KUALA LUMPUR 2012 WORLD GAS CONFERENCE

25th world gas conference

"Gas: Sustaining Future Global Growth"

The Gas Markets of ASEAN

By: Nazlee bt. Abdul Aziz

Manager, Quantitative Research

PETRONAS LNG Ltd

Date:5th June 2012

Venue: Room 406/7, KLCC Convention Centre

Patron	Host	Host Sponsor
IGU INTERNATIONAL GAS UNION UNION INTERNATIONALE DU GAZ	MALAYSIAN Gas ASSOCIATION	PETRONAS

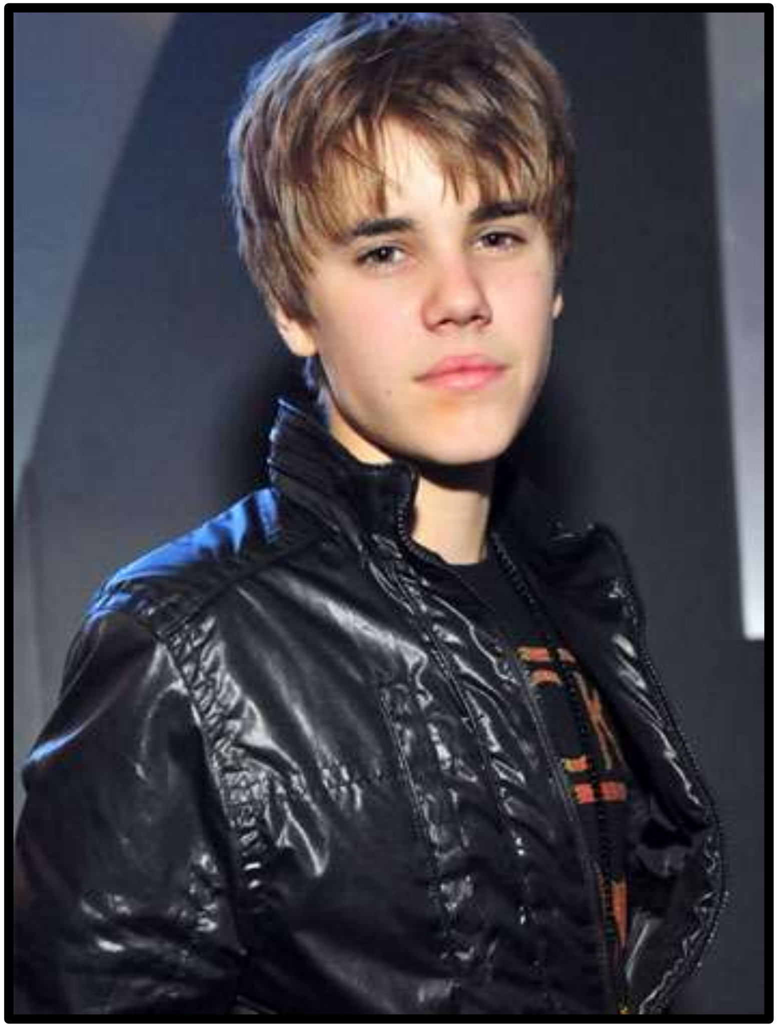
PGC C-1 – ASEAN Report

This presentation is based on an 80 page report co-authored by Graeme Bethune (Australia), Eduardo Frozza (Brazil), Nazlee Abdul Aziz (Malaysia), Sungbok Park (South Korea), Suresh Vasudevan (Malaysia). Assisted by CIRU and Gas and Power Business, PETRONAS

Contents of Report

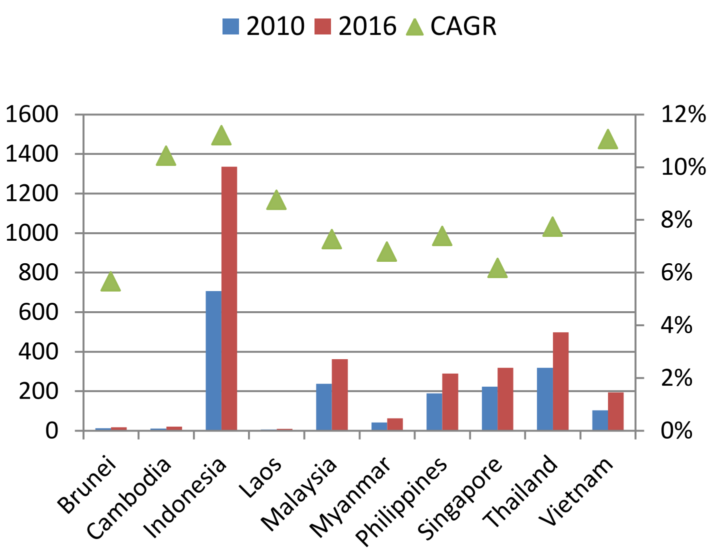
- Executive summary
- Region Overview
- Country Analysis
- Supply/ Demand
- Infrastructure
- Key Players
- Government Policies
- Issues and Challenges, Growth Opportunities and Potential Investments

ASEAN Gas Market – Young Adult With Potential



ASEAN – Economies with healthy growth projection with a equally healthy energy demand projection

- With economic growth rate (CAGR) of above 5 %, in ASEAN countries, power consumption is projected to increase for the forecast period of 2012 to 2024.
- Accordingly, ASEAN gas demand will be growing at between 1% - 5% from 2010 to 2030 in most of current core gas consuming nations, with the fastest growth in Vietnam (CAGR 5%), but the largest growth in terms of volume will be from Indonesia, Malaysia and Thailand.



ASEAN GDP Growth 2010 – 2016
Source: IMF

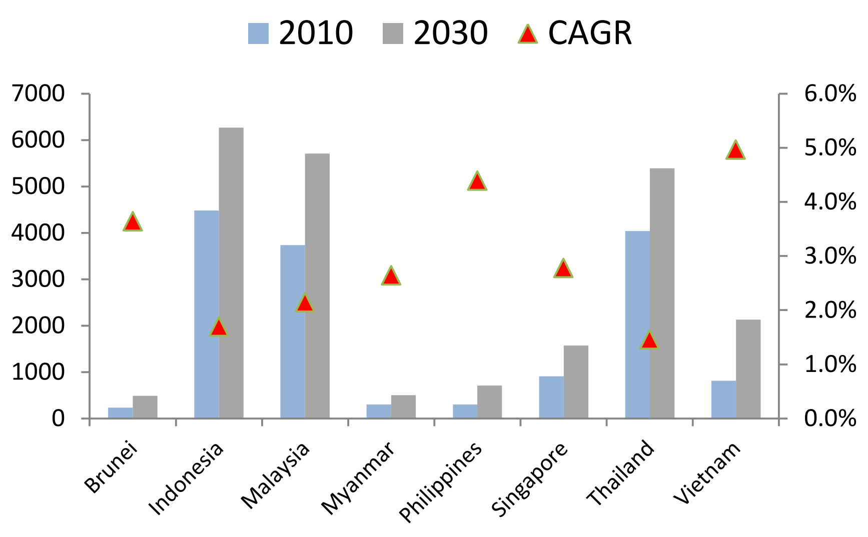
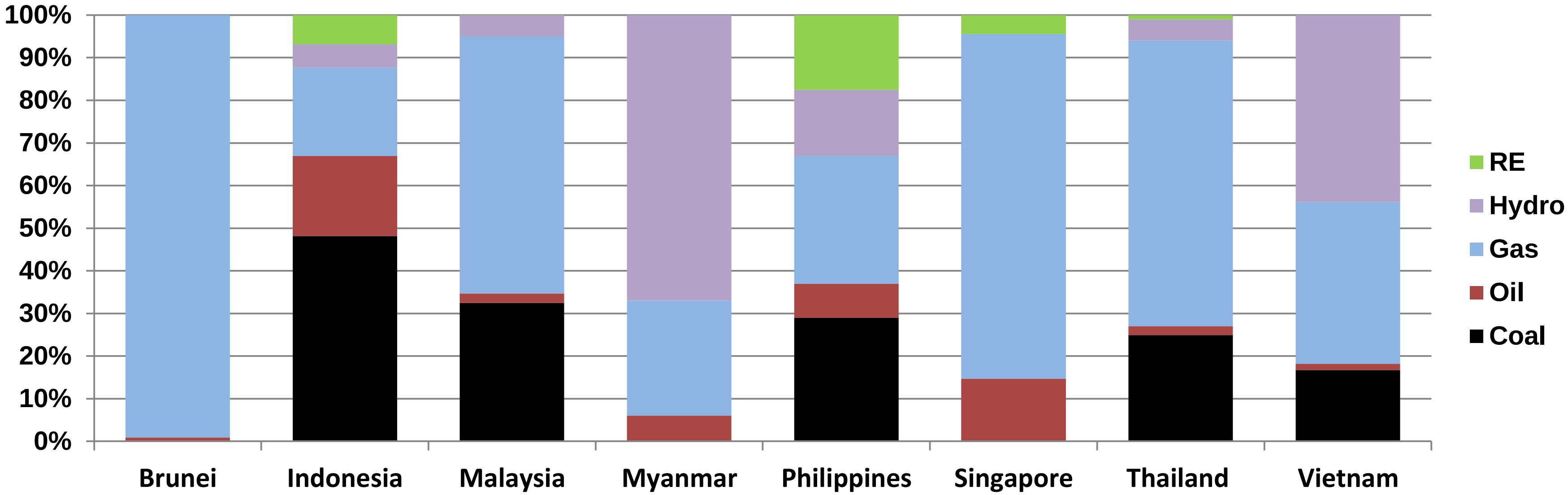
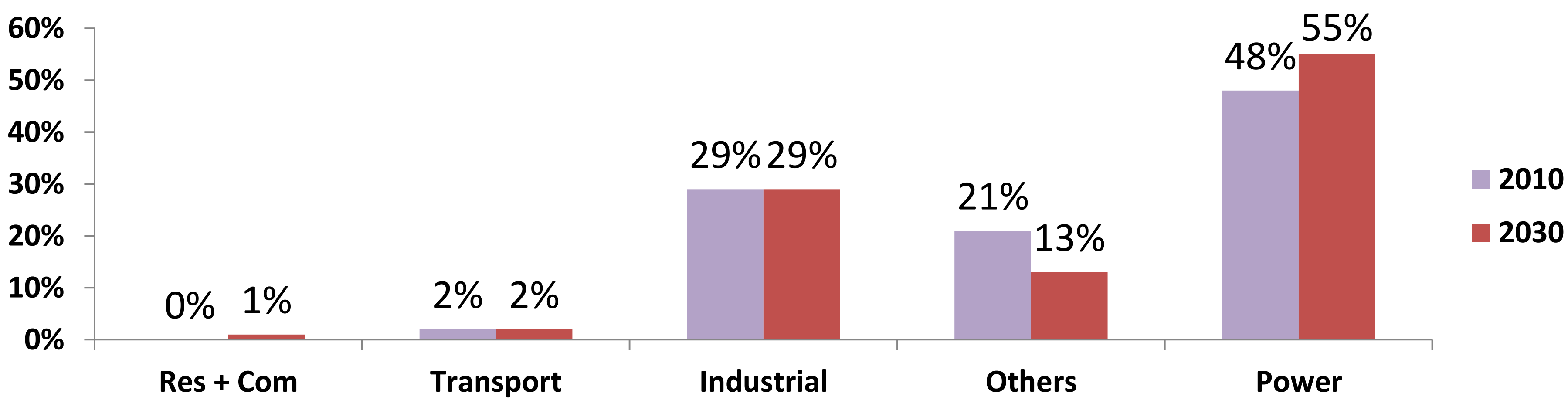


Figure 1.1.5 : ASEAN gas demand growth (2010 & 2030)
Source: FACTS, 2010

ASEAN - Power is the major off-taker of gas and this trend is forecasted to remain

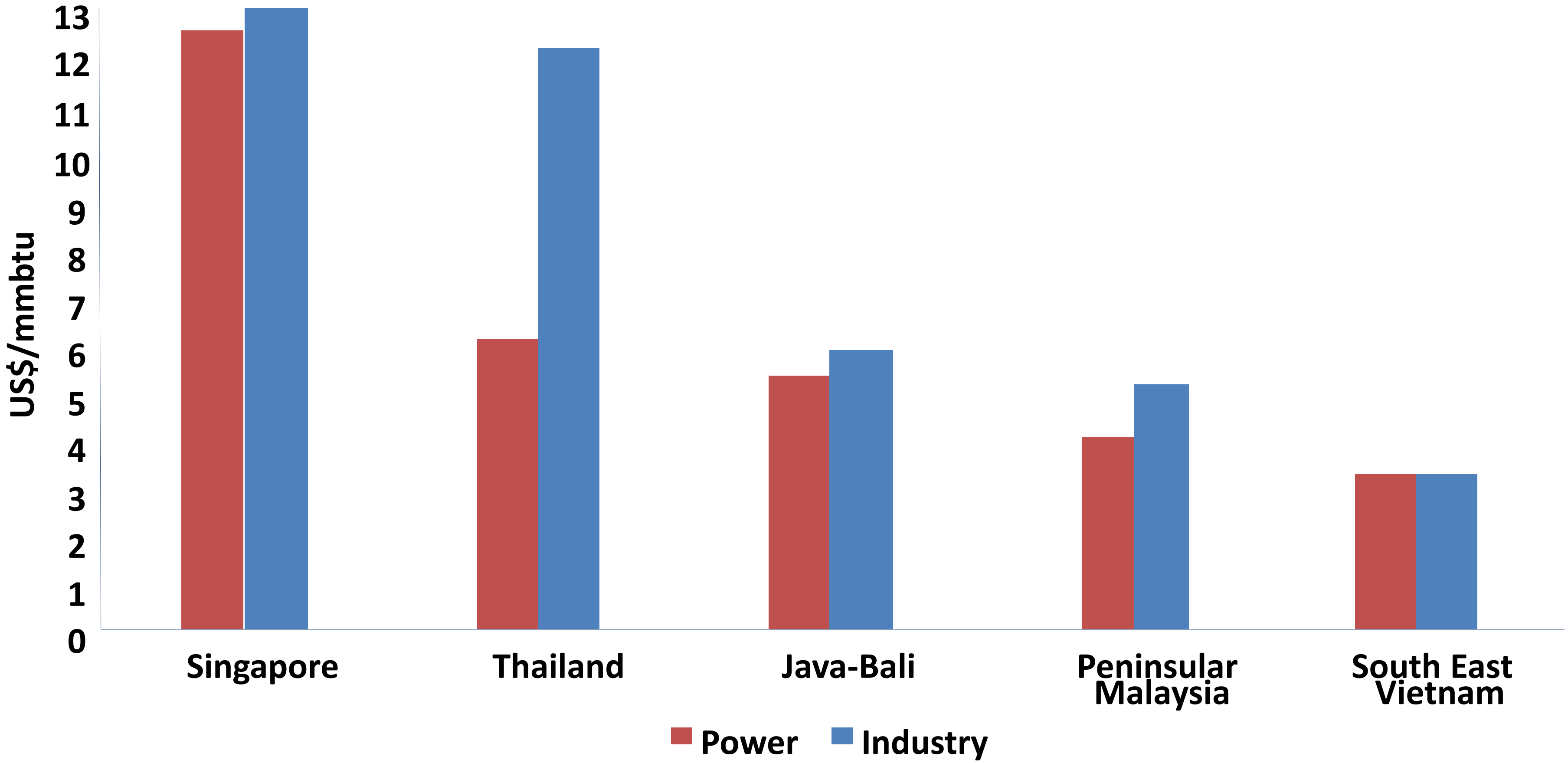


ASEAN Power Generation Mix (2010) Source: FACTS



Gas use by sectors (2010 & 2030) Source: FACTS

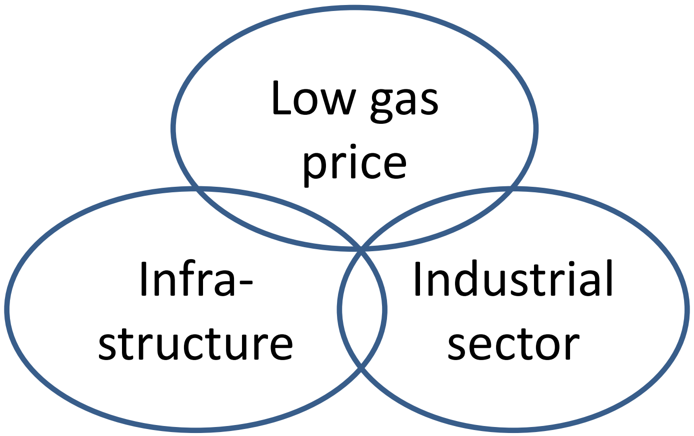
There is considerable variation in gas prices but gas prices to power is generally low



Source: Ministry of Domestic Trade / Gas Malaysia / EPPO / PLN / PGN / Wood Mackenzie (June 2011)

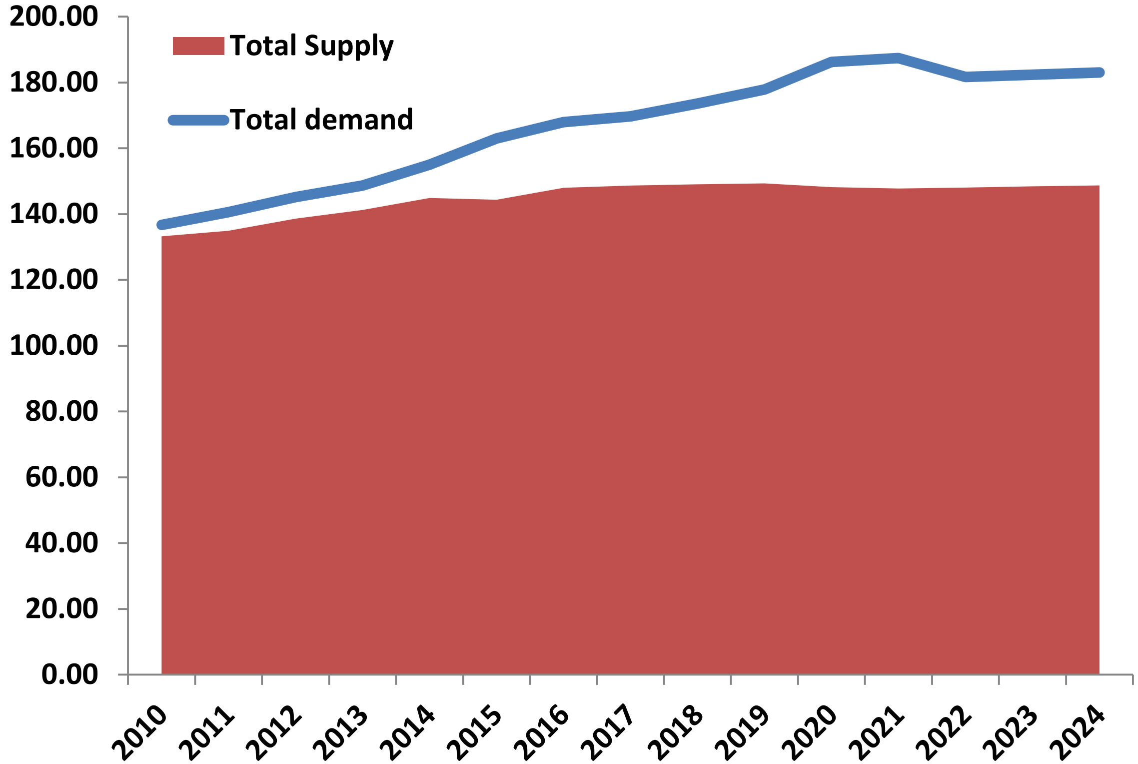
USDMYR = 3.17896

This has led to a growing gas demand, resulting in a widening gap between supply and demand



Factors contributing to demand growth

Source: Team analysis



Aggregated ASEAN gas supply and demand (Bcm)

Source: Team analysis

(ASEAN 6 Indonesia, Malaysia, Thailand, Vietnam, Singapore, Brunei)

What led to this supply shortfall?

Major ASEAN gas consuming countries had made a conscious effort to diversify fuel for power away from fuel oil post embargoes of late 1970s. This led to the beginning in gas consumption. In coping with economic cycles and enabling ASEAN products to be competitive, gas prices are regulated and subsidised, if price to bring to market is below cost.

Low gas prices

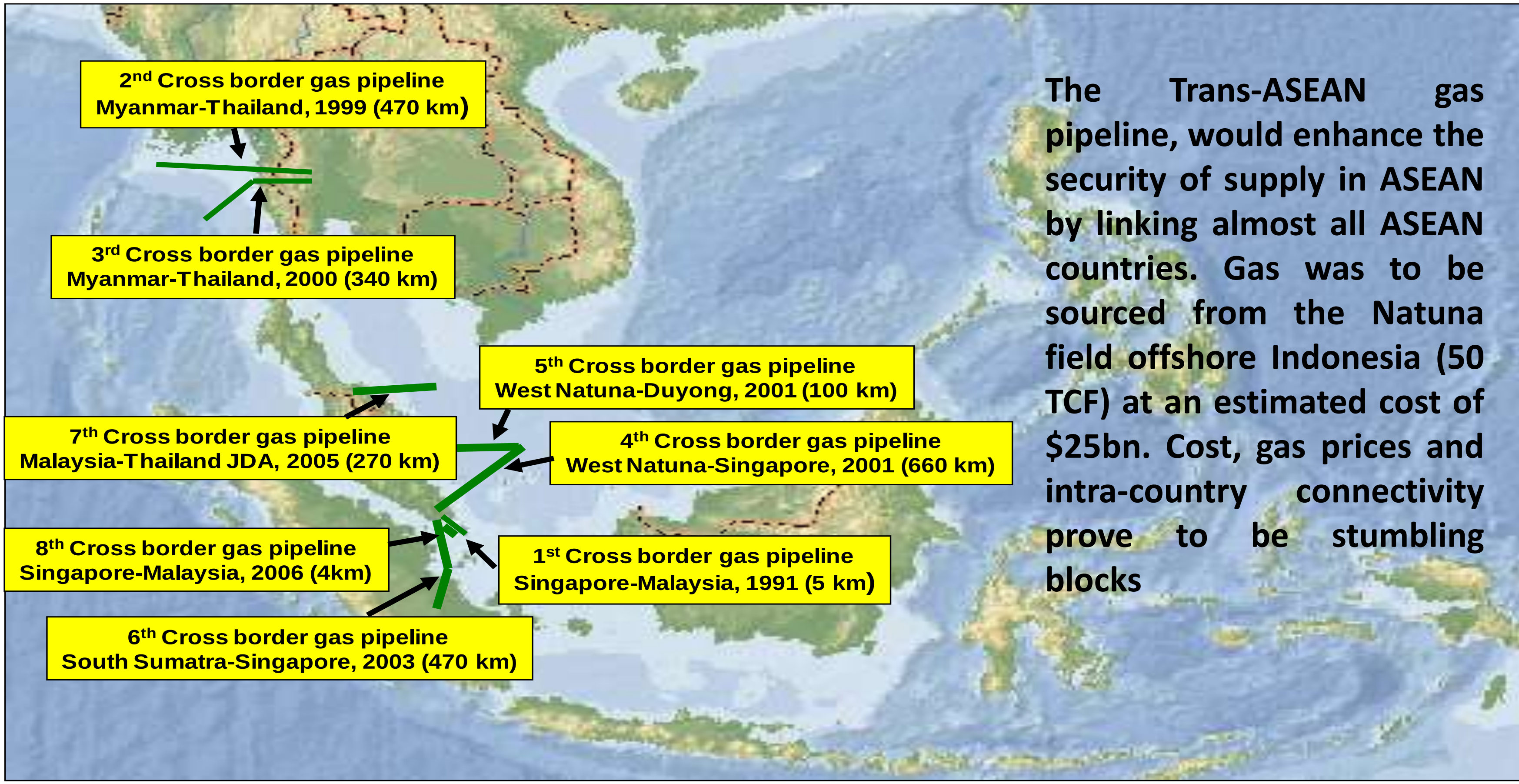
Allowed for energy inefficiencies, leading to higher gas demand

ηj= 45.6%, ηi= 34.7%, ηt=44%

Discourage further exploration and production, leading to lower supply

Source: World Energy Council, 2012

ASEAN had initiated steps to enhance security of supply with the Trans-ASEAN gas pipeline

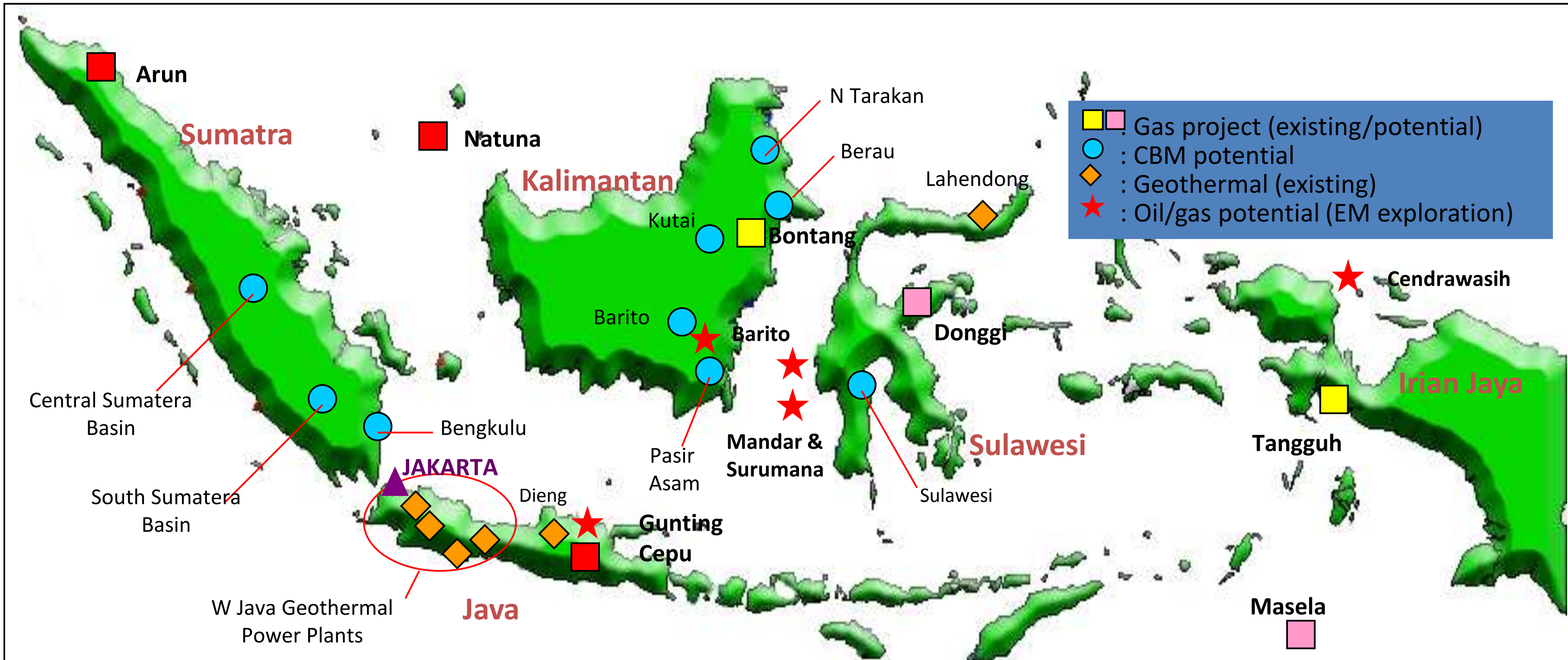


The Trans-ASEAN gas pipeline, would enhance the security of supply in ASEAN by linking almost all ASEAN countries. Gas was to be sourced from the Natuna field offshore Indonesia (50 TCF) at an estimated cost of $25bn. Cost, gas prices and intra-country connectivity prove to be stumbling blocks

The existing bilateral lines in the TAGP project
Source: Adapted from Gasex 2008, Hilmi Ramli

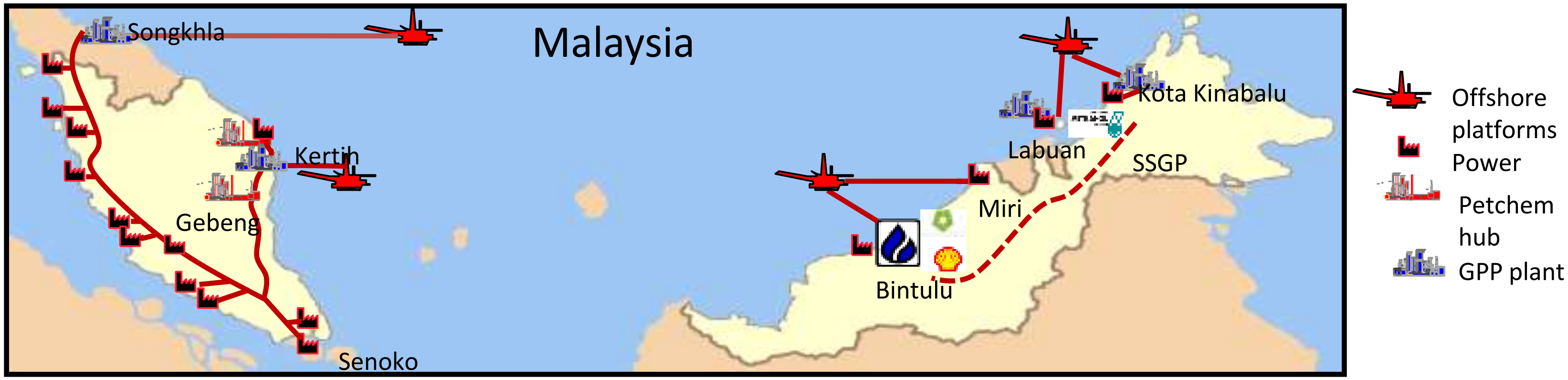
On the other hand, potential supply from Indonesia could also come in the form of CBM

Up to 450 Tcf of resources from CBM



Gas resources in Indonesia
(Source: Hendi , Gasex 2010)

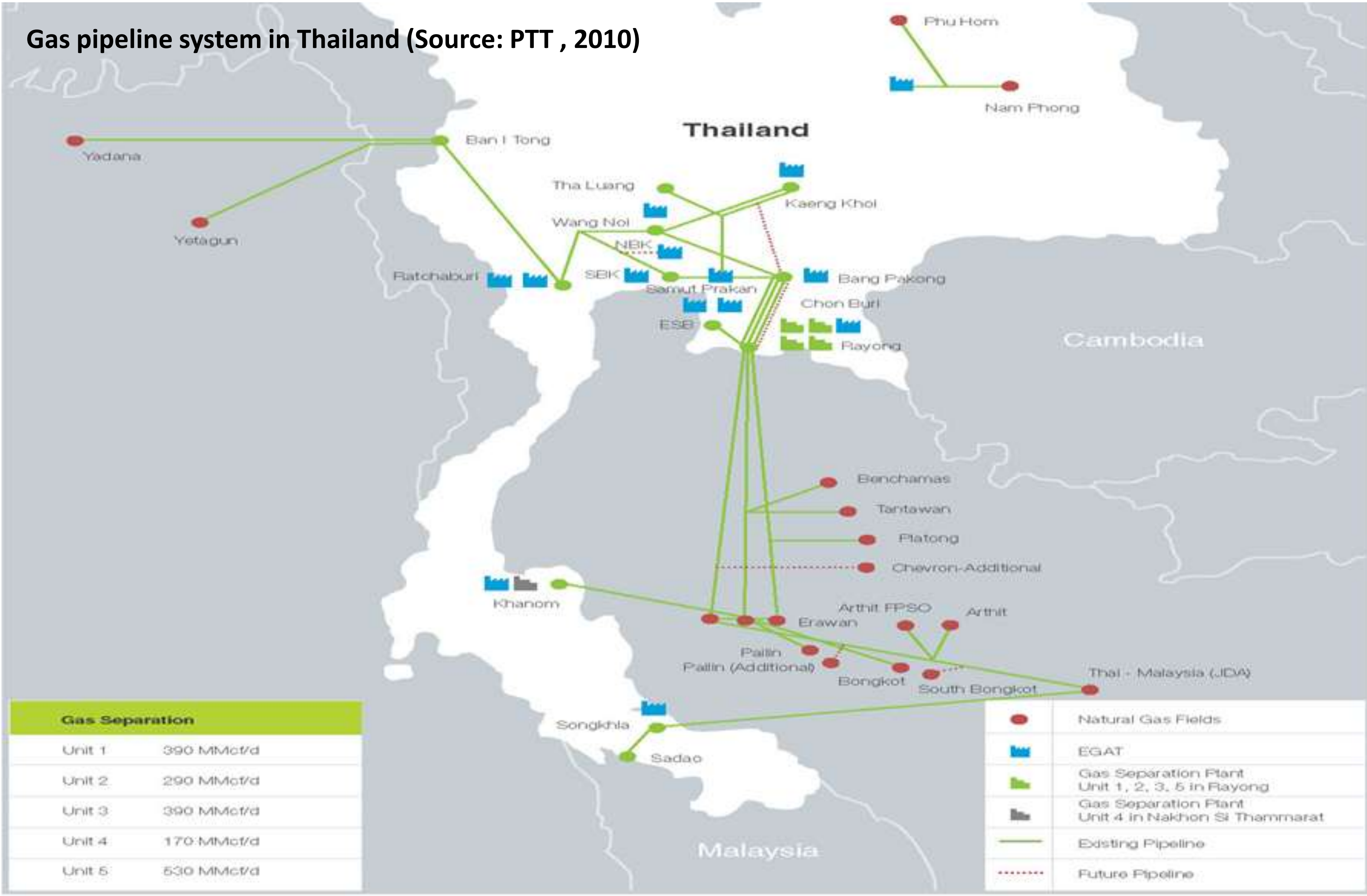
However, intra-country connectivity, ranging from adhoc/developing to established will need to grow



Gas pipeline system in Malaysia (Source: Nazlee , 2011)

Gas pipeline system in Indonesia (Source: Hendi , Gasex 2010)

However, intra-country connectivity, ranging from adhoc/developing to established will need to grow

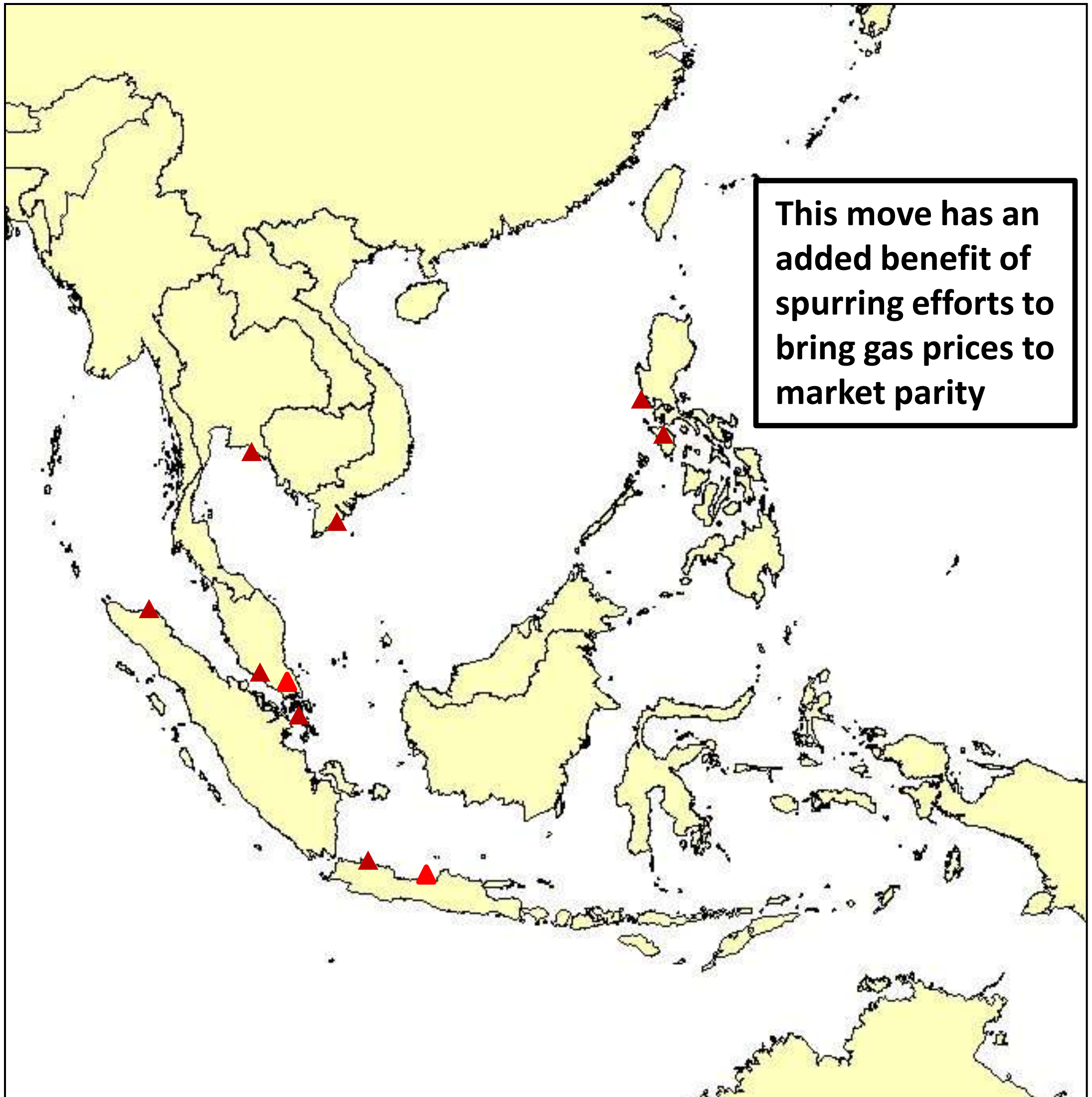


Gas pipeline system in Thailand (Source: PTT , 2010)

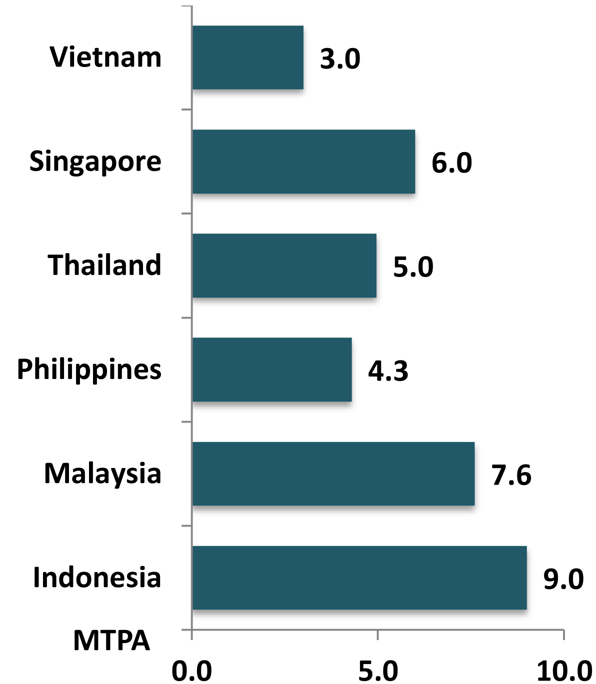
However, intra-country connectivity, ranging from adhoc/developing to established will need to grow

Gas pipeline system in Vietnam (Source: Hien, 2010)
(black = existing, blue = under development, dotted blue = potential)

In the meantime, South East Asean nations have built or are building LNG regas terminals.



This move has an added benefit of spurring efforts to bring gas prices to market parity



Planned and operational ASEAN LNG Terminals

Source: FACTS, Team analysis

ASEAN - Opportunities for investment and growth

- **SEA will develop conventional and non-conventional domestic gas resources as well as LNG importation concurrently to keep up with gas demands**
- **Hence, opportunities for investment lies in upstream exploration and production, gas transmission infrastructure as well as LNG trading**

Vietnam Upstream exploration Transmission lines Downstream gas industries – petrochemicals	**Indonesia** CBM production Transmission lines Downstream gas industries
Thailand Upstream exploration Transmission lines LNG trading	**Malaysia and Singapore** Downstream gas industries LNG trading

THANK YOU

4-8 June 2012
Kuala Lumpur Malaysia