



## Where are the Big Fields hiding in SE Asia? – A Premier Perspective

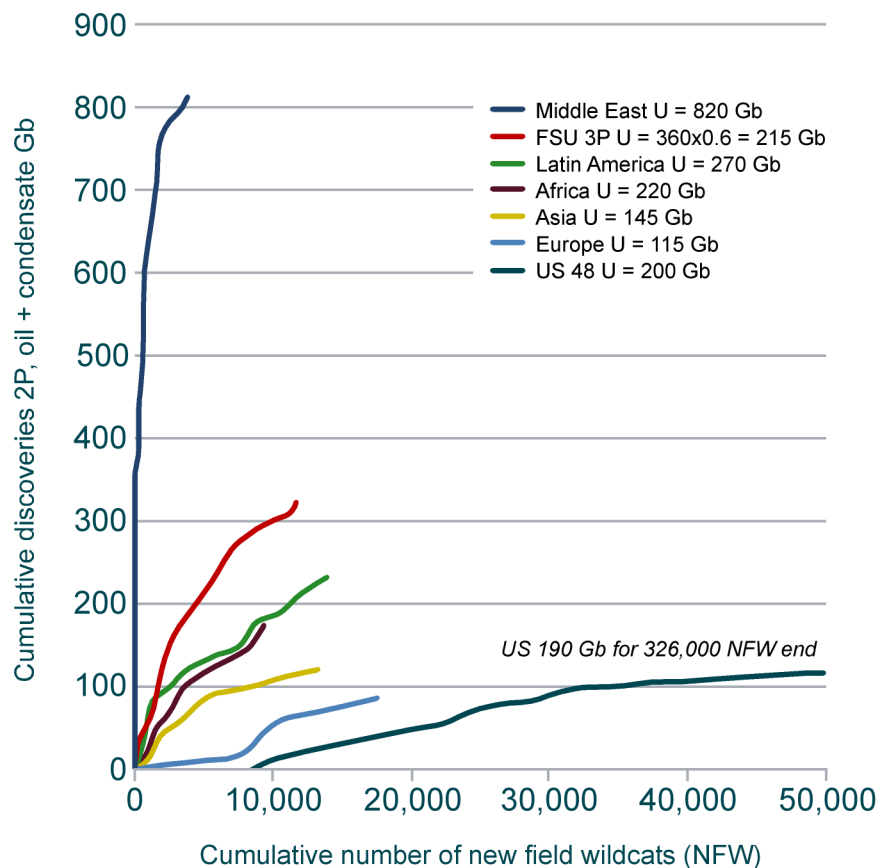


# Agenda

- **Creaming curve analysis – is SE Asia mature for conventional exploration?**
- **Recent “Giant” successes**
- **A strategic exploration framework for exploration – some ideas**
- **A few thoughts on unconventional’s**
- **Target areas for near term exploration**
- **Conclusions**

# Global Creaming curve analysis (Conventional only)

**Creaming curve for oil + condensate  
by continent at end 2000**



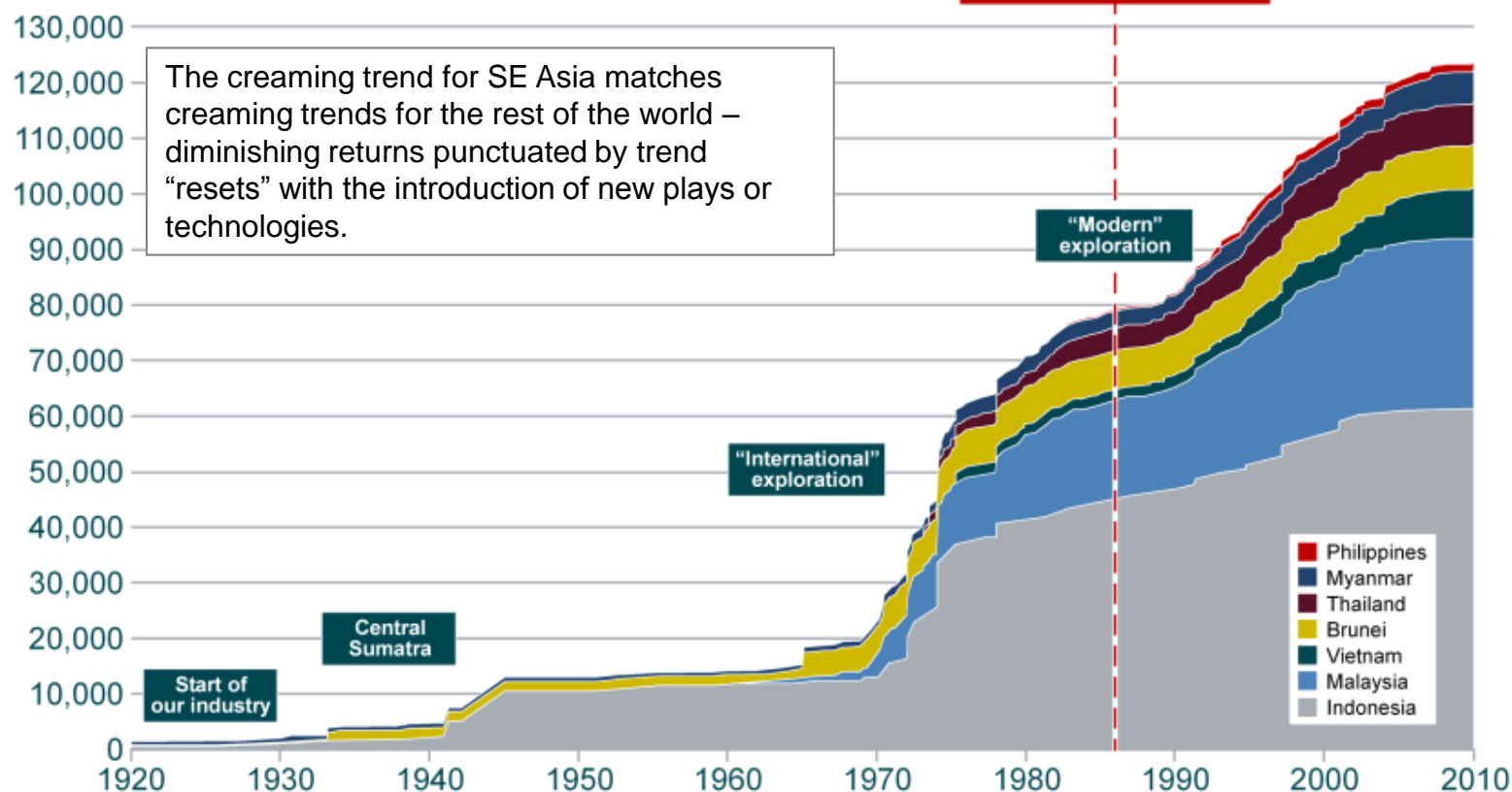
Source: Laherrere 2001

## Creaming curve analysis – The World

- To date over 125 Bboe have been discovered in Asia
- A 2001 study predicted the YTF resources for Asia to be ~25 Bboe
- Compared to the ME, FSU, Africa and Latin America; Asia is apparently mature
- Recent global drilling results are consistent with this interpretation
- At first glance Asia is not the place to go hunting “Giants”

# Creaming curves for the SEA region

**Creaming curve for Asia Region**  
(Billion boe)

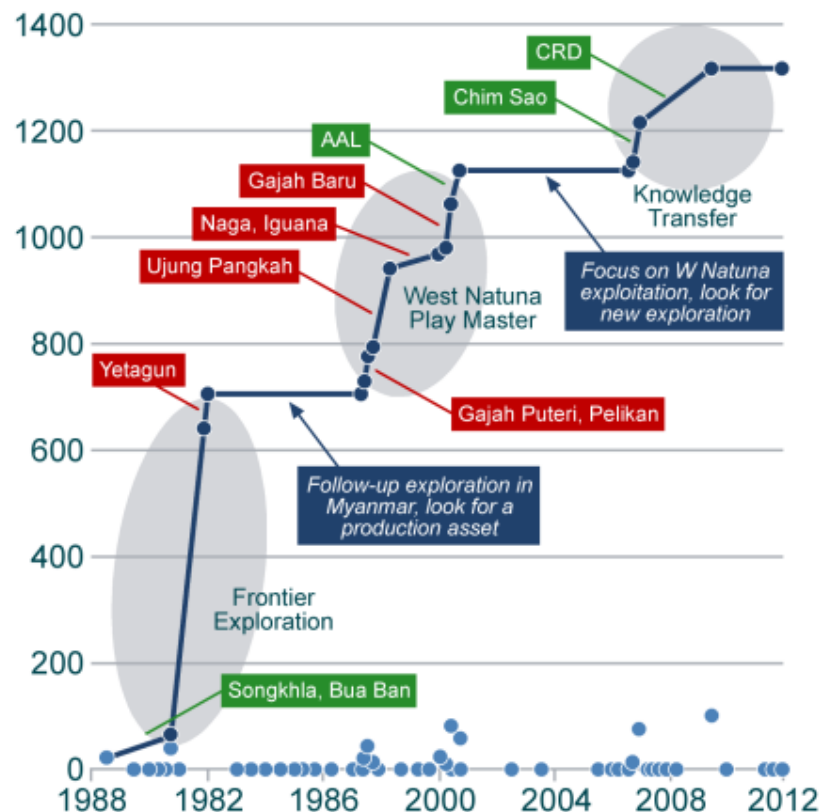


**45 Bboe discovered since 1986 - an average of 1.9 Bboe/year, Since 2001 >10 Bboe has been discovered**

Source : Deloitte Petroview

# Premier's history in SE Asia – timing is everything!

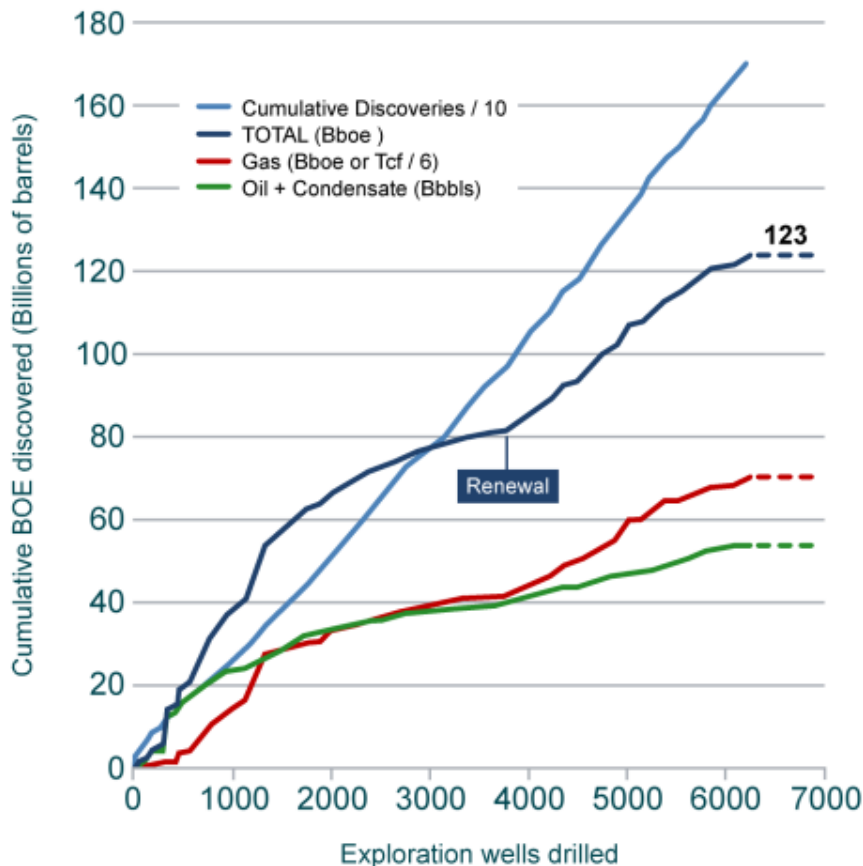
**Premier discoveries 1988-2011**  
(Gross mmboe)



- Premier entered SE Asia in 1986
- Since 1988 Premier has discovered over 1.3 Billion BOE of gross resources in SE Asia
- All discoveries are within Tertiary Rift Basins
- An overall discovery rate of 50%
- An overall commercial success rate of 30%
- The last 35 years have seen Premier evolve from a frontier explorer, to a “play master” in West Natuna
- With the recent discoveries in the Nam Con Son basin Premier demonstrated its ability to successfully build on learning’s to create a new core area in Vietnam

# Remaining exploration potential of SE Asia: Creaming curve analysis

## SE Asia Creaming curve

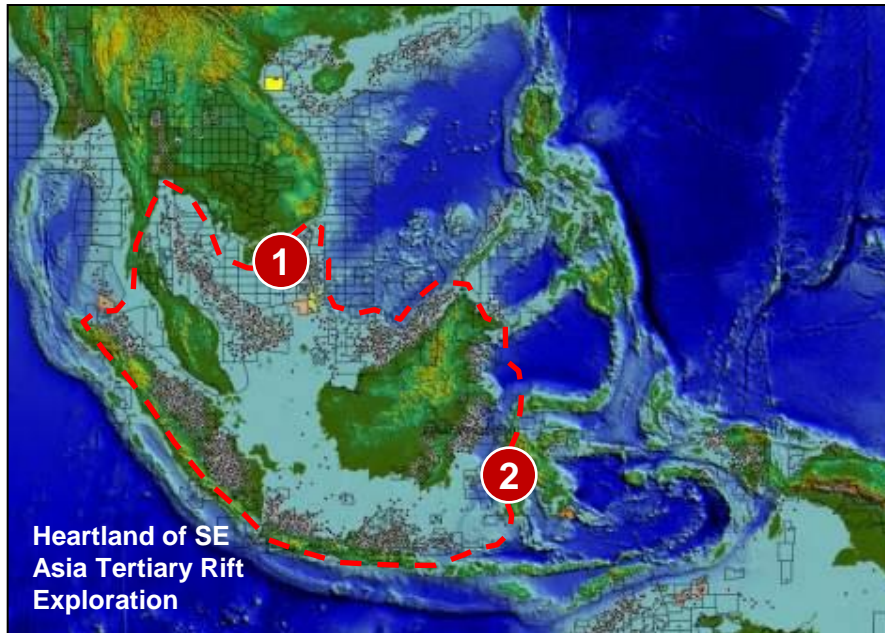


## SE Asia Creaming curve

- The curve shows two creaming trends, the most recent from 1987 to the present. This renewal trend is due to widespread use of 3D seismic, deep water exploration, gas commercialization and political changes.
- To date About 123 Billion boe have been discovered from 6000+ exploration wells.
- The cumulative number of discoveries remains proportionate to the number of wells drilled (about one discovery for every four wells on average).
- The average of the field sizes discovered is 72 mmboe.
- In recent years the discoveries are dominated by gas.



# Remaining exploration potential of Asia: Creaming curve analysis



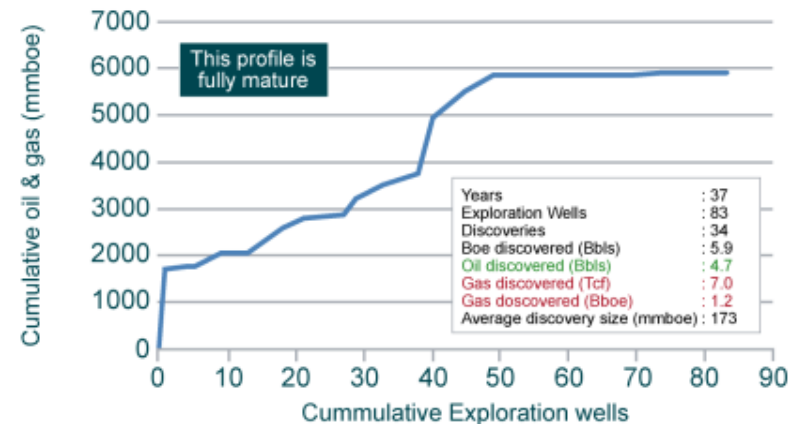
## Maturity: Western SEA Basins vs. Cuu Long Basin

The Cuu Long Basin; a classic example of a fully mature exploration area. The biggest field, Bach Ho was found with the first well, follow-on success came quickly, and recent exploration has yielded little.

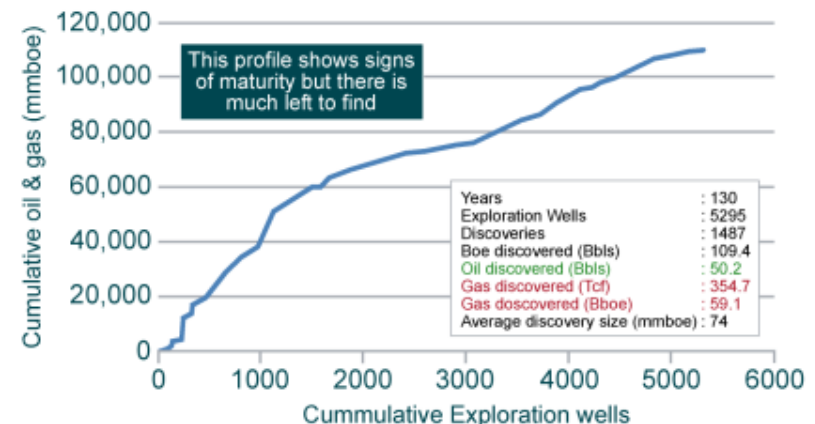
The contrast with the “heartland” Tertiary Rift basins of SE Asia is stark (even though Cuu Long and other very mature areas are included). Many areas still yielding discoveries.

**BUT it is becoming more difficult to find giant discoveries from these maturing basins.**

## 1 Creaming curve for Cuu Long Basin

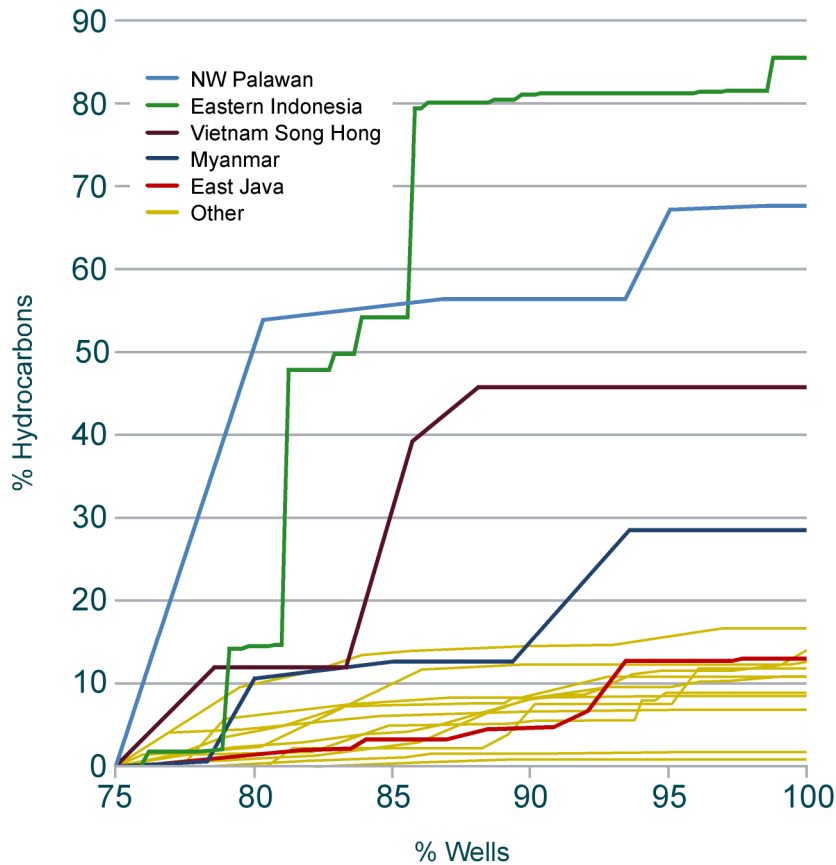


## 2 Creaming curve for Western SE Asia Basins



# SE Asia Creaming curve analysis: Last 25% of wells drilled and amounts discovered

## Normalized creaming curves

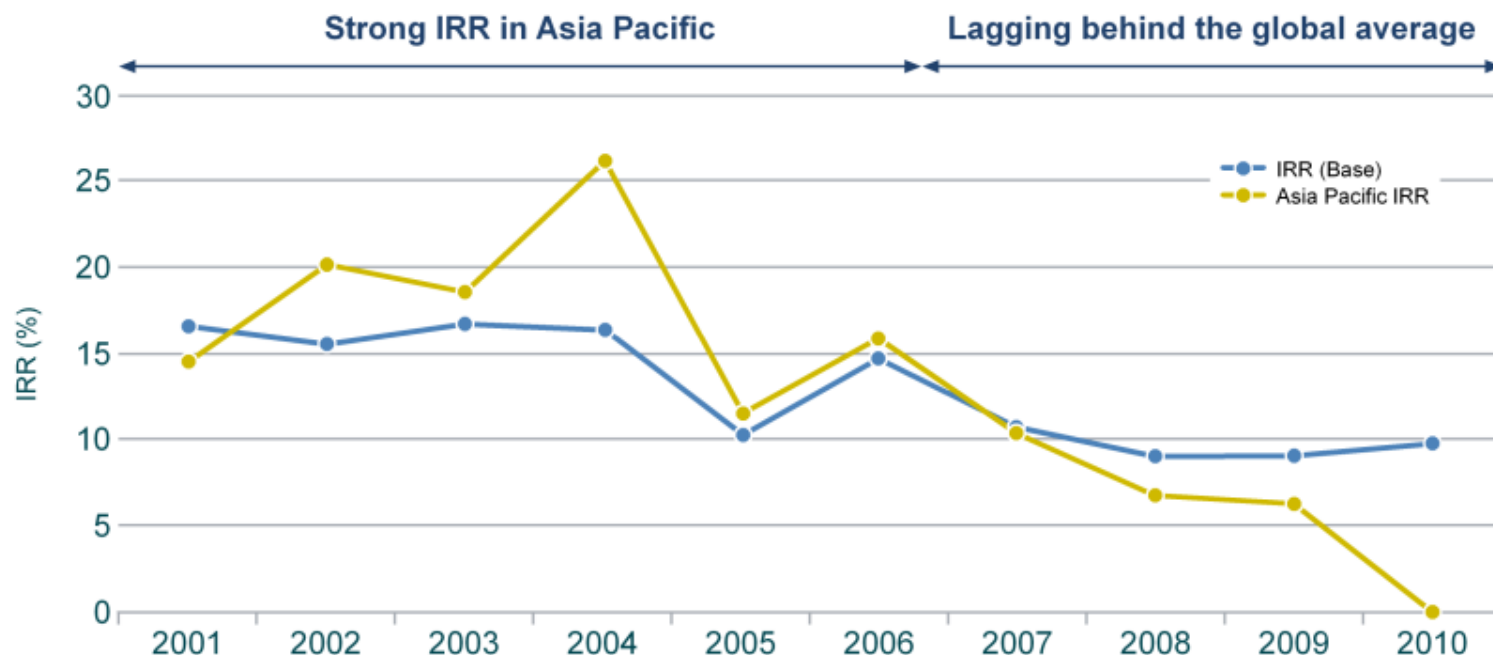


## Recent Performance – Normalized Creaming Curves

- The X axis is the % of the total exploration wells drilled in the area with the most recent 25% plotted (the most recent well is the 100% well).
- The Y axis is the cumulative amount of hydrocarbons found by the most recent 25% of the exploration wells relative to the total amount discovered in that area.
- The most recent 25% of exploration wells drilled in Eastern Indonesia discovered over 85% of the total hydrocarbon volume found to date in that region. In the Gulf of Thailand the most recent 25% of exploration wells found less than 1% of the total discovered in the GoT.
- To find a giant the focus should be to immature areas or new technology / new plays in the mature basins?
- *NB. Lower maturity or poor historic results result in poor trend definition.*



# Industry performance in recent years



Source: Wood Mackenzie

## Exploration in the Asia Region

- Asia was better than the world average in the early part of last decade but it appears to be falling behind in recent years.
- Caution is recommended over the specifics of the last few years as data accuracy is in doubt.
- The recent trend is dominated by high cost failures in deep water; but giant discoveries are being made.

# Recent discoveries – Asia continues to deliver:

## Key discoveries 2009-2011

### Some Significant Discoveries in Last 3 years

100 mmboe+ is considered big (“Giant”)

Scout information indicates the following are potential giants:

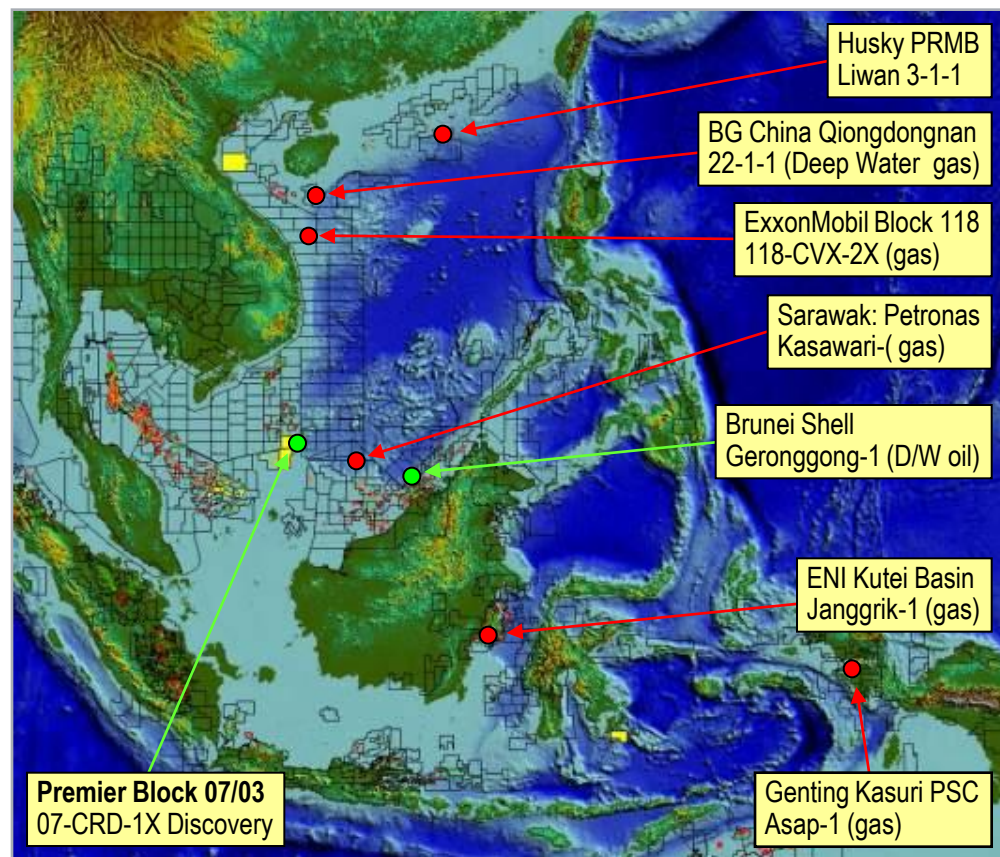
- **Vietnam: Premier Oil 07-CRD-1X**
- **China: Husky Liwan Play**
- **China: BG Qiongdongnan**
- **Brunei: Shell Geronggong**
- **Indonesia :ENI Janggrik**
- **Indonesia: Genting Kasuri**
- **Vietnam: ExxonMobil Vietnam Block 118-CVX-2X**
- **Malaysia: Petronas Kasawai**

➤ **4 billion BOE new resources discovered, dominated by gas**

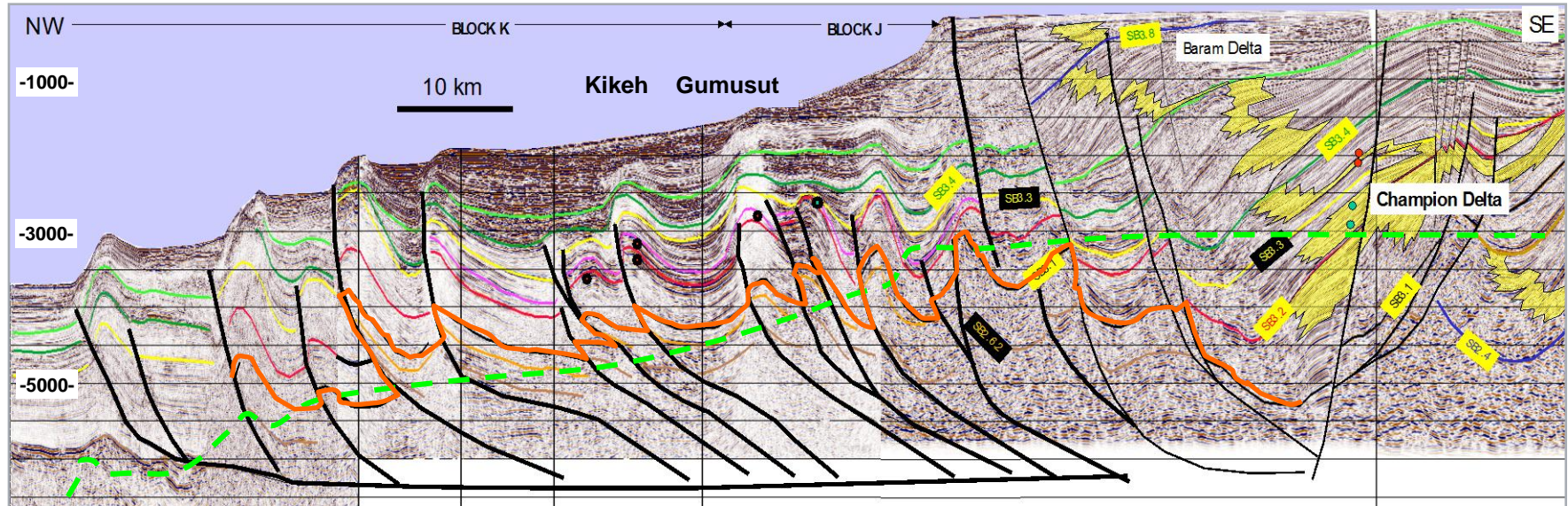
### Exploration in the Asia Region

**What’s working?** Many of the recent discoveries have been made by **pursuing known petroleum systems (mainly) into the deeper water areas of the South China Sea**

**What’s destroyed value?** High cost Frontier exploration drilling programmes by the Majors and Large independents in deep water areas, particularly the Makassar Strait and Eastern Indonesia.



# Extending known plays into deep water (Brunei and Malaysia)



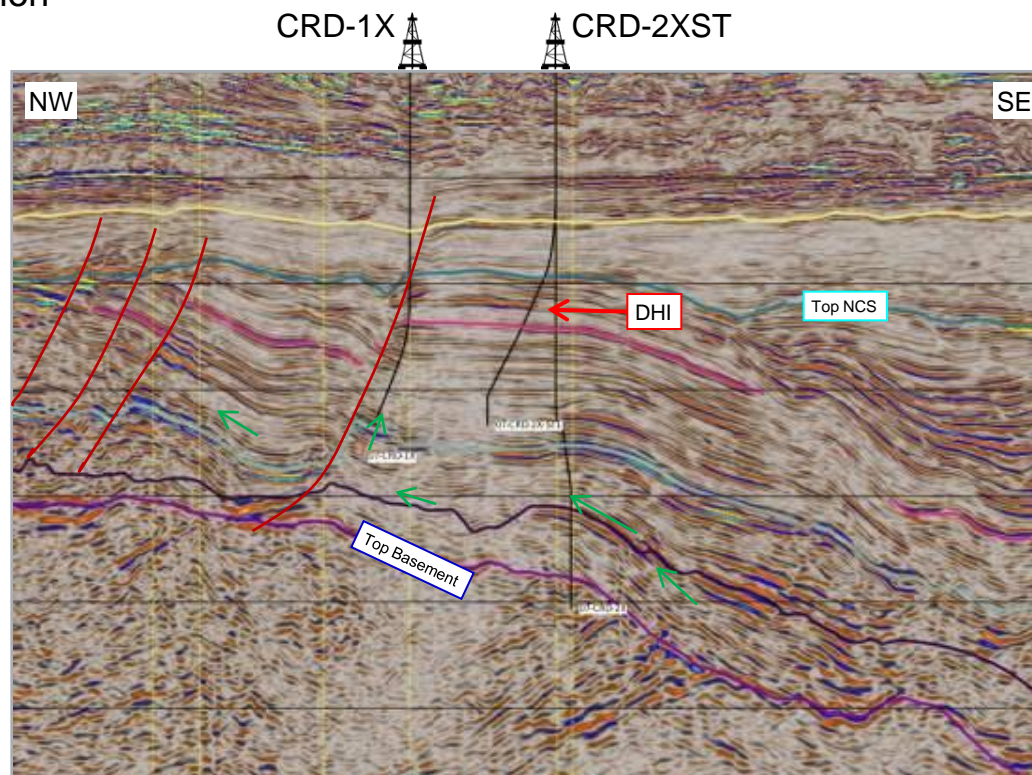
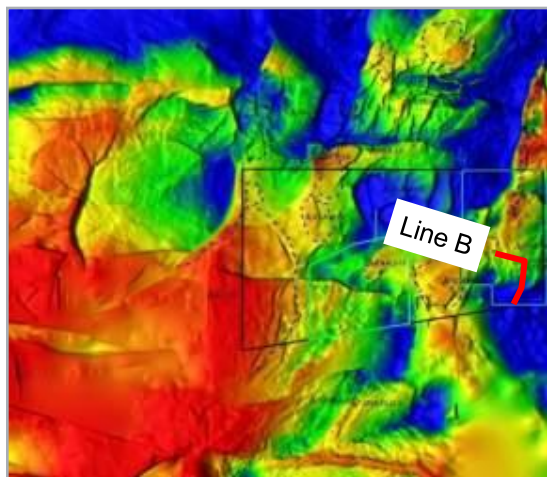
Source : Grant 2005

- Amplitude supported plays in deep water extensions of proven plays on the shelf
- Murphy and Shell have succeeded
- Total will surely succeed in 2012/2013
- Only politics have stalled the exploration of this play in Brunei/Malaysia

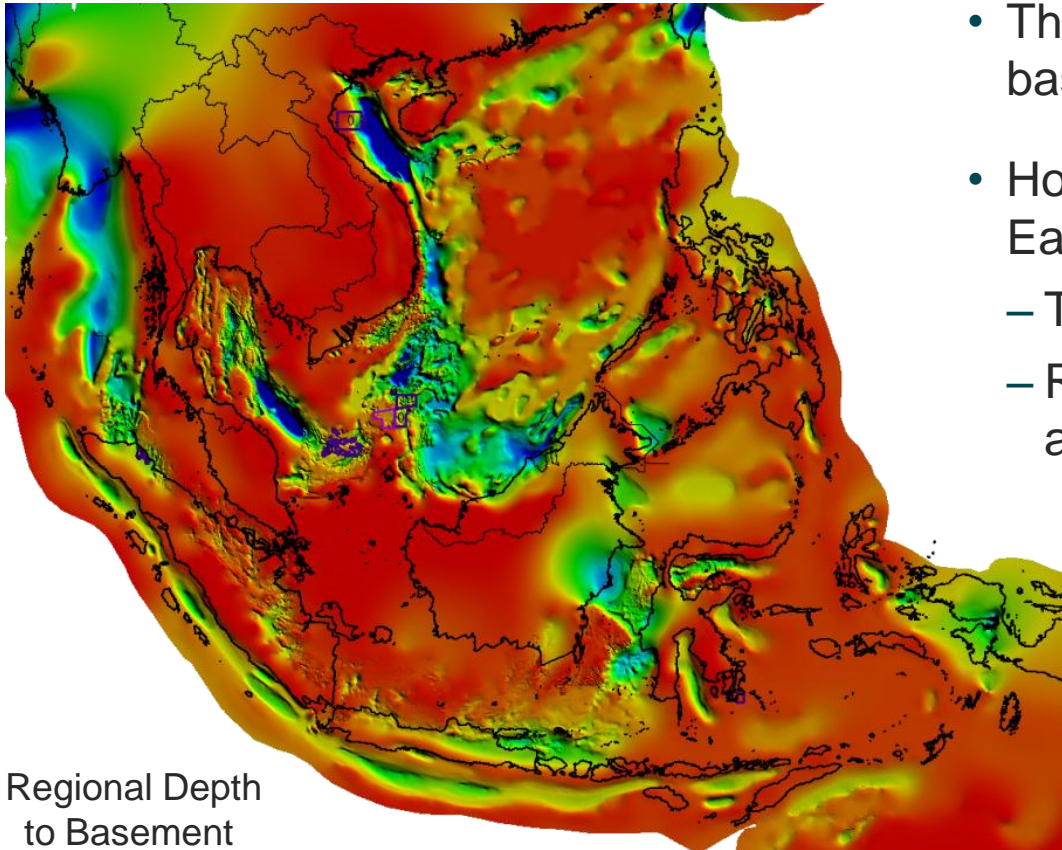


# Ca Rong Do – a recent large discovery

- CRD has an estimated gross resource of 100 mmboe (Both oil and gas/condensate)
- Overlooked in the last century
  - Miocene reefs dominated initial exploration
  - Area disputed- prevented renewed exploration until 2008
- Premier recognised analogues with West Natuna Basin
- Amplitudes de-risked trap pre-drill



# SE Asia- Regional knowledge



Regional Depth  
to Basement

- The industry knows where the basins are and the likely play types
- However knowledge reduces to the East and into deep water
  - Tectonic understanding is key
  - Risk reduction via seismic data and seep detection is required



# A strategic frame work for exploration in Asia

## Quadrant 1

Build on existing core areas when possible. This strategy is expected to yield incremental value at relatively low risk – *But no giants!*

## Quadrant 2

Knowledge transfer is the main tool for new venturing. There are numerous areas in the region where this strategy can be pursued, but dominated by deep water – *Giants are being found.*

## Quadrant 3

Applicable to old areas; the geology is well known with limited opportunities for new plays; but advances in HPHT, CO2 technology, FLNG and unconventional resources may yet yield material reserve growth – *Giant resources may be exploited.*

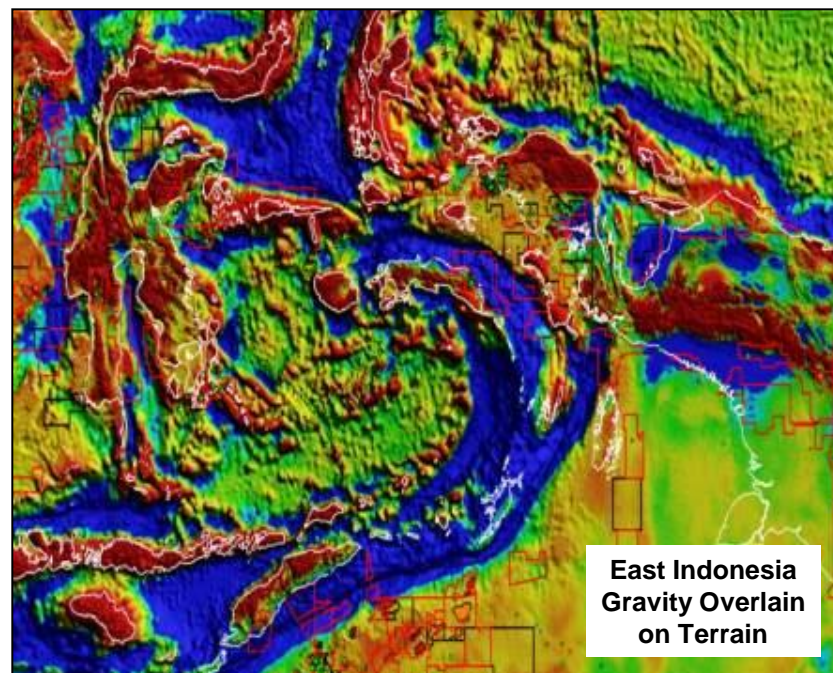
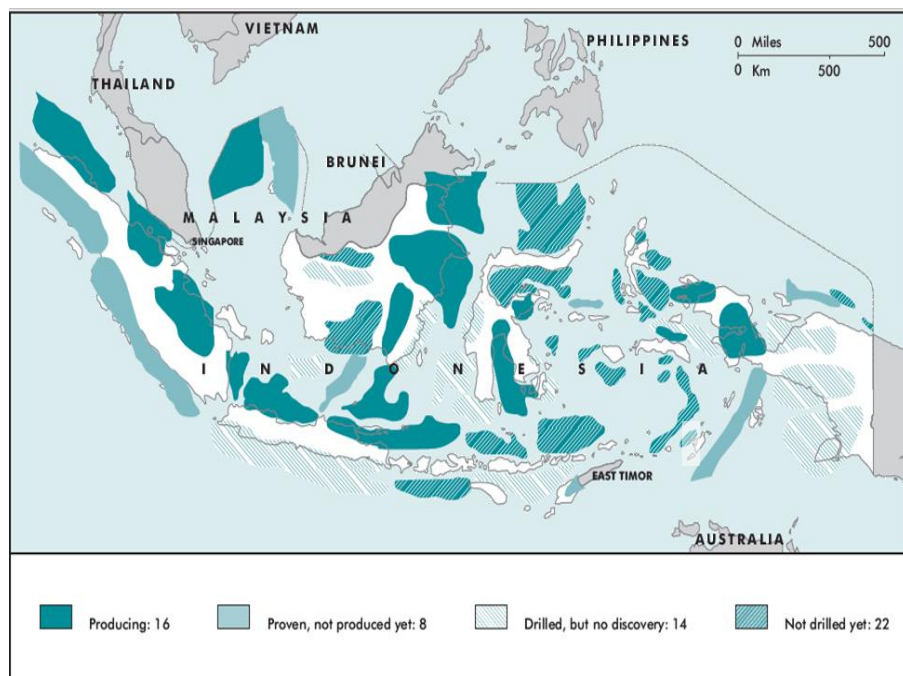
## Quadrant 4

The industry is looking to Eastern Indonesia; but with mixed results to date. Risk reduction and cost management is difficult in frontier basins – *Giants are the target.*

# Eastern Indonesia – the industry can't resist it

## Eastern Indonesia

- Australian geology under Asian tectonics
- Big gas from Permian coals in east
- Oil in numerous places around the Banda Arc
- A play-based approach to track the source rocks and identify favorable areas for exploration is the key



# Could the next Giants be unconventional?

## What you need?

## Does SE Asia have it?

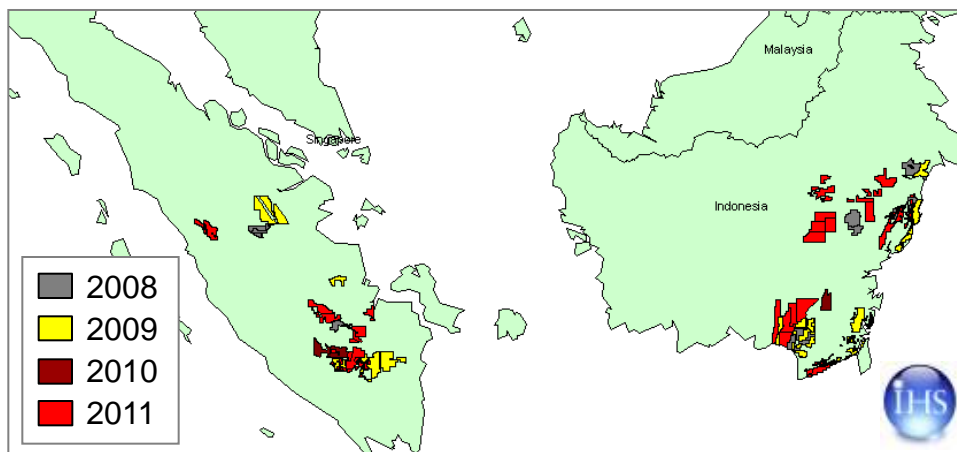
Good rocks with good understanding .....	In parts yes
Access to lots of land .....	Most of the basins are offshore and onshore is either remote or heavily utilised
Cheap rigs and technology .....	Should be okay
Good fiscal terms .....	Variable
Access to market .....	Gas markets could be the driver

**CBM in Indonesia and shale gas in the onshore Tertiary rifts?**

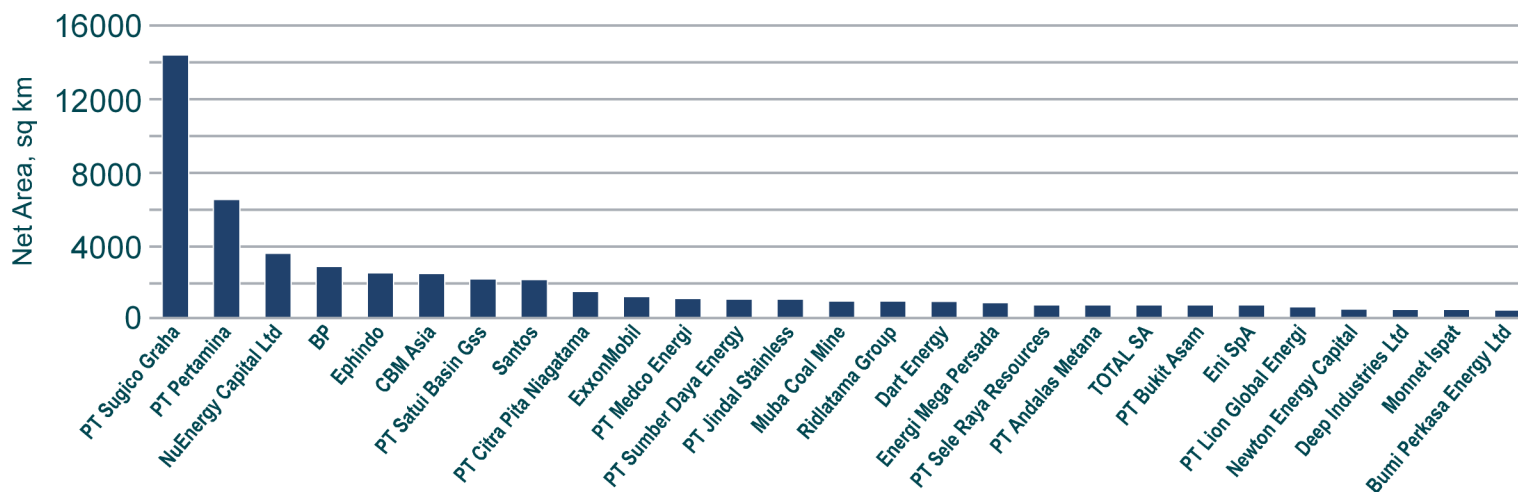
# Indonesia CBM gas resource plays



# Investment in CBM continues to grow

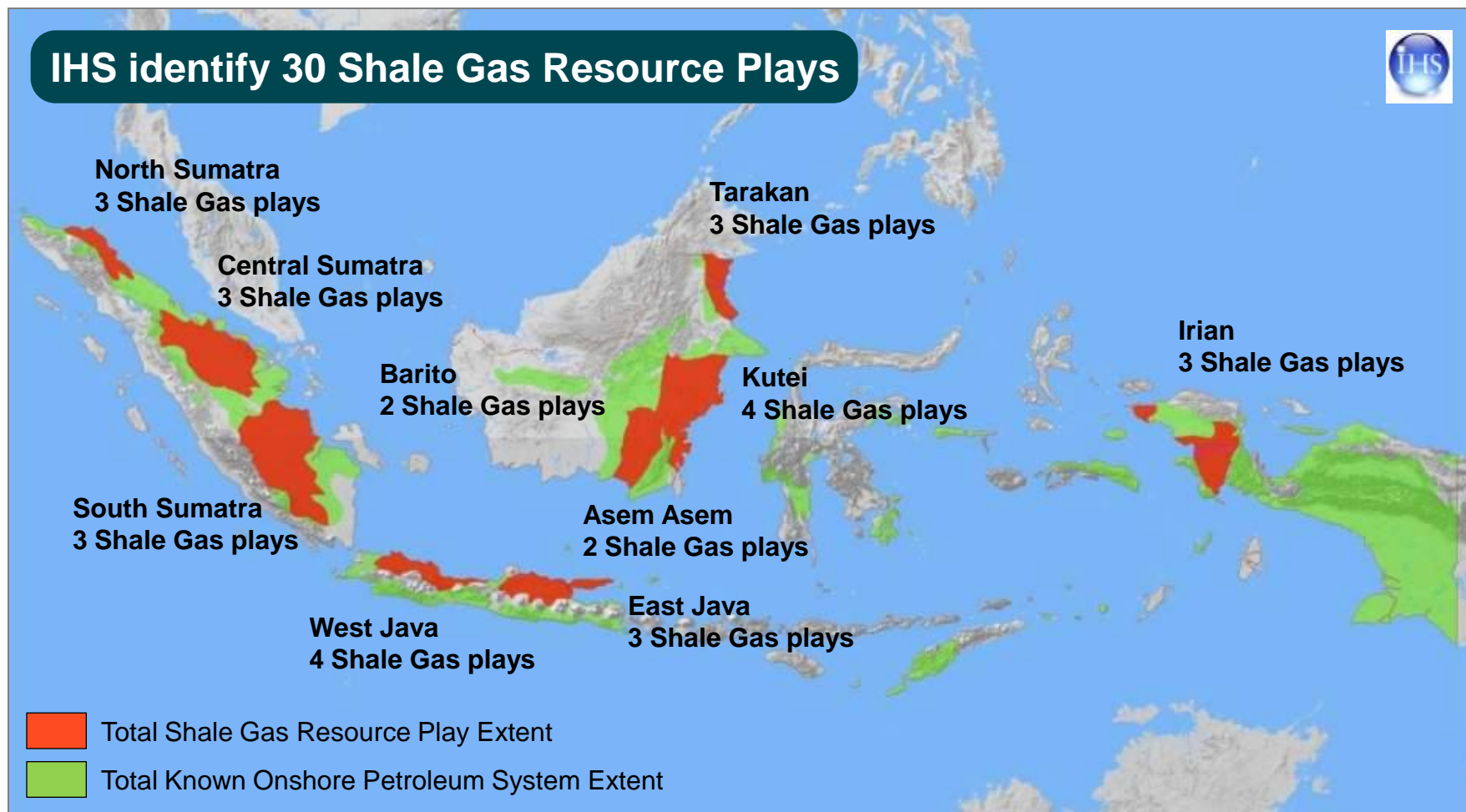


- 46 CBM PSCs as of end 2011 (Sumatra and Kalimantan)
- Total firm commitments of ~ US\$ 275 million (~ 326 coreholes/pilot holes)
- Signature bonus payment of US\$ 51.5 million

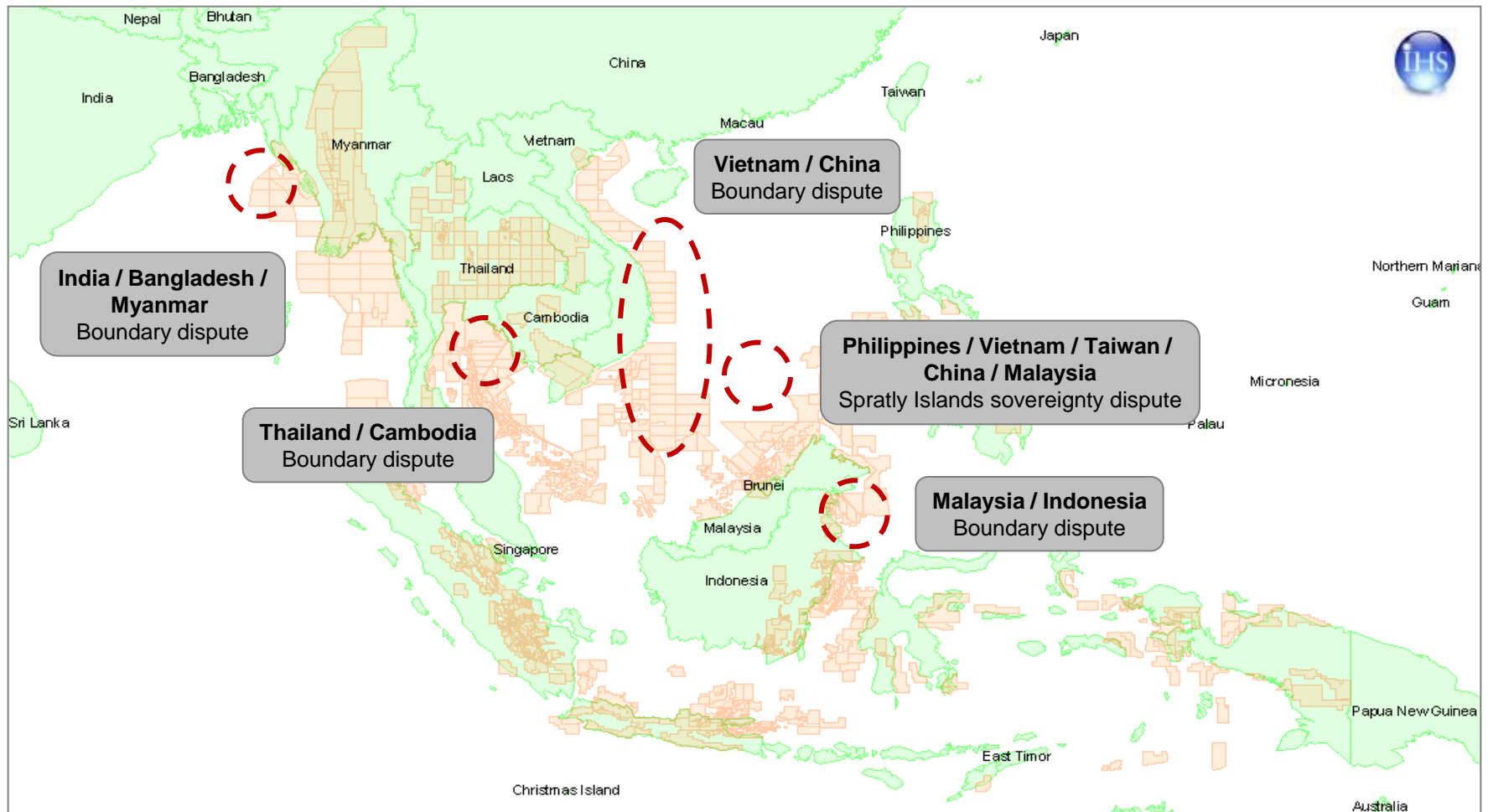




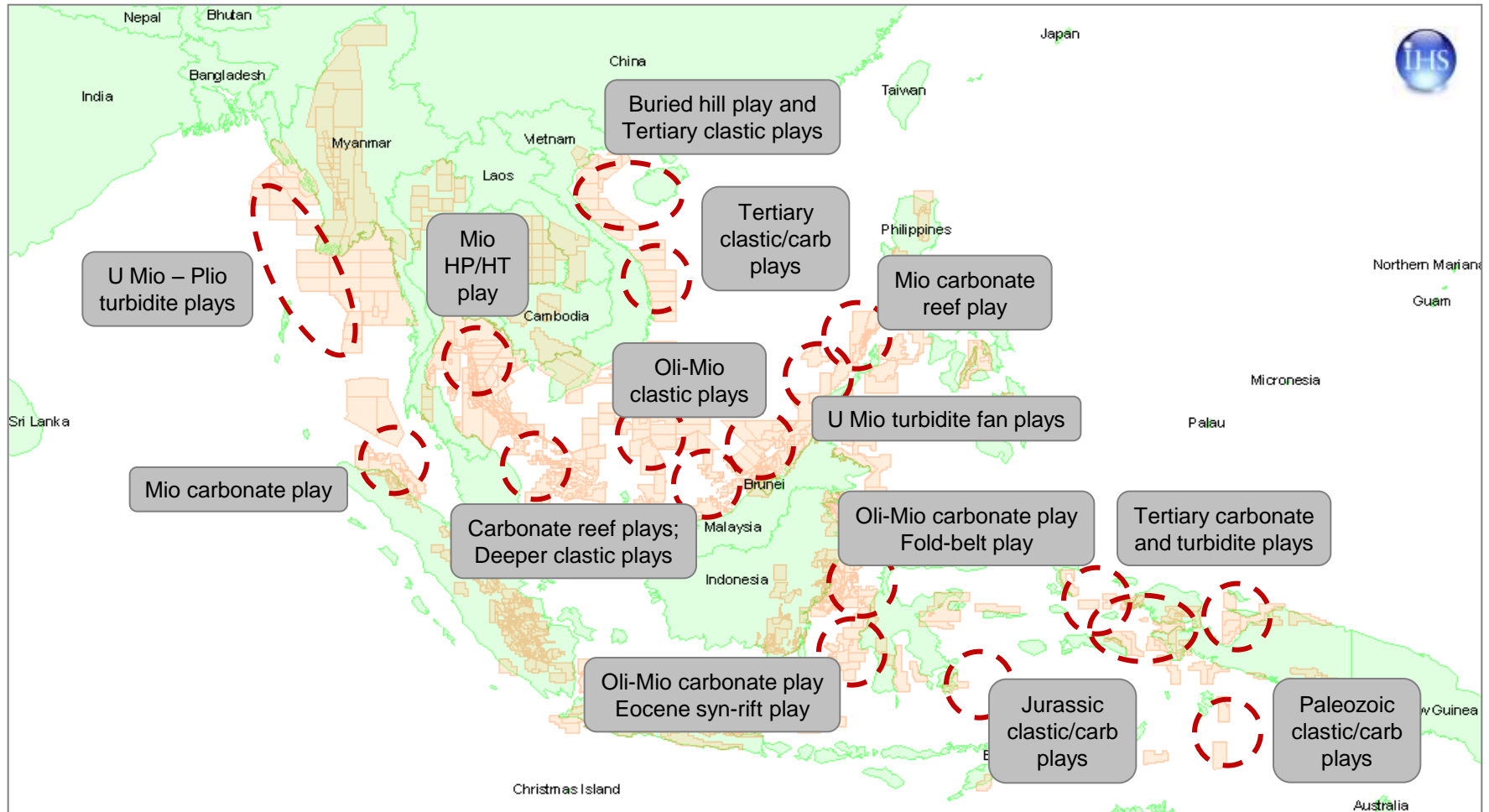
# Indonesia shale gas resource plays



# SE Asia ongoing political discontinuities



# IHS identify >15 Exploration hot spots with key play targets to be drilled over next 24 months



# Summary and conclusions

## Recent Industry Trends:

- Exploration has apparently destroyed value chasing “Giants” in Asia;
- BUT, Giant discoveries continue to be made in the region.

## Creaming Curve analyses for regional areas have good statistical coherency and trends are clear:

- In SEA an average exploration well has a 1 in 4 chance of finding hydrocarbons and trends predict discoveries to average 55 mmboe in 2012, decreasing in size into the future.
- Decreasing discovery sizes are making it more difficult to provide transformational growth, particularly in the classic heartland of SE Asia Tertiary Rift Basins.
- Sustained exploration success is predicted.

## A large resource base may be unlocked through unconventional exploration.

## Value creating conventional “Giants” remain to be discovered in Deep water areas and potentially Eastern Indonesia provided:

***Risks can be reduced, a market is available for gas and politics don't interfere!***

Thank You