

Panel Discussion 3 – Tapping Indonesia's Unconventional Gas Resources

Indonesia's Opportunity in the Development of Unconventional Gas Resources

By:

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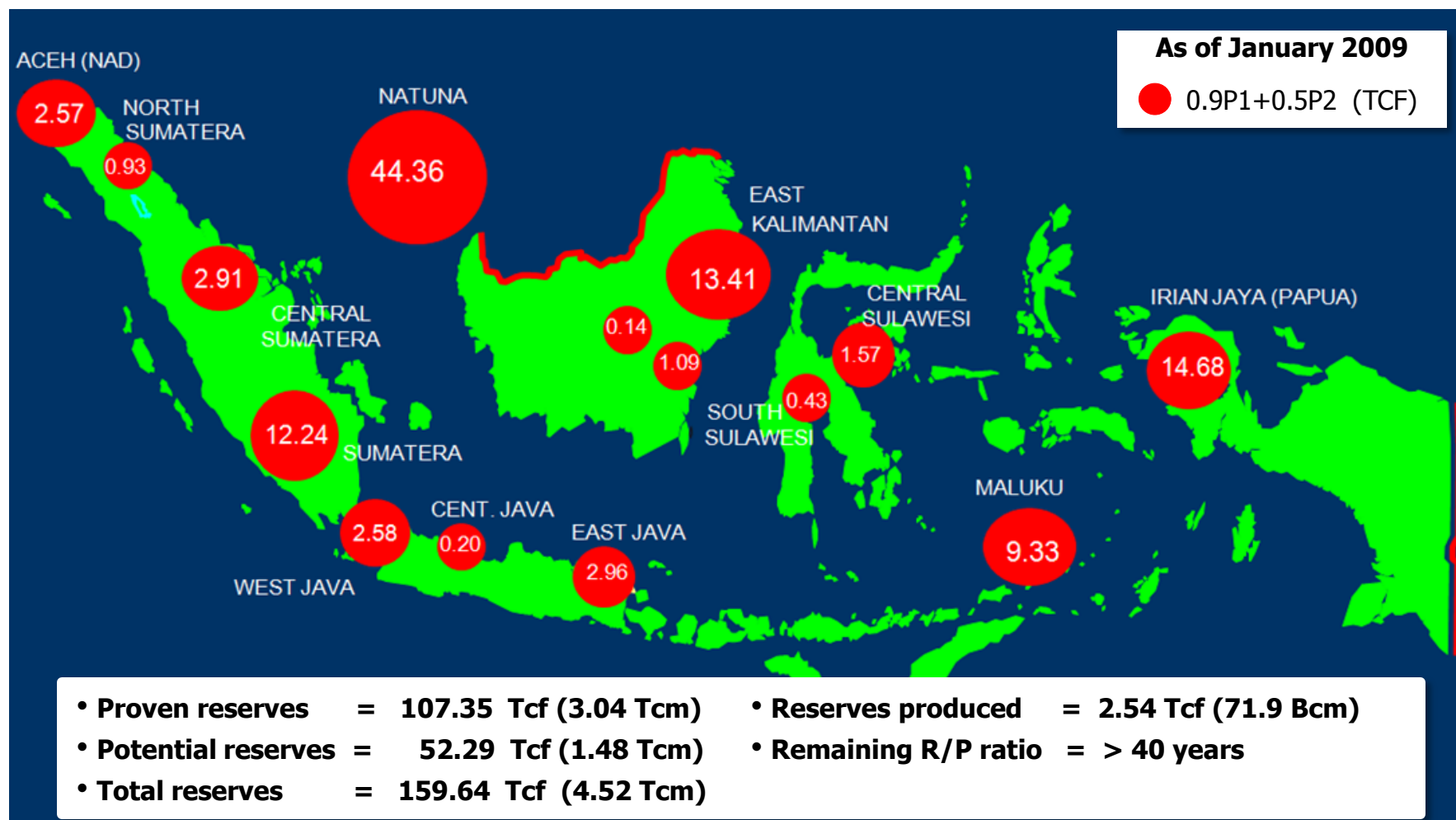


1. Introduction
2. Harnessing Opportunities
3. Issues & Challenges
4. Closing Remarks



Market outlook

Country profile on current conventional natural gas reserves



- The Indonesia's total proven conventional natural gas reserves amounted to 107.35 Tcf (3.04 Tcm), ranking as the fourteenth largest in the world.

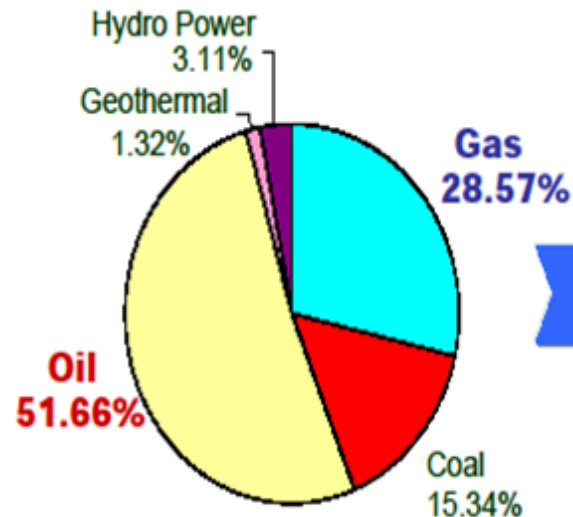


Market outlook

The nation's target of primary energy consumption in 2025

Target of Energy Mix (Presidential Regulation No.5 of 2006)

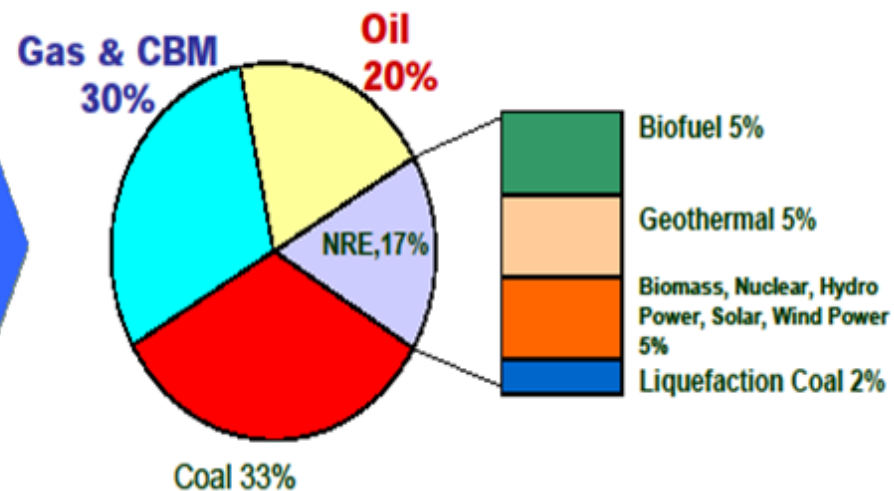
Primary energy mix 2006



Energy elasticity = 1.8

Non-fossil energy < 5%

Primary energy mix 2025



Energy elasticity < 1

Non-fossil energy

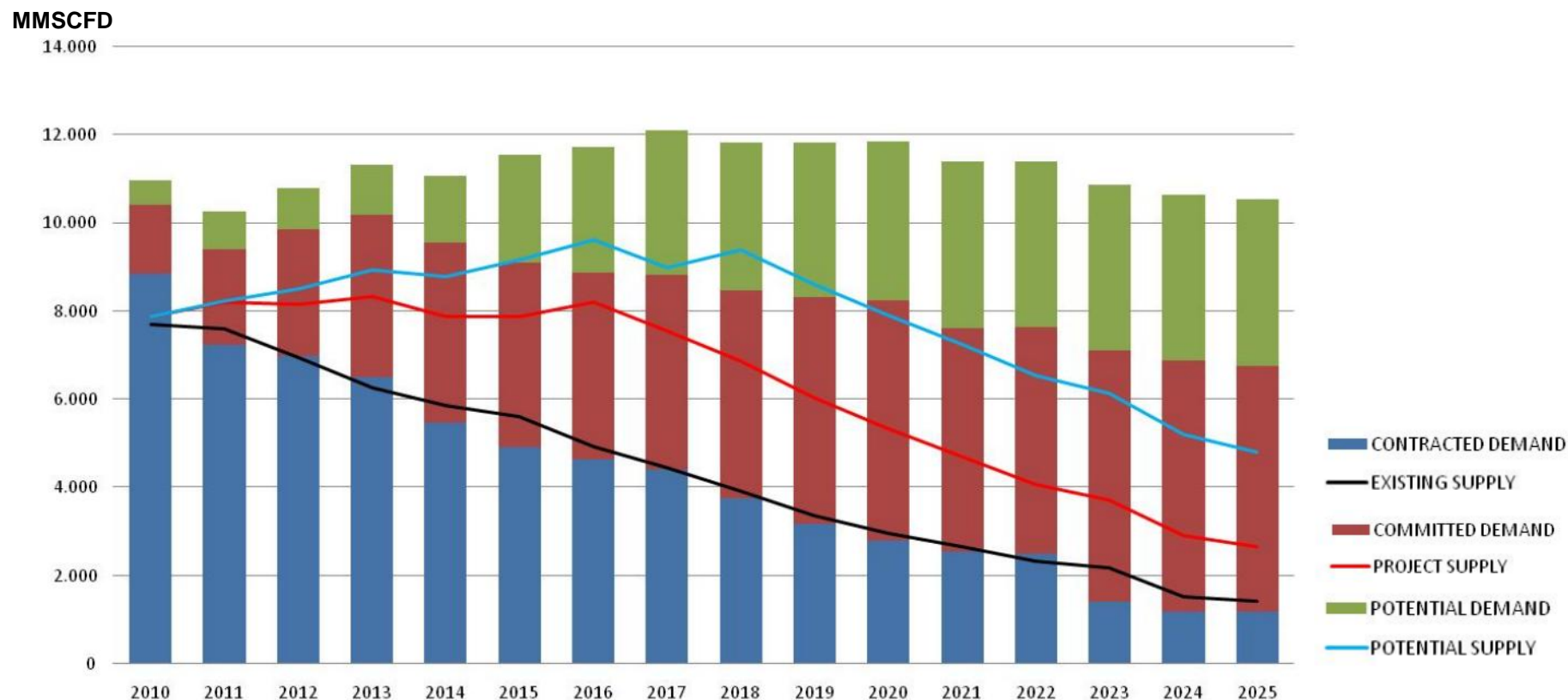
New & Renewable Energy > 17%

- Coal remains as the primary fuel in the total energy mix by 2025.
- Significant reduction of oil's share, robust usage of natural gas and CBM and significant increase alternative energy consumption by 2025.



Market outlook

Natural gas supply – demand balance 2010 - 2025

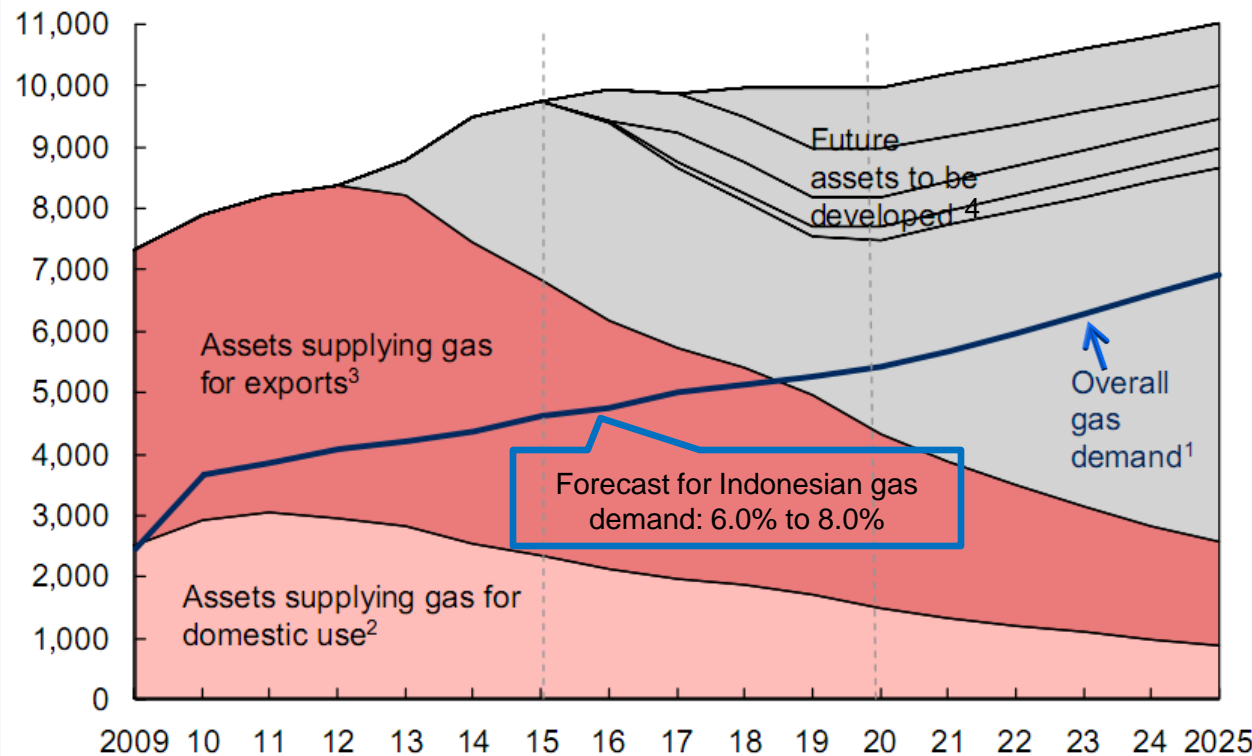


- Domestic gas supply is struggling to keep pace with growing domestic gas demand.
- Integrated approach to meet gas demand (supply, infrastructure & demand management).
- A necessity to identify potential sources of gas supply to address gas demand gap.
- To fulfill domestic needs while capturing export potential.



Tackling possible 'gas supply shortage' situation Indonesia to develop new sources to sustain natural gas availability

Indonesia Gas Production Forecast
mmscf/d



- Future developments
- Existing assets
- Gas demand

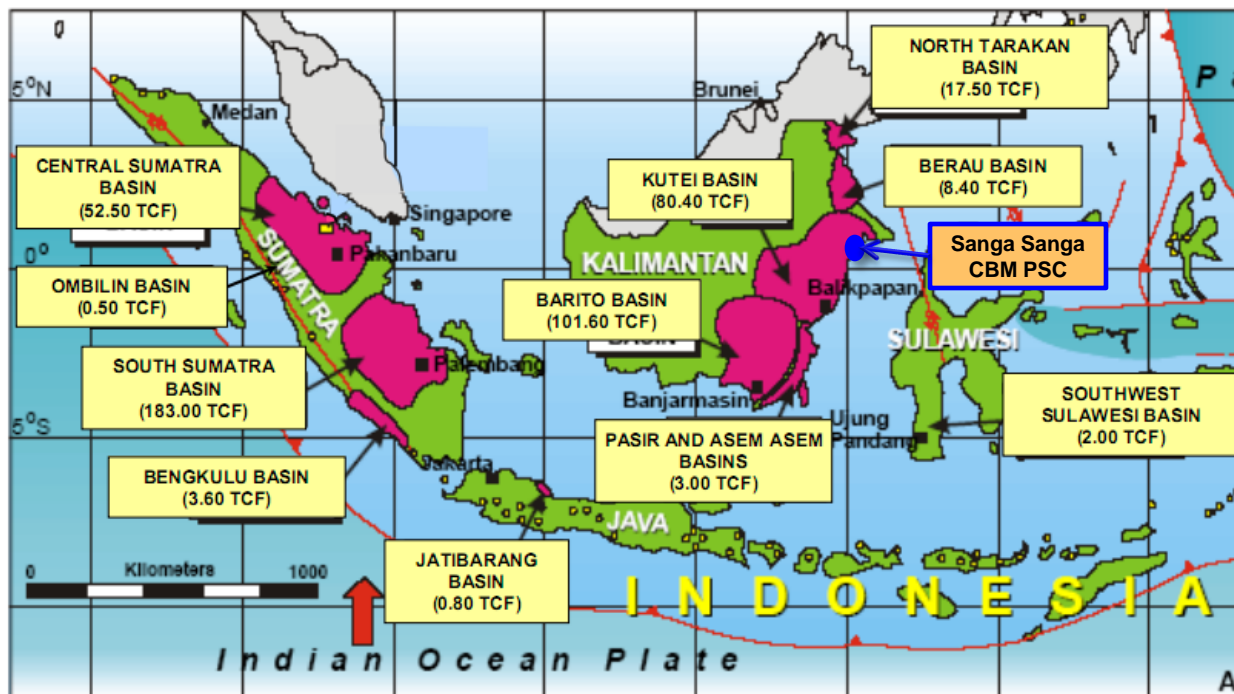
1. 2025 demand number based on extrapolation of 2020 demand numbers at 5%.
2. Includes Subang, Corridor, ONWJ, West Madura, Kangean, Madura Offshore and Poleng.
3. Supplies to Bontang, Arun and Tangguh including Mahakam, Berau, Wiriagar, Muturu & North Sumatra.
4. Assets to be developed – Natuna, Masela, CBM Kalimantan

- Power generation, industrial and fertilizers will drive domestic gas demand until 2025.
- Existing assets are declining rapidly and need to be replaced by new supply sources to meet growing domestic demand.



Unconventional Gas Development

Coal Bed Methane (CBM) resources in Indonesia



Total Resources = 453.30 TCF

Total CBM Basins = 11

Basin	CBM Resources (Tcf)	Prospect-ivity level
S. Sumatra	183.0	High
Barito	101.6	
Kutei	80.4	
C. Sumatra	52.5	Medium
N. Tarakan	17.50	
Berau	8.40	
Ombilin	0.50	
Pasir/Asem	3.00	
Jatibarang	0.80	
S.W. Sulawesi	2.0	Low
Bengkulu	3.6	
Total	453.30 Tcf	

- To date, 20 active CBM PSCs across 11 different basins. Operated accordingly by ExxonMobil, Medco Energi, Dart Energy, VICO and small local companies.
- A slow start for the emerging CBM industry as it is now in exploration and appraisal stages.
- Sanga Sanga CBM PSC is the notable one. Its aim is to be the world's 1st CBM-to-LNG project.



Indonesia's CBM potential

Strong enthusiasm for CBM acreage. How much could be produced?

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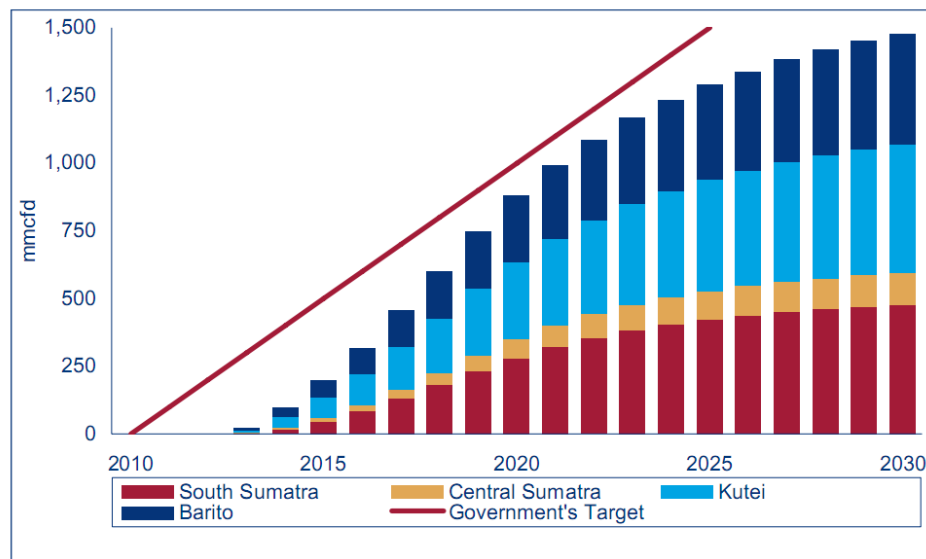


Estimates of Indonesian CBM reserves (High prospectivity level)

Basin	GIIP (Tcf)	Resource/well (bcf/well)	Expected Recovery Factor (%)	Resource Potential (Tcf)
South Sumatra	183.0	1.2	13%	24.0
Barito	102.0	1.43	14%	14.0
Kutei	80.0	1.43	14%	11.0
Central Sumatra	53.0	1.2	13%	7.0
	418.0			56.0

*Assumptions: 30 – 34 year asset lifespan, 5 year average dewatering program and 0.32 mmcf/d/well peak production.

Indonesia's CBM unconstrained supply availability*



*Note: Revised forecast - South East Asia Gas and Power Service July 2010 update

- Indonesian Government targets:-
 - First CBM production in 2011
 - A ramp-up rate of 1,500 mmcf/d by 2025

versus

- Wood Mackenzie estimates:-
 - First CBM production in 2013
 - Initial rate of 22 mmcf/d
 - A ramp-up rate of 900 mmcf/d in 2020
 - A ramp-up rate of 1,300 mmcf/d in 2025

- In reality, a slow startup CBM production due to commercial, technical, and regulatory issues



Unconventional Gas Development

Shale gas potential is enormous yet its play is still at an early stage

- Indonesia has numerous shale gas basins that are only now starting to be evaluated.
- Papua (Eastern Indonesia) and Sumatra (Western Indonesia) have been identified as the main development areas for shale gas.
- From initial studies by Bandung Institute of Technology, Indonesia holds around 1,000 Tcf of shale gas resources particularly in the eastern part.
 - **By analogy: 1,000 Tcf would supply the USA for about 80 years**
- Earlier 2010, the Indonesian government has announced to float tender of their shale gas blocks. No progress on the tender was seen thus far.



Indonesia's unconventional gas potential

When considering unconventional gas, remember that Indonesia is *not* the US!

US Unconventionals

Established thick shale deposits with high organic content at accessible depths.

Highly competitive environment pushing technology.

Regulatory agencies quick to understand and react to operators needs.

US land owners own their mineral rights - facilitates land access.

Open market, multiple players.
Open licensing of acreage.

Service sector highly developed/competitive with 600 rigs able to drill horizontal wells.

US gas suppliers have access to a vast liberalised pipeline transmission system.

Geology

Technology

Licensing & Regulation

Land Access

Competition

Service Sector

Infrastructure & Markets

Indonesia Unconventionals

Difficult topographies that include national parks and swamps in Kalimantan and forests in Sumatra.

Stimulating environment - combined knowledge of coal concessionaires and upstream operators.

Regulatory agencies need time to understand the needs of operators causing potential delays.

Direct offer CBM blocks. Frequent overlapping acreage for coal concessionaires and CBM licensees.

Regulated with strict conditions on market entry level for foreign players.

Service sector is in developing stage and requires sufficient incentives from local government.

Limited pipeline network for CBM developers to channel gas supplies to demand centres.



Unlocking Indonesia's unconventional gas potential

A promising play for the long term

- A growing potential with significant opportunities but yet to be fully assessed.
- Numerous key players such as ExxonMobil, VICO and Dart as well as local players e.g. Pertamina and Ephindo already established in the sector by securing footholds in the most prospective basins.
- Significant long term market opportunities for CBM, both in the gas-short markets of Java and Singapore as well as LNG export potential.
- CBM industry is expected to alter the dynamics of the Indonesian gas market when sufficient transmission and distribution infrastructure is developed.
- Continued government support will be essential and positive market fundamentals must remain in-place.



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