Gas: Answer to Energy Challenges

By:
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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
1. Introduction – Brief on IGU

- 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 as THE spokesman for the gas industry
IGU Members responsible for 95% of Global Gas Sales

74 Charter members
35 Associate members
11 Affiliated members

As of April 2011
1. Introduction – Brief on IGU

IGU Organisation Chart for the 2009 – 2012 Malaysian Triennium

**IGU MANAGEMENT TEAM**

President, Vice President, Immediate Past President, CC Chairman, CC Vice Chairman, Secretary General

**EXECUTIVE COMMITTEE**

President
Datuk (Dr) Abdul Rahim Hashim
Malaysia

**COORDINATION COMMITTEE**

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Mr Georges Liens
France

Chairman
Mr Ho Sook Wah
Malaysia

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Mr Torstein Indrebo
Norway

Director
Mr Hans Riddervold

Senior Advisor / Web Master
Mr Erik Gonder

Vice President
Mr Jérôme Ferrier
France

Immediate Past President
Mr Ernesto A. López Anandón
Argentina

Secretary
Ms Ungku Ainon Ungku Tahir
Malaysia
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.

Source(s): ExxonMobil 2009
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**

### 2. Global Energy Scenario by 2030

<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>

*CAGR = Cumulative Average Growth Rate*

### Gas demand will increase accordingly

<table>
<thead>
<tr>
<th>by sector</th>
<th>Quadrillion BTUs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td>100</td>
</tr>
<tr>
<td>2005</td>
<td>300</td>
</tr>
<tr>
<td>2030</td>
<td>500</td>
</tr>
</tbody>
</table>

- **Power Generation**
- **Transportation**
- **Industrial**
- **Residential/Commercial**

Source(s): ExxonMobil 2009, EIA/IEO 2009, PETRONAS 2009
The reality is the world faces twin challenges…

- Increased demand for energy

versus

- Need to address environmental issues & climate change
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

- 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!

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

Source(s): AGA 2010
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.

<table>
<thead>
<tr>
<th>Energy Source</th>
<th>Capital Costs (measured by multiples)</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

- 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/
## 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>
</tr>
</thead>
<tbody>
<tr>
<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>
</tr>
<tr>
<td>8:30</td>
<td>KA1 Shell</td>
<td>KA5 Chevron</td>
<td>KA9 JGA</td>
<td>KA13 Total</td>
</tr>
<tr>
<td>9:15</td>
<td>KA2 ExxonMobil</td>
<td>KA6 Rasgas</td>
<td>KA10 GAIL</td>
<td>KA14 TBA</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>
</tr>
<tr>
<td>11:45</td>
<td>7 sessions</td>
<td>8 sessions</td>
<td>9 sessions</td>
<td>SP10 WPC</td>
</tr>
<tr>
<td></td>
<td>Lunch - IEA</td>
<td>Lunch - EU</td>
<td>Lunch - Climate</td>
<td>Lunch - CERA</td>
</tr>
<tr>
<td>13:45</td>
<td>KA3 Gazprom</td>
<td>KA7 Pertamina</td>
<td>KA11 CNPC</td>
<td></td>
</tr>
<tr>
<td>14:30</td>
<td>Opening</td>
<td>KA4 KVGN</td>
<td>KA8 Statoil</td>
<td>KA12 AGA</td>
</tr>
<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>
</tr>
<tr>
<td></td>
<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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<tr>
<td></td>
<td>SA3 PETRONAS</td>
<td>SP5 Future of LNG</td>
<td>SP8 Growing gas demand w innovation</td>
<td></td>
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<tr>
<td>16:30</td>
<td>Exhibition</td>
<td>Committee Sessions</td>
<td>Committee Sessions</td>
<td>Closing Ceremony</td>
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<tr>
<td>18:30</td>
<td>8 sessions</td>
<td>8 sessions</td>
<td>8 sessions</td>
<td>Handover</td>
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<tr>
<td></td>
<td>Gala Dinner</td>
<td></td>
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<td>Farewell Party</td>
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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>Name</th>
<th>Position</th>
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<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>Chevron Corporation</td>
<td>GEORGE KIRKLAND</td>
<td>Vice Chairman &amp; Executive Vice President, Global Upstream &amp; Gas</td>
</tr>
<tr>
<td>ExxonMobil</td>
<td>REX W TILLERSON</td>
<td>Chairman &amp; CEO</td>
</tr>
<tr>
<td>GAIL (India) Limited</td>
<td>B C TRIPATHI</td>
<td>Chairman &amp; Managing Director</td>
</tr>
<tr>
<td>Gasunie</td>
<td>PAUL VAN GELDER</td>
<td>Chairman of the Executive Board &amp; CEO</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>RasGas Company Limited</td>
<td>HAMAD RASHID AL MOHANNADI</td>
<td>Managing Director</td>
</tr>
<tr>
<td>Royal Dutch Shell</td>
<td>PETER VOSER</td>
<td>CEO</td>
</tr>
<tr>
<td>Statoil ASA</td>
<td>HELGE LUND</td>
<td>President &amp; CEO</td>
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<td>The Japan Gas Association</td>
<td>MITSUNORI TORIHARA</td>
<td>Chairman</td>
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<tr>
<td>IHS Cambridge Energy Research</td>
<td>DR DANIEL YERGIN</td>
<td>Chairman</td>
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Confirmed Luncheon Speakers:

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<td>NOBUO TANAKA</td>
<td>Executive Director</td>
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See You In Kuala Lumpur...