Gas: Answer to Energy Challenges

By:
Datuk (Dr) Abdul Rahim Hashim
President
International Gas Union (IGU),
Malaysian Gas Association (MGA)

21st June 2011
Vienna | Austria
Outline

1. Introduction – Brief on IGU
2. Global Energy Scenario by 2030
3. Gas: Answer to Energy Challenges
4. Closing Remarks
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 Members responsible for 95% of Global Gas Sales

As of April 2011

74 Charter members
35 Associate members
11 Affiliated members
IGU Organisation Chart for the 2009 – 2012 Malaysian Triennium

1. Introduction – Brief on IGU
2. Global Energy Scenario by 2030

- population growth, economic expansion, urbanisation and individual’s prosperity

Source(s): ExxonMobil 2009, OECD/IEA 2010
Non-OECD energy will grow about 65% of total energy demand notably driven by emerging markets e.g. China & India. Per-capita energy demand will remain lower.

OECD energy demand slightly lower in 2030 versus 2005 due to substantial gains in efficiency.
Renewables are growing rapidly but remain expensive
- Coal is abundant and cheap but environmentally unacceptable
- Vehicles still depend on petroleum products

2. Global Energy Scenario by 2030

- Power generation & industrial demand

<table>
<thead>
<tr>
<th>Sector</th>
<th>CAGR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Power Generation</td>
<td>1.7% p.a.</td>
</tr>
<tr>
<td>2) Industrial</td>
<td>1.5% p.a.</td>
</tr>
<tr>
<td>3) Transportation</td>
<td>1.2% p.a.</td>
</tr>
<tr>
<td>4) Residential / Commercial</td>
<td>0.8% p.a.</td>
</tr>
</tbody>
</table>

Source(s): ExxonMobil 2009, EIA/IEO 2009, PETRONAS 2009
Increased demand for energy versus need to address environmental issues & climate change
The increased relevance of sustainability
Natural gas is key to addressing global energy challenges

**Abundant**
- Abundant global gas resources ~250 years reserves at current production (IEA)

**Affordable**
- CCGT cheapest to build

**Acceptable**
- CCGT: gas-fired power compared to coal:
  - 40% more energy efficient
  - Emits 50-70% less CO2
  - CCS retrofit at similar cost per MWh
  - Better complements with wind power
- Replacing coal with gas for electricity generation is the cheapest and fastest way to meet CO2 reduction targets

**Natural Gas: A Destination Fuel**

Source(s): Shell 2011
Natural gas CARES for the world

- **C**lean: Natural gas is clean. Natural gas produces less nitrogen oxide than coal, and more than 50% less CO2. Gas produces no sulphur and no solid waste.
- **A**ffordable: Modern gas-fired plants have a capital cost that is half that of coal, one-third the cost of nuclear and one-fifth the cost of onshore wind.
- **R**eliable: Gas is readily available from a variety of sources, both pipeline and LNG. The environmental benefits of gas can be realised immediately.
- **E**fficient: Modern gas-fired power plants are 40% more efficient than coal plants.
- **S**ecure: Natural gas is abundant. Global production will increase over the next 20 years, with growing supplies from conventional, unconventional, frontier and LNG resources.

- **N**atural gas does not require subsidies.
- **N**atural gas is the affordable choice.
- **N**atural gas is available now.
- **N**atural gas is efficient.
- **N**atural gas is versatile.
- **N**atural gas saves time.
- **N**atural gas is safe.

- Natural gas promotes sustainable transport.
- Unlike renewable technologies which must be heavily subsidized by governments, natural gas use allows countries to affordably reduce their emissions.
- Gas can serve as a flexible partner in power generation for intermittent energy sources like wind and solar, facilitating the phase-in of renewables.
- Gas-fired plants require less construction time than nuclear or coal plants.
- The natural gas sector has the best safety record in the industry.

- It is a clean, affordable, reliable, efficient, and secure energy source.
The growing role of natural gas to meet energy service needs

By 2030, about 1.3 billion people do not have access to electricity despite more widespread prosperity and more advanced technology.

- The energy-deprived countries should not be neglected!
Gas resources are becoming plentiful and geographically diverse

- Availability: 60 years to 250 years
- Abundant global gas reserves

Source(s): Shell 2011
Technological breakthrough for unconventional gas

- Technology – hydraulic fracturing

Source(s): AGA 2010
Natural gas is the affordable choice

- On a per kW basis, natural gas is very competitive relative to coal and nuclear.
- In terms of capital costs, natural gas is compelling in a world’s short of money.

Capital Costs (measured by multiples)

<table>
<thead>
<tr>
<th>Fuel Type</th>
<th>Capital Cost Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas</td>
<td>1</td>
</tr>
<tr>
<td>Coal</td>
<td>2 – 3</td>
</tr>
<tr>
<td>Nuclear</td>
<td>5</td>
</tr>
<tr>
<td>Onshore wind</td>
<td>7 – 10</td>
</tr>
<tr>
<td>Offshore wind</td>
<td>10 - 15</td>
</tr>
</tbody>
</table>

Source(s): PFC Energy 2010, Shell 2010/2011
Energy technologies for short-to-medium term targets

- Energy efficiency & conservation
- Natural gas

Source(s): PETRONAS 2010
Make gas green!
- from biogas, synthetic natural gas (SNG) & landfill gas

Carbon Capture & Storage (CCS)
Fuel cells

Source(s): PETRONAS 2010, Senternovem 2010
The role of government is imperatively important...

- To encourage investments in all parts of the value chain
- To encourage use of clean burning fuels – legislate, incentivise
- To encourage R&D for game changing technology
- To encourage multifaceted approaches to solutions – don’t pick winners/losers
- To encourage & grow demand for gas
- To encourage efficiency & conservation of energy
4. Closing Remarks

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 25th World Gas Conference (25th WGC)

"GAS: SUSTAINING FUTURE GLOBAL GROWTH"

Kuala Lumpur Convention Centre
4 to 8 June, 2012

www.wgc2012.com/, www.igu.org/

CHARMING COUNTRY, COLOURFUL CITY
## The programme for the 25th WGC is ready

<table>
<thead>
<tr>
<th>Day</th>
<th>Monday, 4 June</th>
<th>Tuesday, 5 June</th>
<th>Wednesday, 6 June</th>
<th>Thursday, 7 June</th>
<th>Friday, 8 June</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theme</td>
<td>Foundation for growth</td>
<td>Securing gas supply</td>
<td>Enhancing gas demand</td>
<td>A sustainable future</td>
<td></td>
</tr>
<tr>
<td>8:30</td>
<td>KA1 Shell</td>
<td>KA5 Chevron</td>
<td>KA9 JGA</td>
<td>KA13 Total</td>
<td>KA14 TBA</td>
</tr>
<tr>
<td>9:15</td>
<td>KA2 ExxonMobil</td>
<td>KA6 Rasgas</td>
<td>KA10 GAIL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9:45</td>
<td>Committee Sessions</td>
<td>Committee Sessions</td>
<td>Committee Sessions</td>
<td>SP9 Gas and Renewables</td>
<td></td>
</tr>
<tr>
<td>11:45</td>
<td>7 sessions</td>
<td>8 sessions</td>
<td>9 sessions</td>
<td>SP10 WPC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lunch - IEA</td>
<td>Lunch - EU</td>
<td>Lunch - Climate</td>
<td>Lunch - CERA</td>
<td></td>
</tr>
<tr>
<td>13:45</td>
<td>KA3 Gazprom</td>
<td>KA7 Pertamina</td>
<td>KA11 CNPC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14:30 Opening</td>
<td>KA4 KVGN</td>
<td>KA8 Statoil</td>
<td>KA12 AGA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14:30 SA1 Prime Minister</td>
<td>SP1 Attracting and Retaining Talents</td>
<td>SP3 Impact of Geopolitics</td>
<td>SP6 Case for Natural Gas</td>
<td>TWP 2012-2015</td>
<td></td>
</tr>
<tr>
<td>14:30 SA2 United Nations</td>
<td>SP2 Youth Roundtable Forum</td>
<td>SP4 Unconventional gas</td>
<td>SP7 NGV in sustainable transport</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:30 Exhibition</td>
<td>Committee Sessions</td>
<td>Committee Sessions</td>
<td>Committee Sessions</td>
<td>Closing Ceremony</td>
<td></td>
</tr>
<tr>
<td>18:30 Gala Dinner</td>
<td>8 sessions</td>
<td>8 sessions</td>
<td>8 sessions</td>
<td>Handover</td>
<td>Farewell Party</td>
</tr>
</tbody>
</table>

SA - Special Address  KA - Keynote Address  SP - Strategic Panel
Welcome to the 25th World Gas Conference and Exhibition

4-8 June 2012
Kuala Lumpur, Malaysia

Thank you for your kind attention!
BACK-UP SLIDES
### Confirmed Keynote Speakers:

<table>
<thead>
<tr>
<th>Organization</th>
<th>Name</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Gas Association</td>
<td>NICK STAVROPOULOS</td>
<td>Chairman, American Gas Association &amp; Executive Vice President &amp; COO of US Gas Distribution, National Grid</td>
</tr>
<tr>
<td>ExxonMobil</td>
<td>REX W TILLERSON</td>
<td>Chairman &amp; CEO</td>
</tr>
<tr>
<td>Gasunie</td>
<td>PAUL VAN GELDER</td>
<td>Chairman of the Executive Board &amp; CEO</td>
</tr>
<tr>
<td>RasGas Company Limited</td>
<td>HAMAD RASHID AL MOHANNADI</td>
<td>Managing Director</td>
</tr>
<tr>
<td>Statoil ASA</td>
<td>HELGE LUND</td>
<td>President &amp; CEO</td>
</tr>
<tr>
<td>The Japan Gas Association</td>
<td>MITSUNORI TORIHARA</td>
<td>Chairman</td>
</tr>
<tr>
<td>Chevron Corporation</td>
<td>GEORGE KIRKLAND</td>
<td>Vice Chairman &amp; Executive Vice President, Global Upstream &amp; Gas</td>
</tr>
<tr>
<td>GAIL (India) Limited</td>
<td>B C TRIPATHI</td>
<td>Chairman &amp; Managing Director</td>
</tr>
<tr>
<td>OAO Gazprom</td>
<td>ALEXEY MILLER</td>
<td>Deputy Chairman of the Board of Directors &amp; Chairman of the Management Committee</td>
</tr>
<tr>
<td>Royal Dutch Shell</td>
<td>PETER VOSER</td>
<td>CEO</td>
</tr>
<tr>
<td>TOTAL</td>
<td>CHRISTOPHE DE MARGERIE</td>
<td>Chairman</td>
</tr>
</tbody>
</table>

### Confirmed Luncheon Speakers:

<table>
<thead>
<tr>
<th>Organization</th>
<th>Name</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>IHS Cambridge Energy Research</td>
<td>DR DANIEL YERGIN</td>
<td>Chairman</td>
</tr>
<tr>
<td>International Energy Agency</td>
<td>NOBUO TANAKA</td>
<td>Executive Director</td>
</tr>
</tbody>
</table>

---

See You In Kuala Lumpur...