Gas: Answer to Energy Challenges

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

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Vienna | Austria
Outline

1. Introduction – Brief on IGU
2. Global Energy Scenario by 2030
3. Gas: Answer to Energy Challenges
4. Closing Remarks
1. Introduction – Brief on IGU

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
1. Introduction – Brief on IGU

IGU Members responsible for 95% of Global Gas Sales

As of April 2011

74 Charter members
35 Associate members
11 Affiliated members

IGU Members
IGU Organisation Chart for the 2009 – 2012 Malaysian Triennium

**IGU MANAGEMENT TEAM**
- President
  - Datuk (Dr) Abdul Rahim Hashim
  - Malaysia
- Vice President
  - Mr Jérôme Ferrier
  - France
- Immediate Past President
  - Mr Ernesto A. López Anandón
  - Argentina

**EXECUTIVE COMMITTEE**
- President, Vice President, Immediate Past President, CC Chairman, CC Vice Chairman, Secretary General

**COORDINATION COMMITTEE**
- Secretary General
  - Mr Torstein Indrebo
  - Norway
- Director
  - Mr Hans Riddervold
- Senior Advisor / Web Master
  - Mr Erik Gonder

**IGU SECRETARIAT**
- Vice Chairman
  - Mr Georges Liens
  - France
- Chairman
  - Mr Ho Sook Wah
  - Malaysia
- Secretary
  - Ms Ungku Ainon
  - Ungku Tahir
  - Malaysia
2. Global Energy Scenario by 2030

World demand for energy is increasing

- 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.
2. Global Energy Scenario by 2030

- Renewables are growing rapidly but remain expensive
- Coal is abundant and cheap but environmentally unacceptable
- Vehicles still depend on petroleum products

CAGR of Fuel Consumption 2010-2030

<table>
<thead>
<tr>
<th>Fuel Type</th>
<th>CAGR 2010-2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquids</td>
<td>1.3%</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>2.0%</td>
</tr>
<tr>
<td>Coal</td>
<td>2.1%</td>
</tr>
<tr>
<td>Nuclear</td>
<td>1.7%</td>
</tr>
<tr>
<td>Other</td>
<td>3.0%</td>
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</tbody>
</table>

% of natural gas from total energy mix 1990-2030

<table>
<thead>
<tr>
<th>Year</th>
<th>Percentage</th>
</tr>
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<tbody>
<tr>
<td>1990</td>
<td>22%</td>
</tr>
<tr>
<td>2005</td>
<td>23%</td>
</tr>
<tr>
<td>2010</td>
<td>23%</td>
</tr>
<tr>
<td>2030</td>
<td>?</td>
</tr>
</tbody>
</table>

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*
The reality is the world faces twin challenges…

- Increased demand for energy
- Need to address environmental issues & climate change

versus
The global energy equation certainly becomes more complicated...

- 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 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
  - Global production will increase over the next 20 years, with growing supplies from conventional, unconventional, frontier and LNG resources.

- **N**atural gas promotes sustainable transport.
  - Natural gas vehicles can improve air quality and energy efficiency in large cities.

- **N**atural gas does not require subsidies.
  - Unlike renewable technologies which must be heavily subsidized by governments, natural gas use allows countries to affordably reduce their emissions.

- **N**atural gas is versatile.
  - Gas can serve as a flexible partner in power generation for intermittent energy sources like wind and solar, facilitating the phase-in of renewables.

- **N**atural gas saves time.
  - Gas-fired plants require less construction time than nuclear or coal plants.

- **N**atural gas is abundant.
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- It is a clean, affordable, reliable, efficient, and secure energy source.
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!

Source(s): OECD/IEA 2009, IAEA 2010, ExxonMobil 2009
Gas resources are becoming plentiful and geographically diverse

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

Source(s): Shell 2011
The technological breakthrough for unconventional gas

- Technology – hydraulic fracturing
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.

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, September 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
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*
4. Closing Remarks

"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>Monday, 4 June</th>
<th>Tuesday, 5 June</th>
<th>Wednesday, 6 June</th>
<th>Thursday, 7 June</th>
<th>Friday, 8 June</th>
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<td><strong>Theme</strong></td>
<td><strong>Foundation for growth</strong></td>
<td><strong>Securing gas supply</strong></td>
<td><strong>Enhancing gas demand</strong></td>
<td><strong>A sustainable future</strong></td>
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<tr>
<td>8:30</td>
<td>KA1 Shell</td>
<td>KA5 Chevron</td>
<td>KA9 JGA</td>
<td>KA13 Total</td>
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<td>9:15</td>
<td>KA2 ExxonMobil</td>
<td>KA6 Rasgas</td>
<td>KA10 GAIL</td>
<td>KA14 TBA</td>
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<td>9:45</td>
<td>Committee Sessions</td>
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<td>Committee Sessions</td>
<td>SP9 Gas and Renewables</td>
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<tr>
<td>11:45</td>
<td>7 sessions</td>
<td>8 sessions</td>
<td>9 sessions</td>
<td>SP10 WPC</td>
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<td>Lunch - IEA</td>
<td>Lunch - EU</td>
<td>Lunch - Climate</td>
<td>Lunch - CERA</td>
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<td>13:45</td>
<td>KA3 Gazprom</td>
<td>KA7 Pertamina</td>
<td>KA11 CNPC</td>
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<td>14:30</td>
<td>Opening</td>
<td>KA4 KVGN</td>
<td>KA8 Statoil</td>
<td>KA12 AGA</td>
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<tr>
<td>14:30</td>
<td>SA1 Prime Minister</td>
<td>SP1 Attracting and Retaining Talents</td>
<td>SP3 Impact of Geopolitics</td>
<td>TWP 2012-2015</td>
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<td>SA2 United Nations</td>
<td>SP2 Youth Roundtable Forum</td>
<td>SP4 Unconventional gas</td>
<td>SP7 NGV in sustainable transport</td>
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<td>SA3 PETRONAS</td>
<td>SP5 Future of LNG</td>
<td>SP8 Growing gas demand w innovation</td>
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<td>16:30</td>
<td>Exhibition</td>
<td>Committee Sessions</td>
<td>Committee Sessions</td>
<td>Closing Ceremony</td>
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<td>18:30</td>
<td>8 sessions</td>
<td>8 sessions</td>
<td>8 sessions</td>
<td>Handover</td>
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<td></td>
<td>Gala Dinner</td>
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<td>Farewell Party</td>
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</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
# 25th World Gas Conference, 4 - 8 June 2012

**“Gas: Sustaining Future Global Growth”**

## Confirmed Keynote Speakers:

<table>
<thead>
<tr>
<th>Organization</th>
<th>Speaker Name</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Gas Association</td>
<td>NICK STAVROPOULOS</td>
<td>Chairman, American Gas Association &amp; Exec. 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 &amp; CEO</td>
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## Confirmed Luncheon Speakers:

<table>
<thead>
<tr>
<th>Organization</th>
<th>Speaker Name</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>IHS Cambridge Energy Research</td>
<td>DR DANIEL YERGIN</td>
<td>Chairman</td>
</tr>
<tr>
<td>Associates (IHS CERA)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>International Energy Agency</td>
<td>NOBUO TANAKA</td>
<td>Executive Director</td>
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See You In Kuala Lumpur...