil majors facing rig & crew shortage, but outlook is optimistic.

Malaysia's energy riches



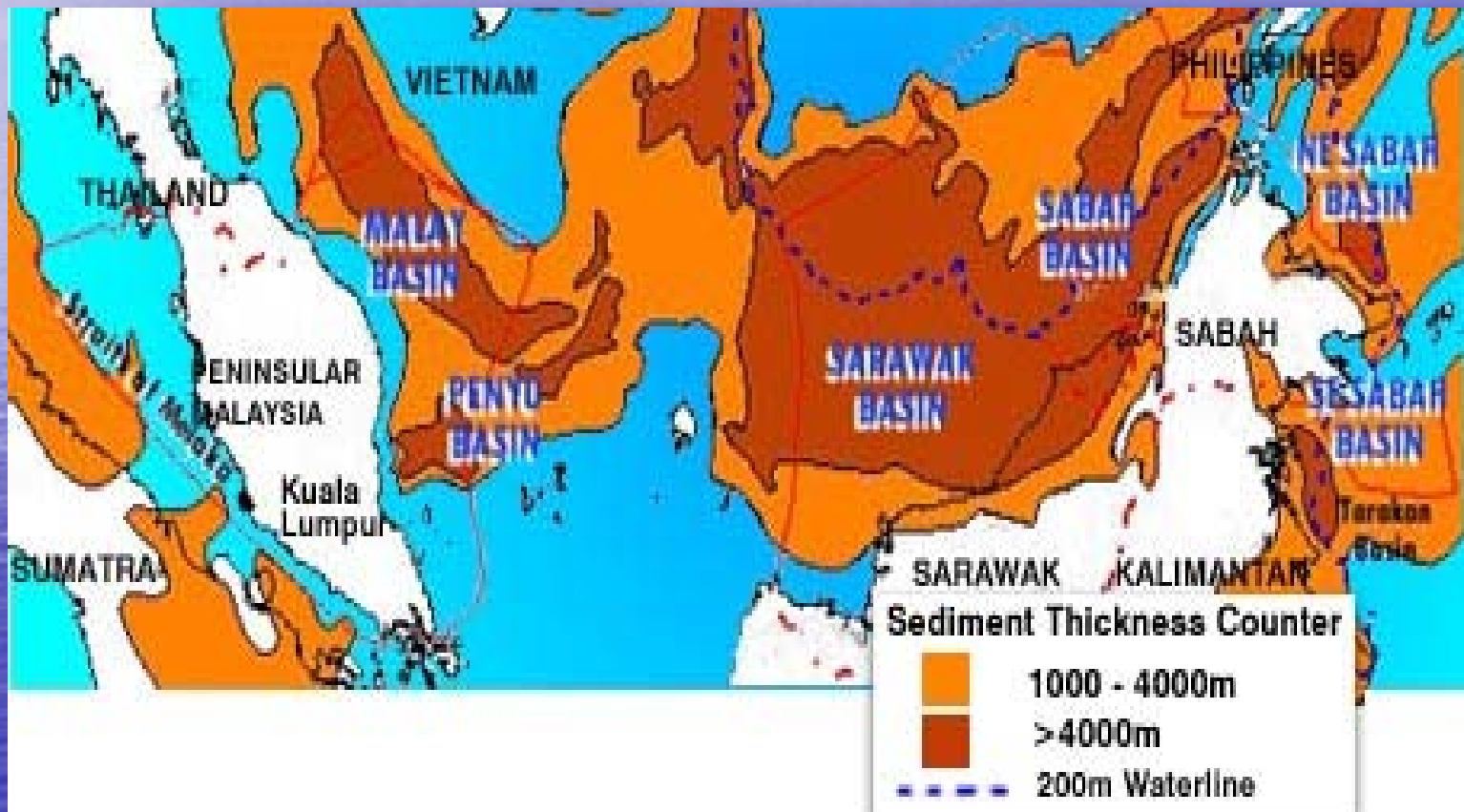
- 24th largest producer of oil and 14th for gas (2004).
- Oil reserves : 4.84 barrels.
- Gas reserves : 89 tcf.
- Offshore exploration area : 565,555 sq km / 60 blocks.
- One third of these are in deepwaters.

Malaysia's energy production capacity



- Six oil refineries with 545,000 bpd processing capacity.
- Oil output : 750,000 bpd.
- Half of crude comes from Tapis field (off the east coast of Peninsula).
- Gas output : 5 bil. cu. ft per day.
- 0.9 tcf exported to Japan, Korea, Taiwan.

Malaysia's sedimentary basins

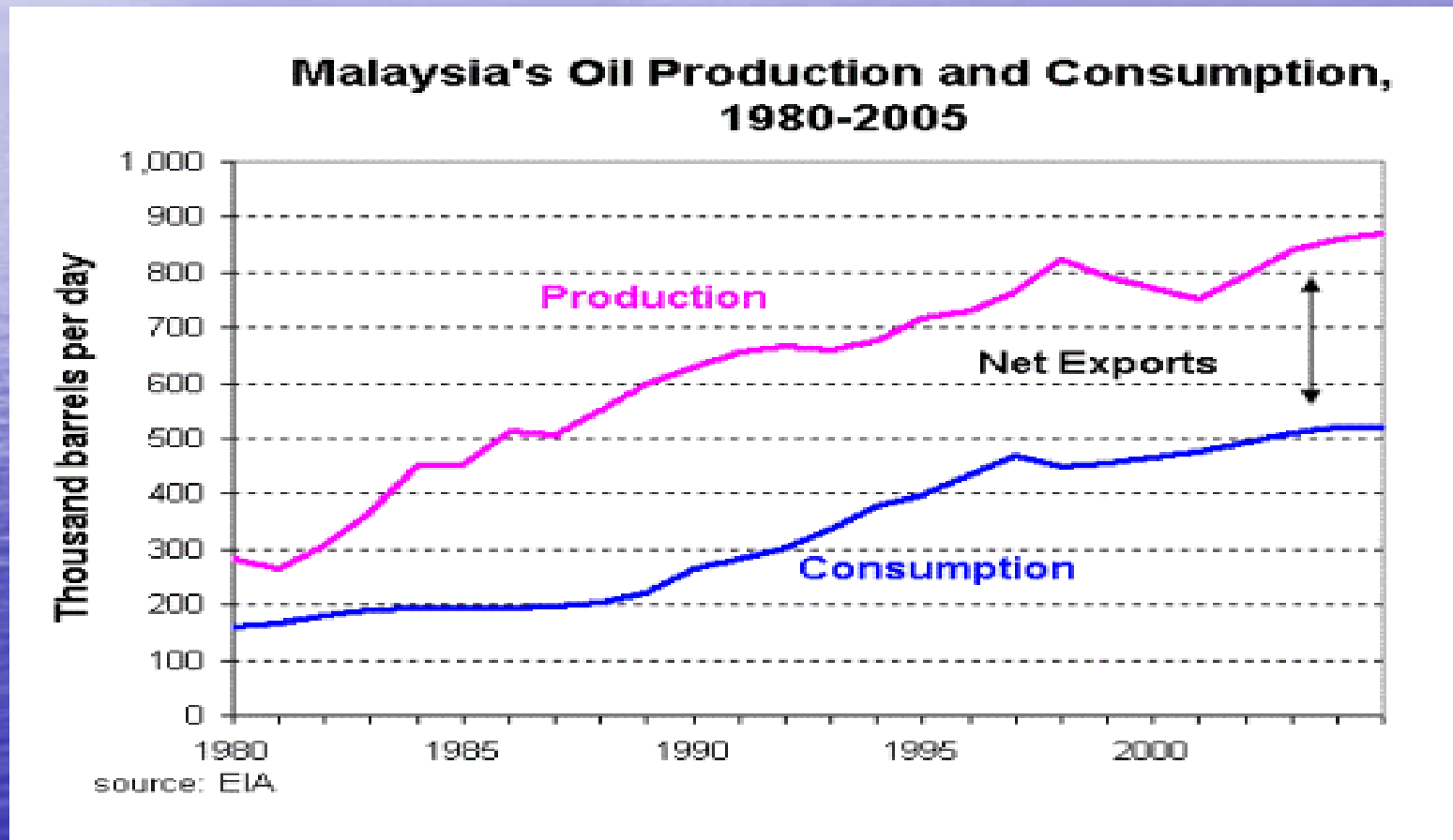


Malaysia's sedimentary basins

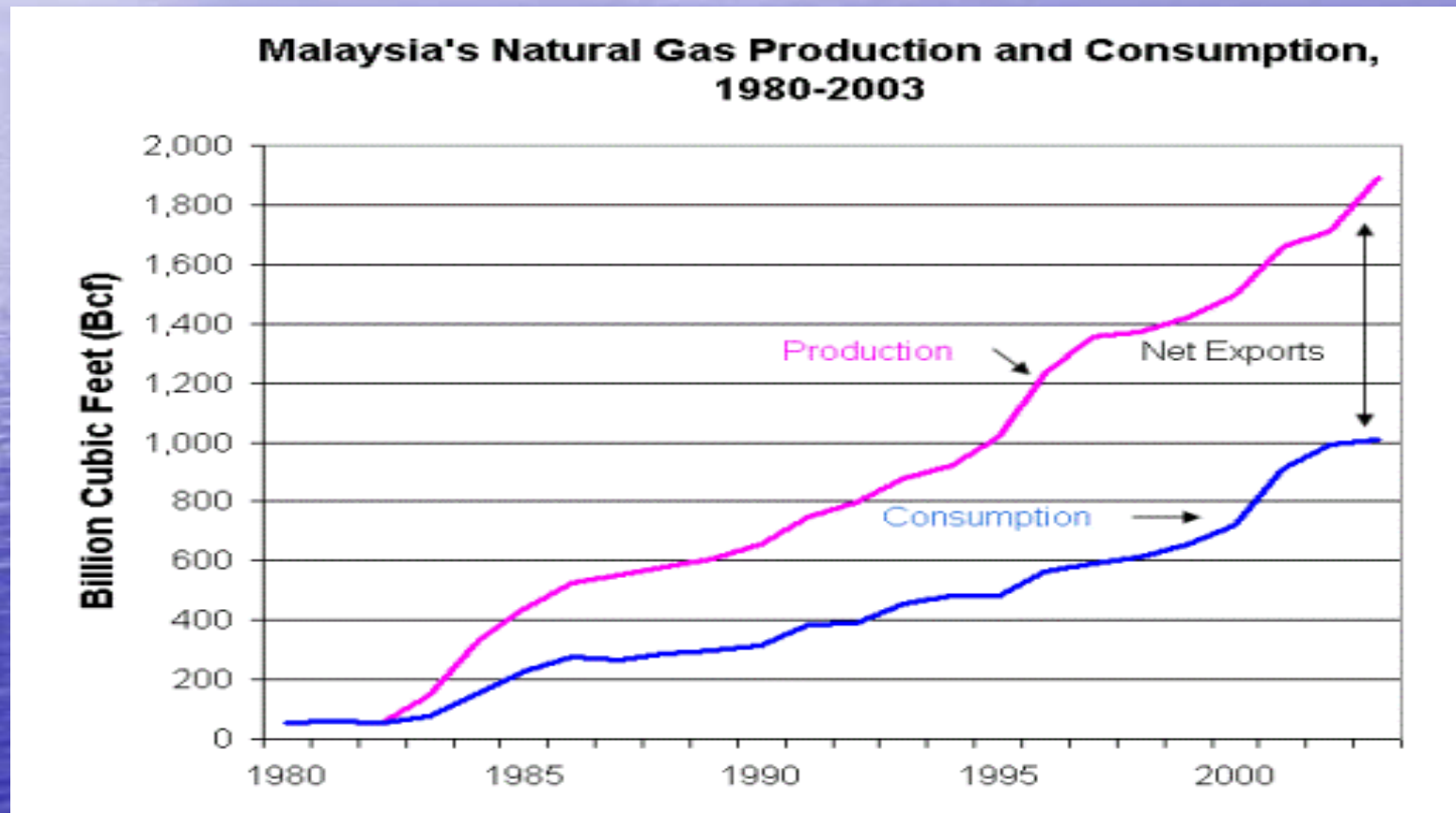


- 6 basins in Malaysia's continental shelf.
- Hydrocarbon is produced in Malay, Sabah & Sarawak Basins.
- Malay Basin has most oil and gas.
- Deepwater E&P are being undertaken in Sabah & Sarawak Basins, subdivided into exploration blocks.

Malaysia's oil production & consumption 1980-2005

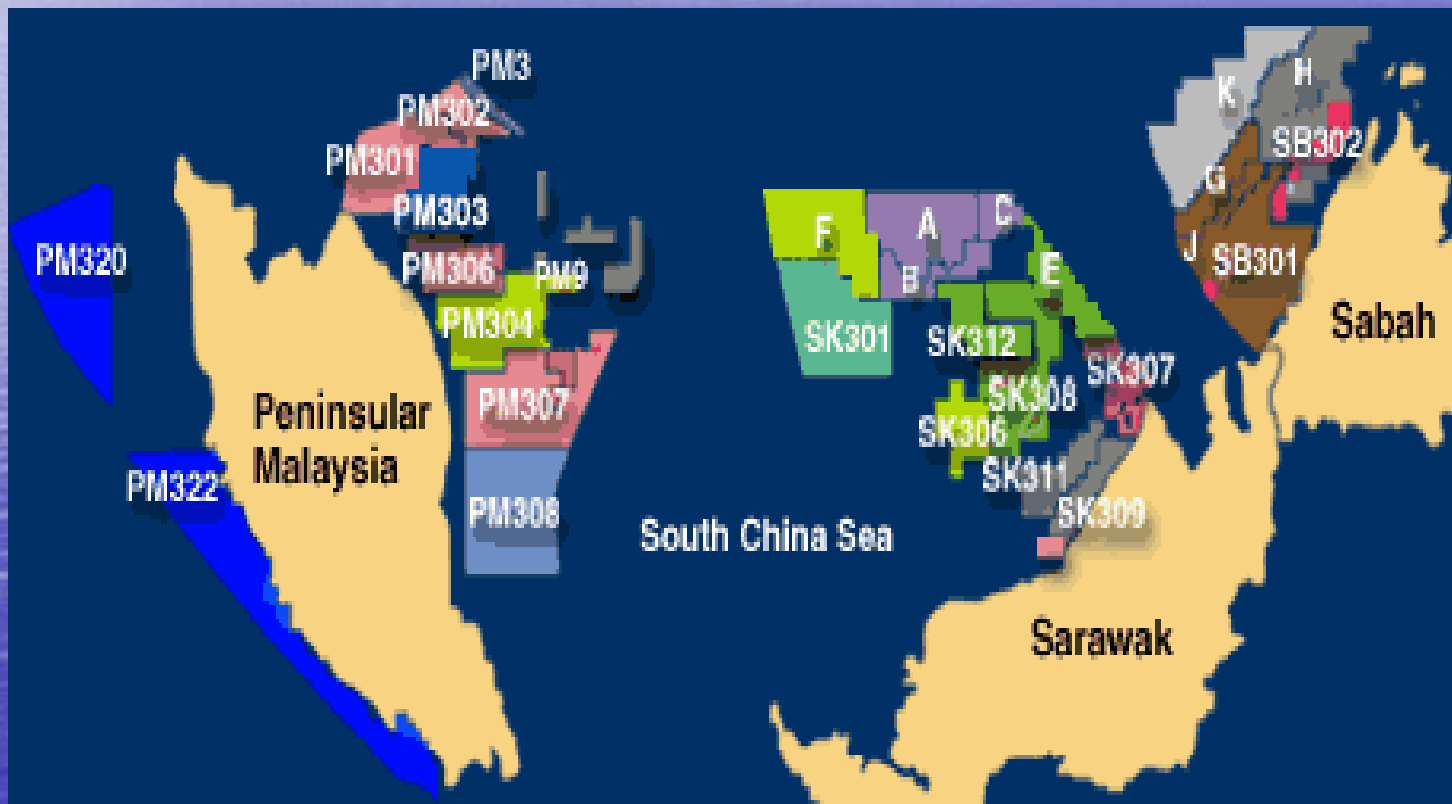


Malaysia's gas production & consumption 1980-2003



www.iea.org

Malaysia's offshore oil & gas sites



www.petronas.com.my

Malaysia's offshore venture for energy



- Exploration in shallow waters started in 1960s, deepwater in 1990s.
- Deepwater is 15% of its 402,000 sq. km. of its offshore territory.
- First success : discovery of Kikeh in 2002 by Murphy Oil & Shell Sabah.
- Estimated deepwater deposits : 1bil. barrels of oil and 6 tcf of gas.

Petronas : Leading the nation's deepwater foray



- Petronas focusing on deepwater E&P.
- Plans to turn Malaysia into regional deepwater hub.
- Has made a spate of discoveries since 2004, totaling 1.3b barrels.
- Most in exploration stages, but 8 fields will be developed in 2010-13.

Petronas : Leading the nation's deepwater foray



- Petronas carries out deepwater E&P activities via PSC with int'l oil majors.
- Has signed over 60 PSC to date.
- Its PSC obligate contractors to bear risk in exchange of production share.
- The 'revenue over cost' (R/C) PSC encourage additional investment in Malaysia's upstream sector.

Malaysia's major deepwater sites



Block	Site	Contractors
F	Offshore Sarawak	Amerada/Total
G,J	Gumusut, Malikai, Ubah, Pisagan	Shell /Conoco Phillips
K	Kikeh, Kebabangan, Todak, Senangin, Kakap	Murphy Oil
ND6&7	Tarakan Basin off Tawau	Shell
P	Offshore Labuan	Murphy Oil

Petronas, Murphy Oil, Shell, Conoco Phillips, worldoil.com

Petronas' R/C PSC



Main features	R/C concept
Royalty	10%
Petroleum tax	38%
Export duty	10%
Petronas' participation	Min. 15%
Exploration period	5
Development period	4
Production period	20

Petronas' deepwater PSC terms for oil (200-1000m)



Main features	Terms
Royalty	10%
Cost recovery	70%
Profit split (Petronas : Contractor)	1 st 50,000 BOPD - 30:70 Nxt. 50,000 BOPD - 45:55 Above 100,000 BOPD - 50:50 Above 300,000 MMBBLS - 50:50
Contract period	Exploration : 7 yrs, Development : 6 yrs, Production : 25 yrs.

Petronas' deepwater PSC terms for oil (>1000m)



Main features	Terms
Royalty	10%
Cost recovery	75%
Profit split (Petronas : Contractor)	1 st 50,000 BOPD - 14:86 Nxt. 50,000 BOPD - 18:82 Above 100,000 BOPD - 37:63 Above 300,000 MMBBLS - 50:50
Contract period	Exploration : 7 yrs, Development : 6 yrs, Production : 25 yrs.

Petronas' deepwater PSC terms for gas (200-1000m)



Main features	Terms
Royalty	10%
Cost recovery	60%
Profit split (Petronas : Contractor)	Cumulative production Up to 2.1 TSCF 40:60 Above 2.1 TSCF 60:40
Contract period (years)	Exploration:7, Development:6, Production:25.

Petronas' deepwater PSC terms for gas (>1000m)



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Petronas' deepwater ventures abroad



- 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.

Leveraging technology in M'sian deepwater E&P



- Deeper water = greater challenges, hence better technologies needed.
- E&P is a technology-driven pursuit in design, production, operations.
- Technology also plays a major role in forecasting reservoir performance.
- Some groundbreaking technologies have been used in M'sian ventures.

Deeper waters, greater challenges



- Technological and geological challenges must be overcome.
- Adequate support base detrimental to deepwater E&P success.
- Bigger capital investment required.
- More effective solutions needed to shorten production and delivery time.
- More greensites need to be explored.

Deeper waters, greater challenges



- Competition for market share impacting deepwater investment.
- Environmental issues.
- Human dimension issues.
- Deepwater exploration of gas as an alternative energy source.

The road ahead



- As energy thirst grows, deepwater pursuit will gain momentum.
- As new fields are discovered, more supply will be on the way.
- With technologies available, the outlook should remain bullish.
- Daunting geo-tech challenges loom.
- Respect and protect, not just extract!

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THANK YOU

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