

Investment Opportunities  International Partnerships  Market Drivers

# **SHALE GAS – A TRUE ENERGY “GAME CHANGER” ?**

## **THE SHALE GAS REVOLUTION: WHAT DOES IT REALLY MEAN FOR THE GLOBAL ENERGY INDUSTRY?**

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- 1. Introduction – Brief on IGU**
- 2. Global Energy Scenario until 2030**
- 3. The Shale Gas Revolution**
- 4. Opportunities, Challenges & Implications**
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# IGU as **THE** spokesman for the gas industry

- Worldwide and non–profit organisation established in 1931
- Promotes technical and economic progress of the gas industry
- Emphasising sound environmental performance worldwide
- Increased focus on strategic and policy issues
- Cooperation with IEA, United Nations, World Bank, IEF and others

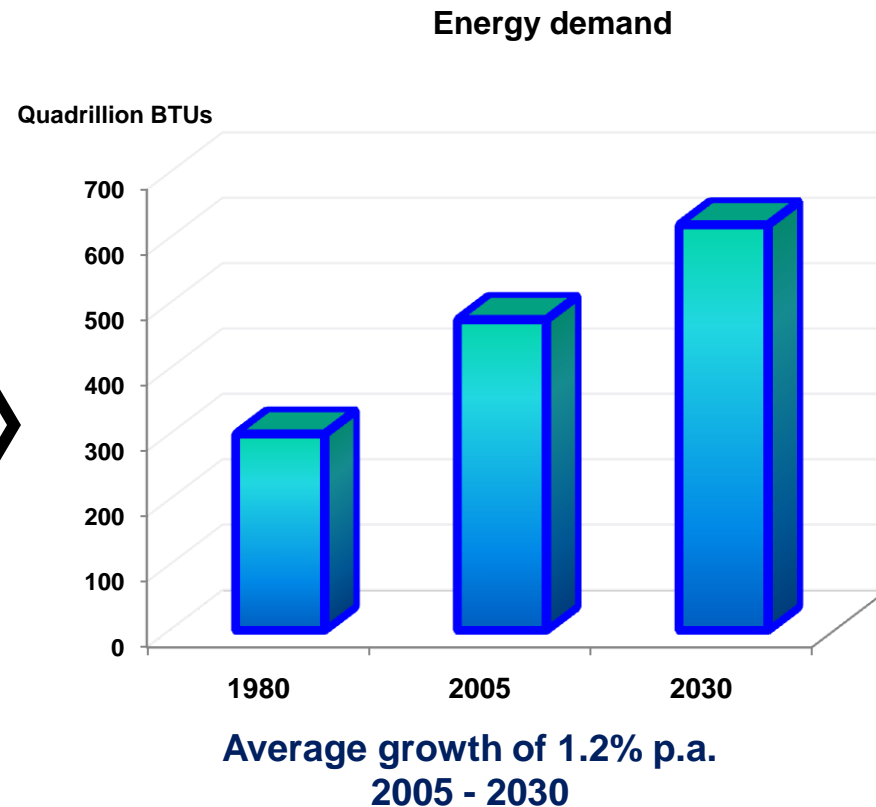
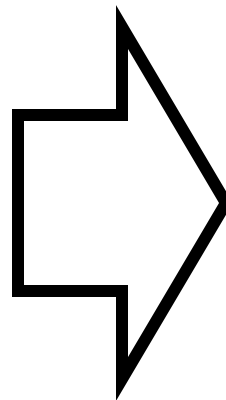
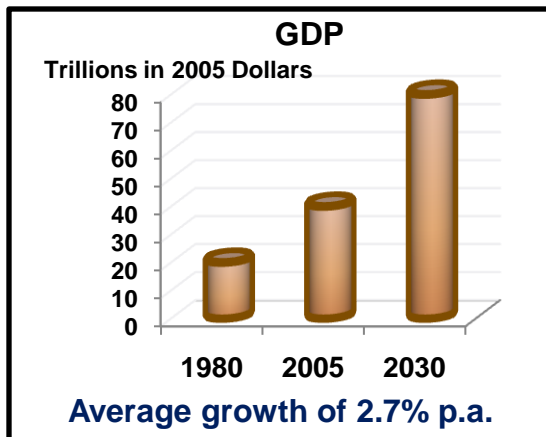
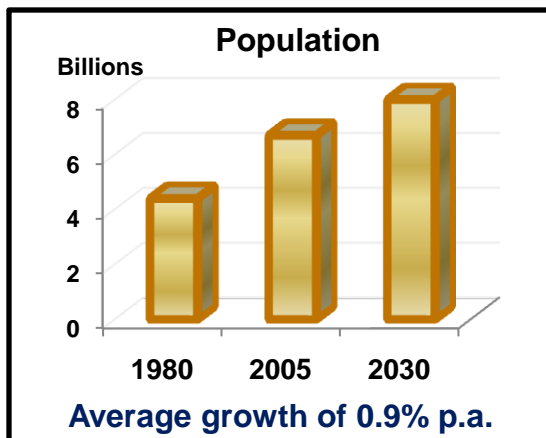




# IGU Organisation Chart for the 2009 – 2012 Malaysian Triennium



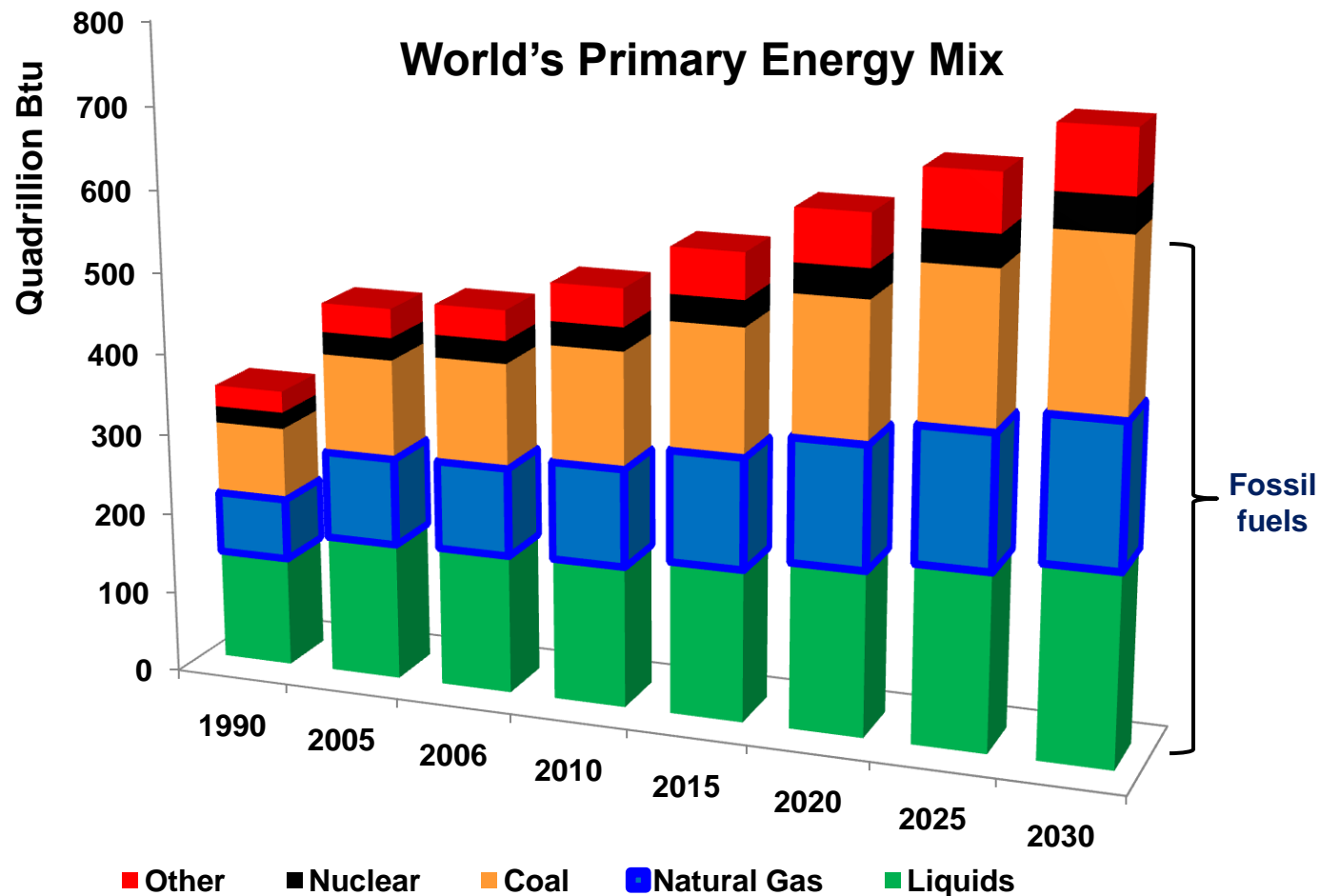
# Energy demand is expected to grow in the foreseeable future



- World's population to increase from 6.7 billion today to 8.0 billion by 2030.
- GDP to expand from USD 20 Trillion in 1980 to USD 80 Trillion by 2030.
- The world will use 35% more energy by 2030 than in 2005 level!



# Fossil fuels will still dominate the 2030 energy mix



## CAGR of Fuel Consumption, 2010-2030

Liquids	1.3%
Natural Gas	2.0%
Coal	2.1%
Nuclear	1.7%
Other	3.0%

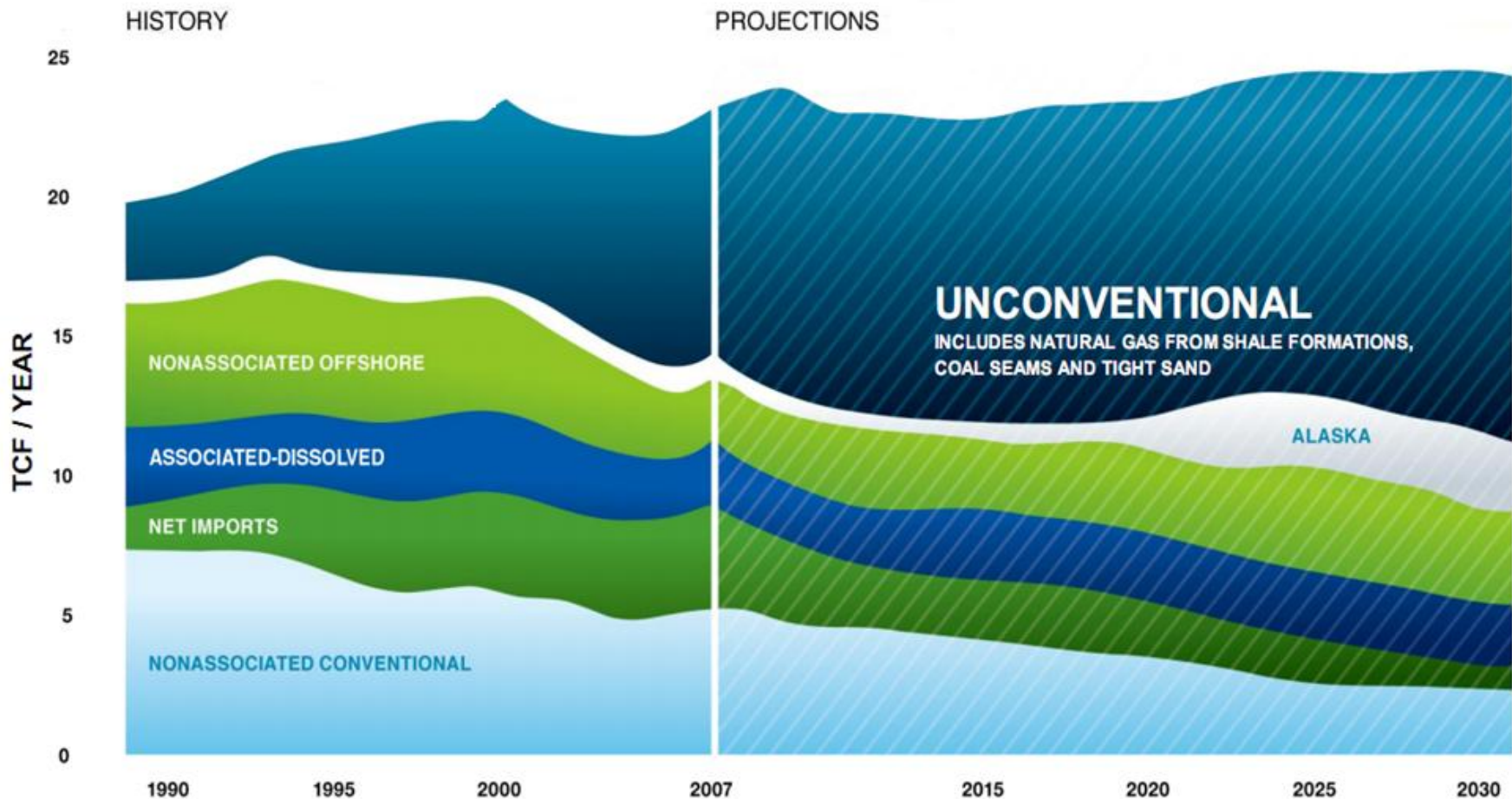
## % of natural gas from total energy mix 1990-2030

1990	22%
2005	23%
2010	23%
2030	24%

- Natural gas is the fastest growing energy source.
- By 2030, global natural gas demand will be 55% higher than it was in 2005!



## The long-term growth of natural gas outlook



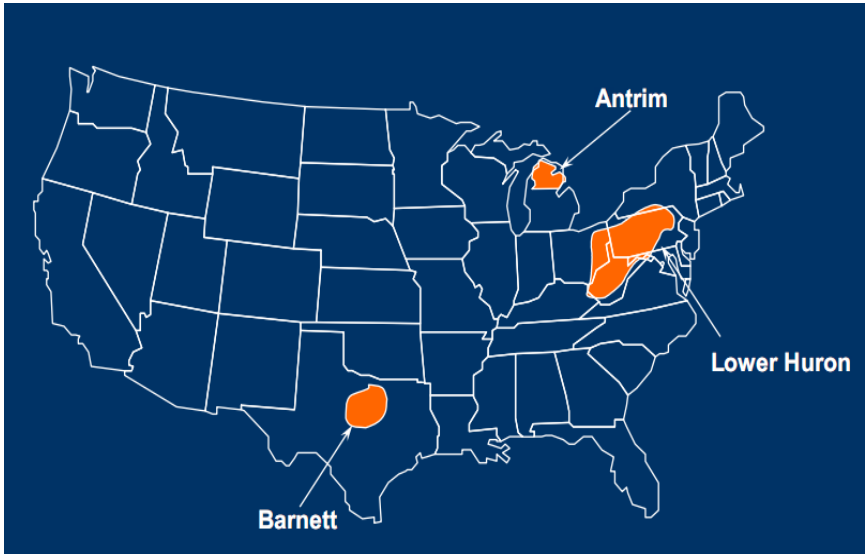
- The long-term global recoverable gas reserves will account for 850 Tcm.
- Unconventional gas will make up about 45% of the total.





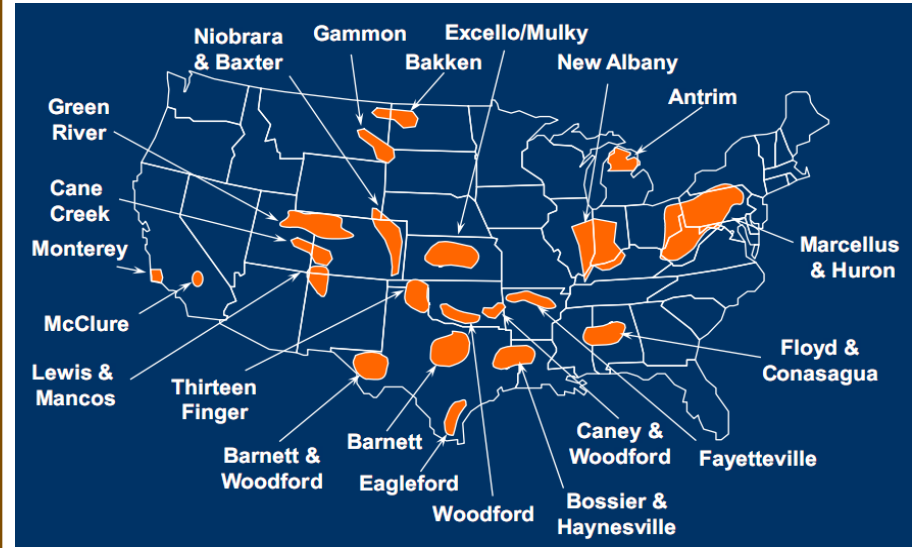
# The significant contribution by shale gas to the U.S. total natural gas production

## North American: Shale gas in 2000



Total annual production in 2000  
= 1.1 bcfd

## North American: Shale gas in 2010



Total annual production in 2010  
= 12.0 bcfd

- The shale gas production has grown by ten-fold and will reach 12 bcfd this year, which equals to more than 20% of the U.S. natural gas production.
- Shale gas could make up more than 60% of the domestic market by 2030.



## The outcome of shale gas on global markets if it is developed globally



REGION	SHALE RESERVES
Asia Pacific	6,155 Tcf
North America	3,842 Tcf
Middle East	2,548 Tcf
South America	2,117 Tcf
Asia	627 Tcf
Europe	549 Tcf
Africa	274 Tcf
<b>WORLDWIDE</b>	<b>16,112 Tcf</b>

Some of conceivable impacts that may include:-

- It will alter the energy mix globally.
- It will increase the role of gas as compared to other fuels.
- It will influence the geopolitics of energy security.



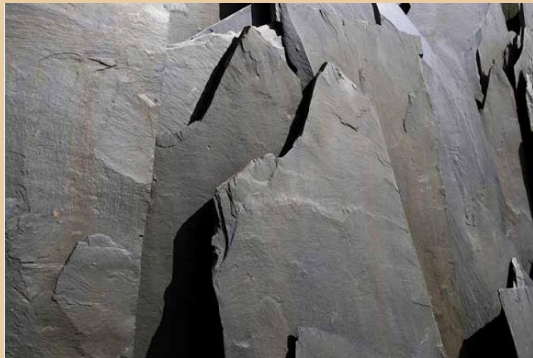
## To make it a success, collaboration among stakeholders is a must

Stakeholder	Interests	Contributions
Government	Energy security Increased supply Reduced carbon	Stable funding Sound regulatory regime
Operators	Investment opportunity Increased efficiency Reduced cost	Data Wells expertise Insights
Buyers	Energy option Reasonable price Secured investment	Business trust
Resource holders	Guaranteed returns	Approval Provide acreages
University Research institution	R&D funding Solving problems	New ideas R&D expertise

● No individual stakeholder alone can make shale gas reach full potential!



## Will market dynamics still change if shale gas is only a U.S concern?



The emergence of shale gas revolution

### Moving into “Oversupplied” situation

- It allows larger LNG volume to be sold on the spot-market.
- It prolonged periods of depressed domestic natural gas prices.
- The U.S shale gas production influences the global gas markets with pricing projections to trend lower until 2013.

### Reducing over-reliance on gas-rich nations & prioritising energy security issues

- Many countries have peaked and matured gas fields/basins and rely on external sources (piped gas/LNG) for energy.
- The rise of indigenous shale gas production in gas-hungry countries may deter significant LNG import needs.



# Shale gas: economic development opportunity or environmental threat?

Compound	% of total	Purpose	Common application
1 Acids	0.123%	Help dissolve minerals	Swimming pool cleaner
2 Glutaraldehyde	0.001%	Eliminates bacteria in water Allows a delayed break down of	Disinfectant
3 Sodium Chloride	0.01%	the gel polymer chains	Table salt
4 Formamide	0.002%	Prevents corrosion	Pharmaceuticals
5 Borate salts	0.007%	Maintain fluid viscosity	Laundry detergent
6 Petroleum distillates	0.088%	Minimise friction	Laxatives, candy
7 Guar gum	0.056%	Thicken the water	Baked goods, tooth-paste
8 Citric acid	0.004%	Prevents precipitation	Food additive, lemon juice
9 Potassium chloride	0.06%	Creates a brine carrier fluid Maintain effectiveness of other	Table salt substitute Detergents, soap, water
10 Potassium carbonate	0.011%	components	softener, glass, ceramics Automotive antifreeze,
11 Ethylene glycol	0.043%	Prevents scale deposits in the pipe Increases the viscosity of the	household cleansers Glass cleaner, antiperspirant
12 Isopropanol	0.085%	fracture fluid	and hair color



- The industry has emphasized that fracking is a tested and proven technology.
- The primary environmental concern is the safety of groundwater supplies where hydraulic fracturing (fracking) is used.
- The secondary concerns are on the associated air pollution and the management of wastewater.



# IGU Message on Natural Gas

- It is abundant, affordable and acceptable
- Clean, efficient, versatile and environmental friendly fuel
- Continue to play a substantial role in global energy demand
- Basis for sustainable economic growth



***Natural gas  
– major part of the long term energy solution***



# The 25<sup>th</sup> World Gas Conference



**“GAS : SUSTAINING FUTURE  
GLOBAL GROWTH”**

**Kuala Lumpur Convention Centre  
4 to 8 June, 2012**

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