Challenges & Prospects in Enhancing Malaysia's Energy Security

National Energy Security Conference 2012
28th February 2012

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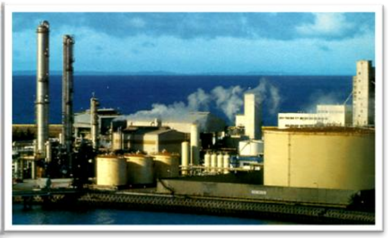


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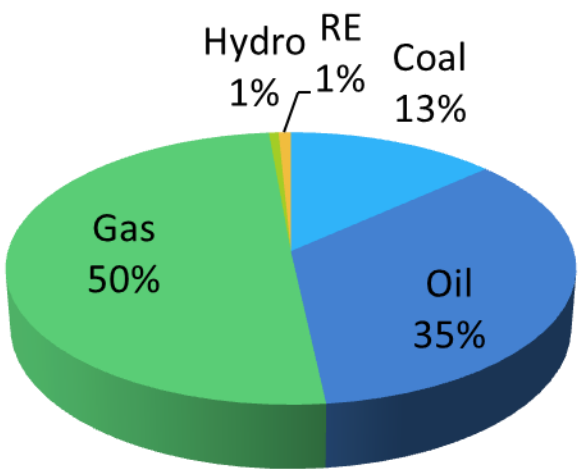
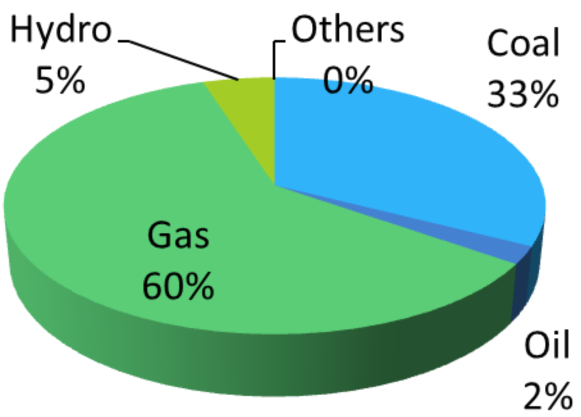
Malaysia needs to review its high dependency on gas for a sustainable economic growth…

Malaysia's Primary Energy Consumption 2010 (73,563 ktoe)



Malaysia's Power Generation Source 2010 (105,250 GWh)



Source: FGE Energy, PETRONAS

- Declining domestic production and increasing cost necessitate a review of energy mix

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As we are aware, Malaysia gas industry is facing many challenges…

Supply

- Indigenous Peninsula Malaysia production is not able to meet demand
  - domestic producing fields are on rapid decline due to accelerated extraction rate
- Over-stretching of the supply system has led to frequent supply interruptions
- Remaining reserves are technically & commercially challenged
  - Small in size
  - Scattered locations
  - High CO_2 content

Demand

- Inappropriately priced gas has created unsustainably high demand
  - end users preference to gas have increased compared to other higher cost of fuels such as coal, fuel oil, diesel or LPG

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To ensure security of gas supply to the nation a holistic market transformation is necessary…

Regulated Market → DOMESTIC GAS MARKET REFORM → Open Market

Infrastructure

- **Malaysia LNG Regasification Terminal**
  - RGT 1 in Melaka
  - RGT 2
  - RGT 3
- **Third Party Access for PGU & RGTs**

Pricing

- **Gradual removal of subsidy**

Policy & Regulatory Framework

- **New Energy Policy 2010 & 10th Malaysia Plan**
- **Malaysia's Competition Act 2010**
- **Review of energy mix**
- **Clarity in roles and functions of Regulators**

Supply Management

- **LNG**
  - New domestic projects e.g. FLNG & T9
  - Imports
- **Enhance supply from**
  - MTJDA
  - West Natuna
- **Domestic E&P**
  - Enhance production from existing producing fields
  - Accelerate marginal fields monetisation
  - Intensify exploration efforts

Source: PETRONAS

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Market reform…

“Easier said than done…”

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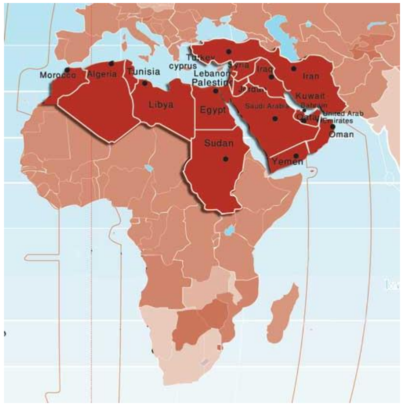
Malaysia still faces external challenges in securing energy security for the country…

Competition for gas/LNG volumes

High cost environment leading to high cost of LNG purchases

MENA crisis heightens uncertainties & pushes up commodity prices



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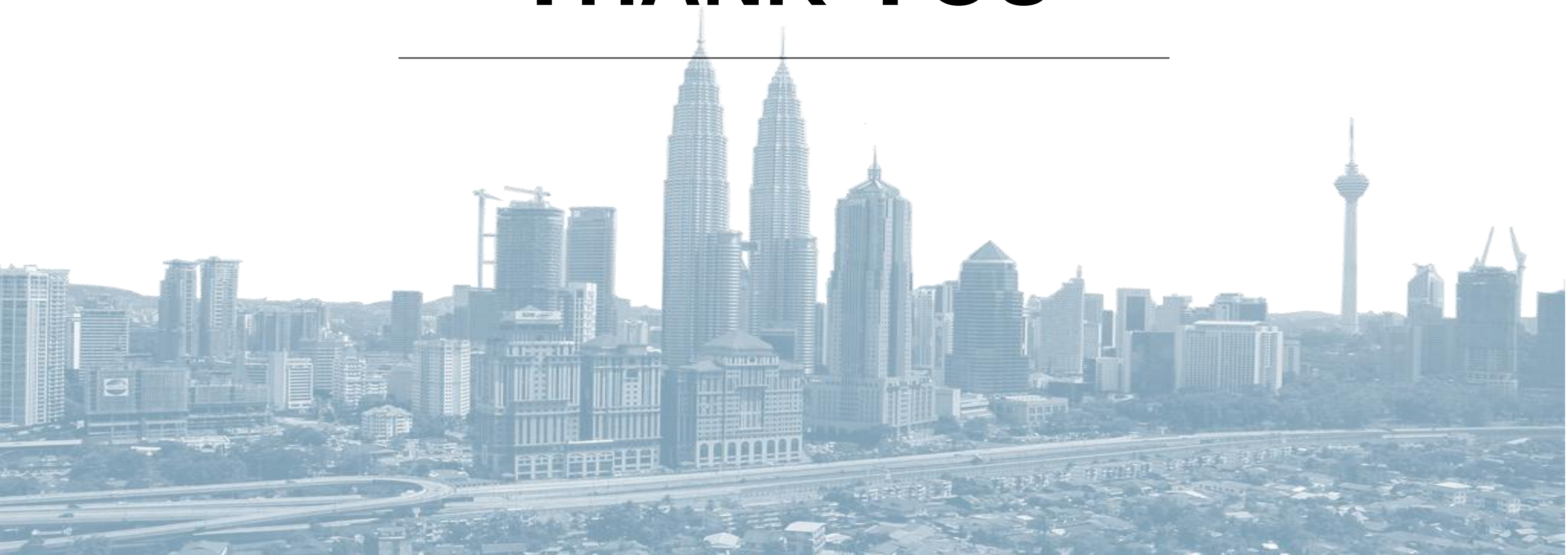
Way forward

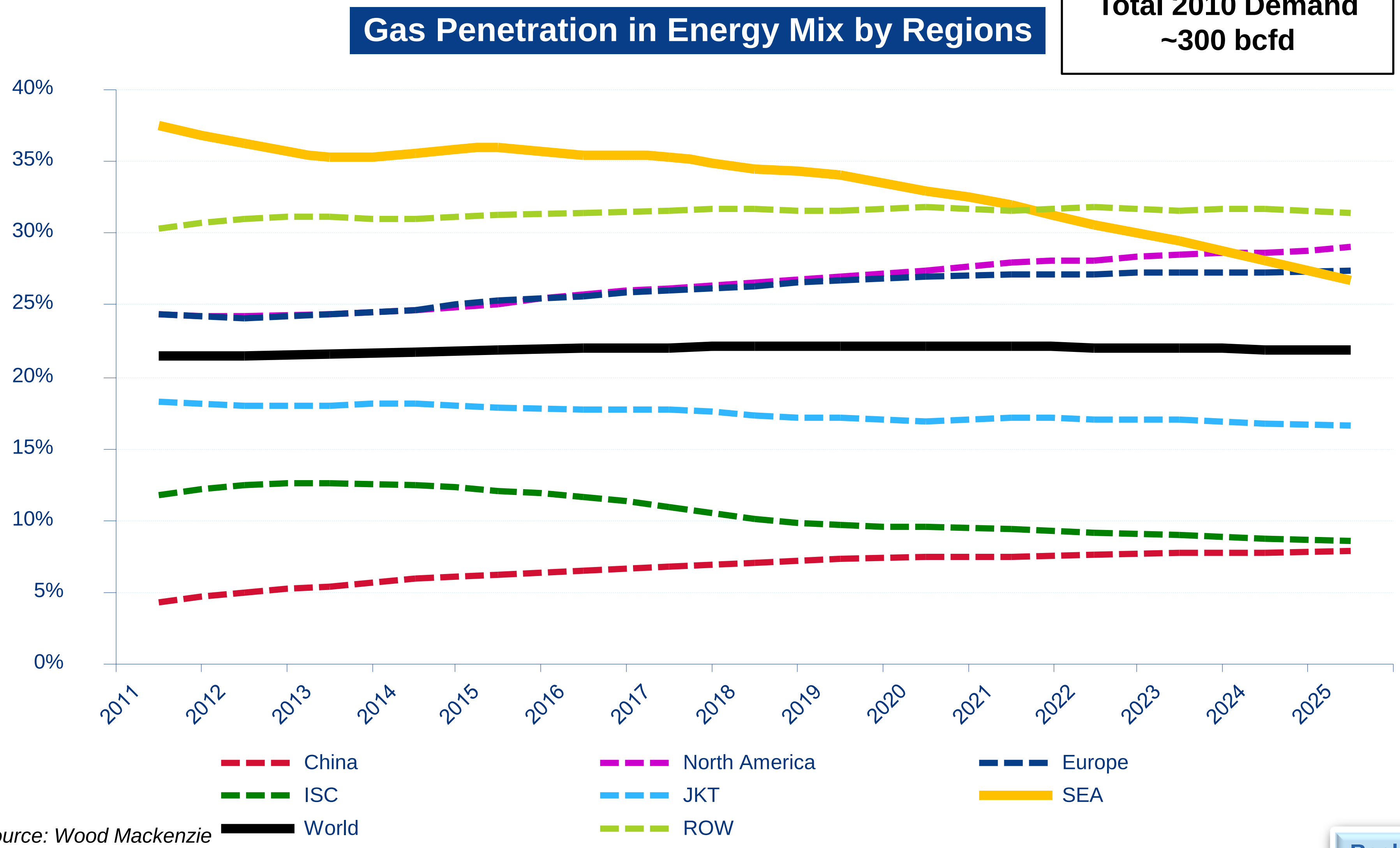
- Malaysia need to review its **high gas dependency** in the energy mix especially in power sector
- Gas needs to be priced at its **true value**
- Malaysia need to move towards a **sustainable economic** model that competes on productivity and innovation rather than on low cost of natural resources
- **Market reform** requires holistic and disciplined efforts by all stakeholders

THANK YOU



Gas penetration in South East Asia markets is typically high compared to other regions

Total 2010 Demand ~300 bcfd



Source: Wood Mackenzie

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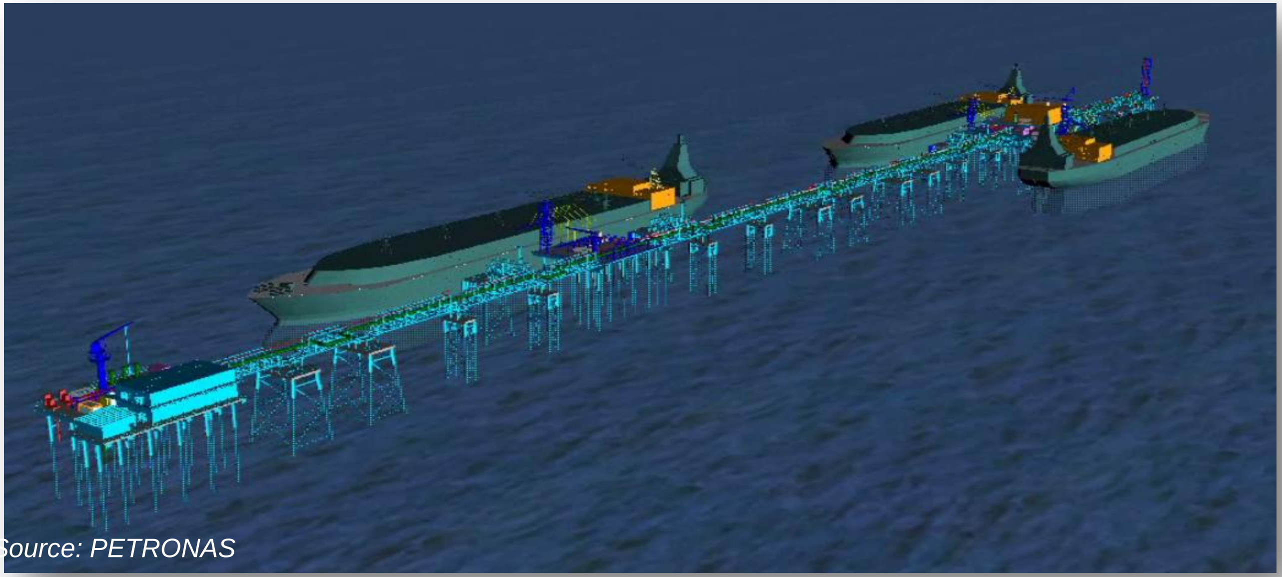
RGT 1 progress as at January 2012 is 82.34% and targeted to be operational by end August 2012

- **Designed to receive, store and vaporise imported LNG with a maximum capacity of 3.8 MTPA (up to 530 MMSCFD).**

- **The terminal consists of :**
  - **2 Floating Storage Unit (FSUs)**
  - **Island Jetty with Regasification System (JRU)**
  - **Sub-sea & On-Shore Pipeline**



Source: PETRONAS

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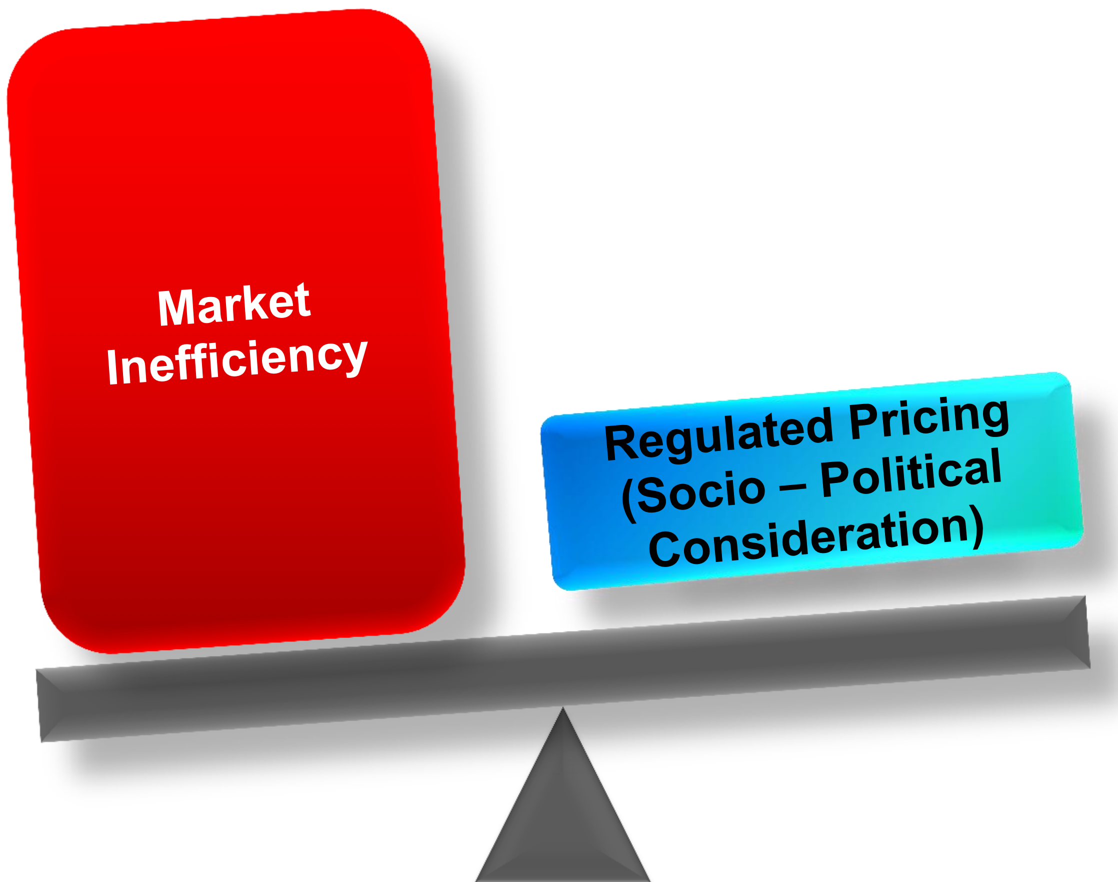
Prolonged regulated pricing causes market imbalance & inefficiencies

- Inefficient usage
- Gas shortage
- Does not reflect cost of new supplies



Source: PETRONAS

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Oil indexed gas price will still be dominant especially in the Asian and Europe market

Source: PETRONAS

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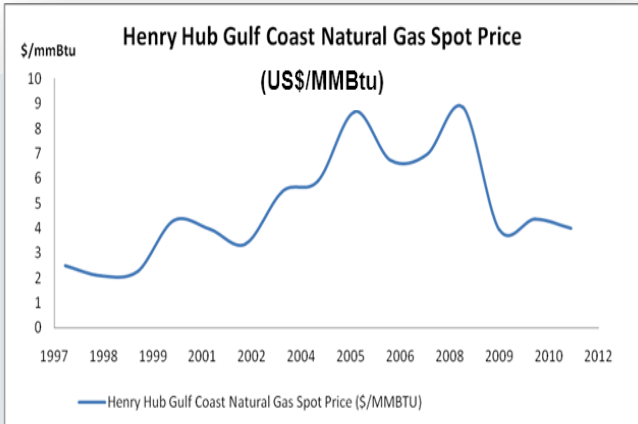
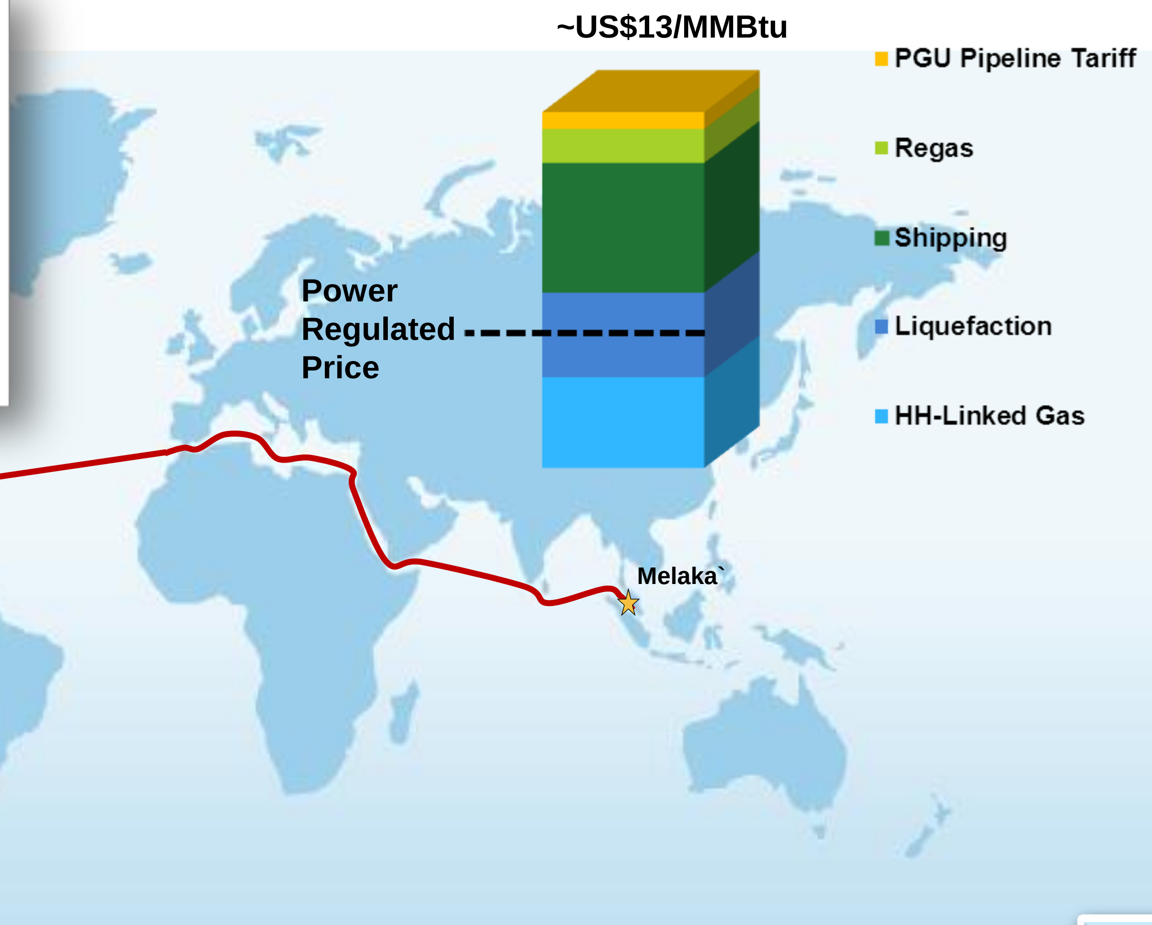
Importation of LNG from US may be feasible …

…but is also exposed to price risk as development cost need to be underpinned by long term gas supply agreement





Source: EIA, Wood Mackenzie, PETRONAS

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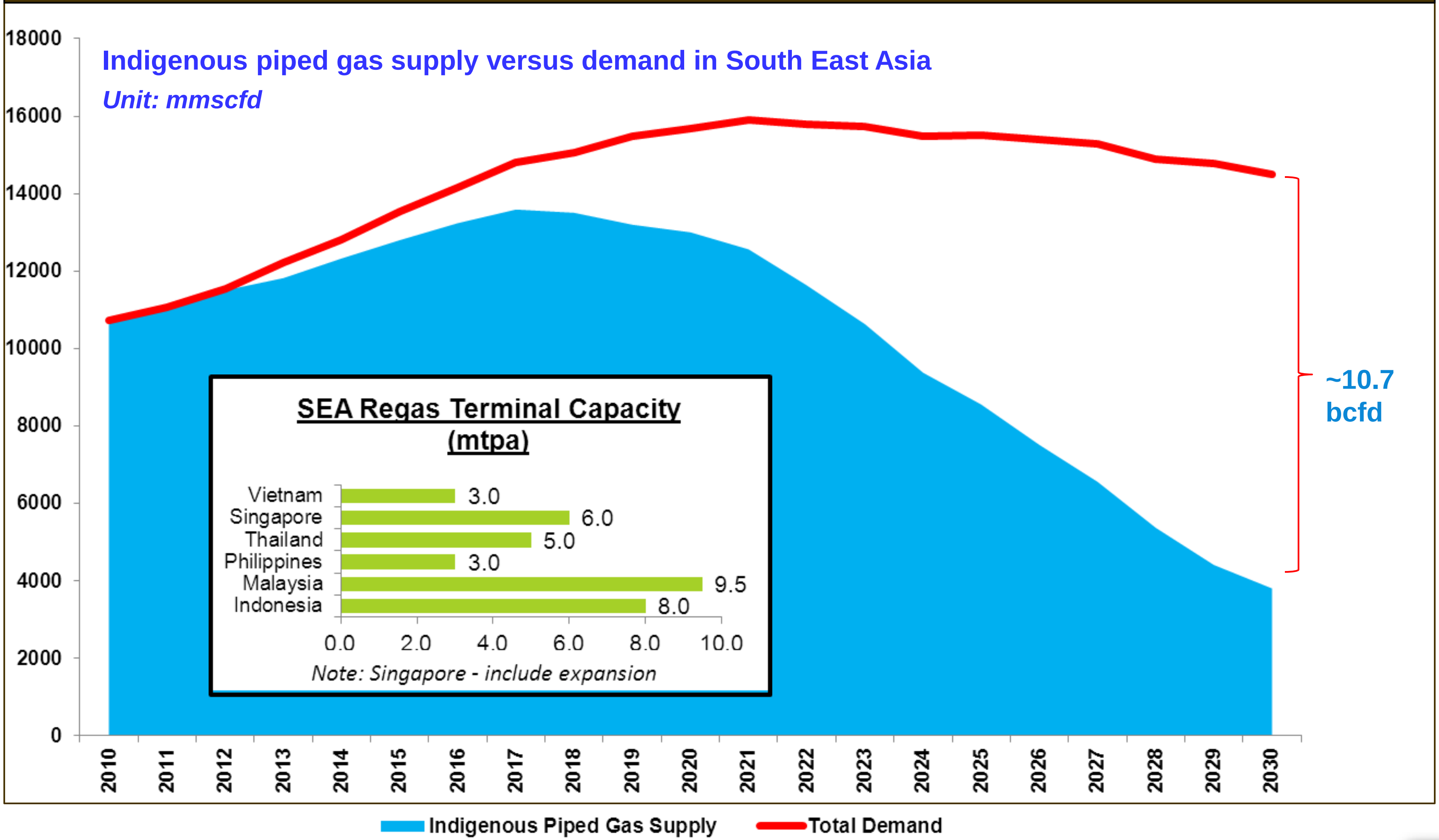
Available piped gas supply in the ASEAN region is inadequate to meet rising demands

ASEAN region will face the stark reality of depleting available indigenous piped gas resources post-2012, with widening supply-demand gap ~10.7 bcfd in 2030



Source: Wood Mackenzie, PETRONAS

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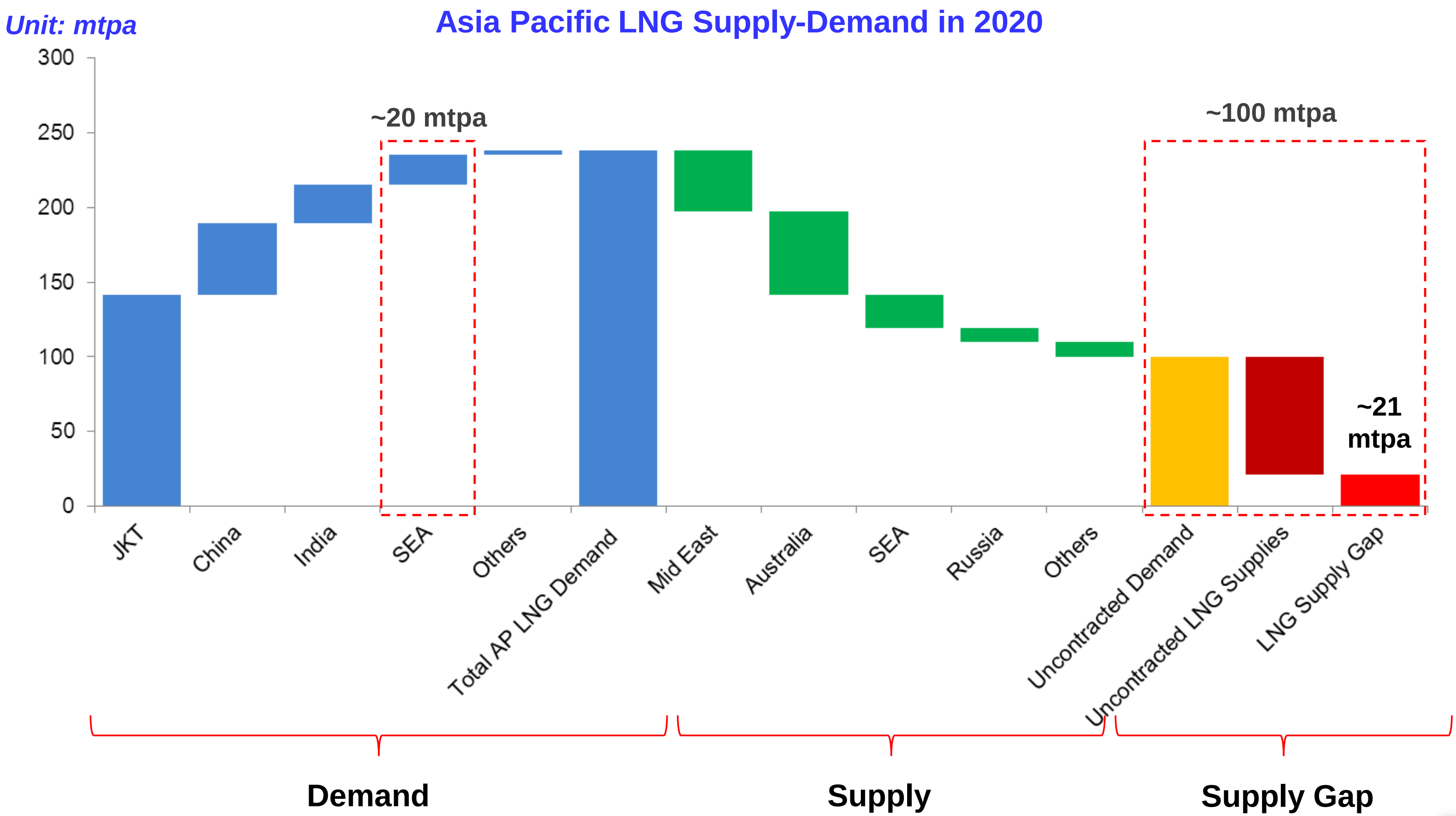
However, Malaysia/ ASEAN is facing growing competition for LNG volume

ASEAN will need as much as ~20 mtpa of LNG volume to meet its demand by 2020



Source: Wood Mackenzie, PETRONAS

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Development of unconventional gas in SEA is expected to be limited

Unconventional Commercialisation Index

	Resource Potential	Supply Chain/ Infrastructure	Land Access	Regulatory & Environmental
North America	GREEN	GREEN	GREEN	GREEN
Australia	GREEN	GREEN	GREEN	YELLOW
Europe	YELLOW	RED	RED	YELLOW
China	GREEN	YELLOW	YELLOW	YELLOW
South East Asia	YELLOW	RED	RED	RED

GREEN - Favourable ; YELLOW - Moderate ; RED - Challenging

Source: Wood Mackenzie, PETRONAS

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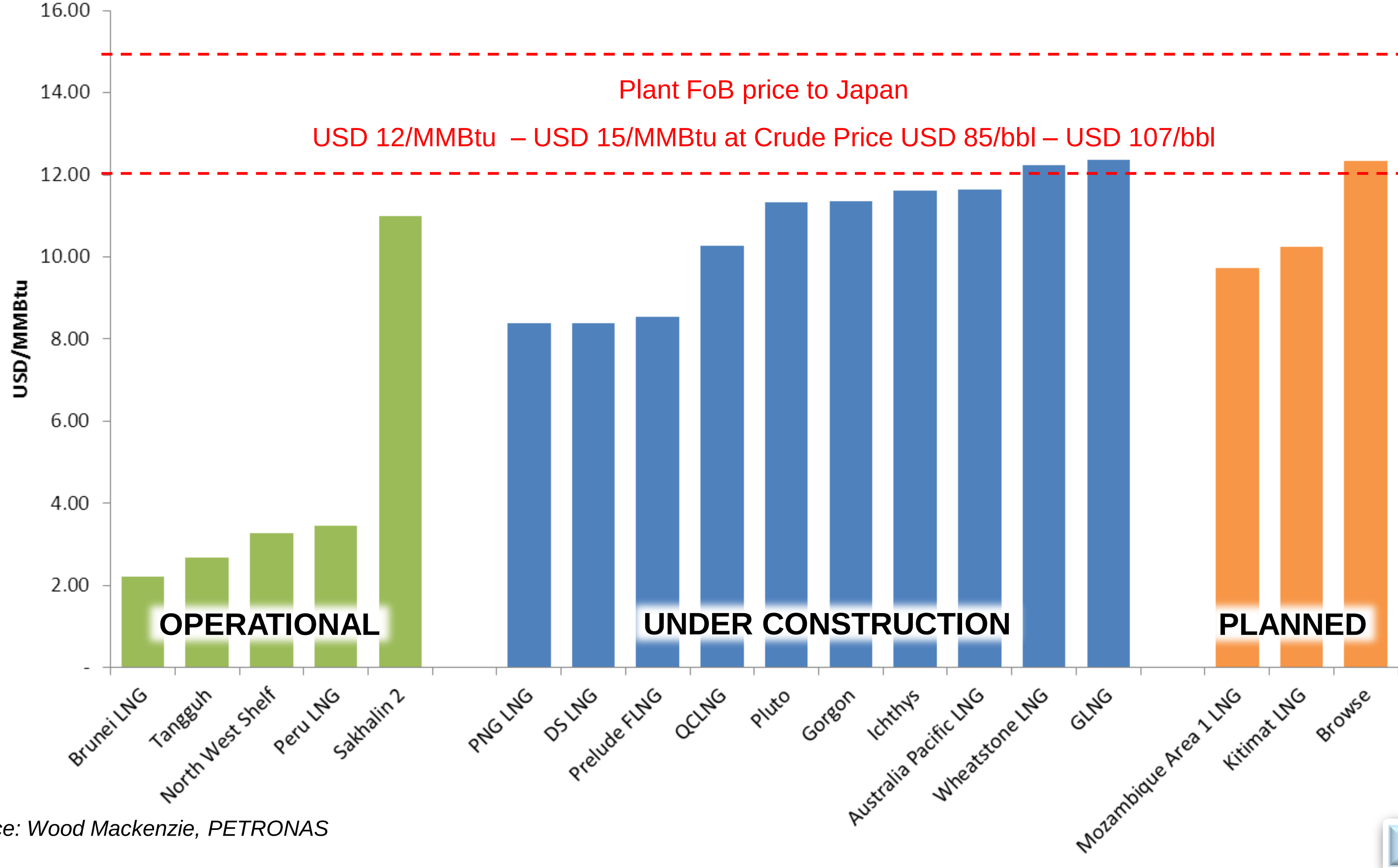
Going forward, it is expected that new LNG projects serving Asia Pacific will require high cost to materialize

New projects serving Asia Pacific require breakeven cost of USD 8/mmbtu or higher to be economically viable



Source: Wood Mackenzie, PETRONAS

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Disruptions from key producing countries in MENA will add an upward momentum to crude oil prices

All price projections for Brent crude are >US$100/bbl

$143/bbl

~ PIRA

$105/bbl

~ CERA

$105/bbl

~ Wood Mackenzie

$123/bbl

~ FACTS

** Projections for 2016*

- High oil prices will exert upward pressure on other energy and commodity prices

Source: PETRONAS

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