Examining regional market outlooks and developments - Challenges & Opportunities

By:
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President
International Gas Union (IGU),
Malaysian Gas Association (MGA)

12th October 2010
Kuala Lumpur, Malaysia
1. Introduction – Brief on IGU
2. Global Energy Scenario until 2030
3. Regional market outlooks & developments
4. Challenges & Opportunities
5. 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

- 75 Charter members
- 36 Associate members
- 11 Affiliated members

As of October 2010
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 Haslim
Malaysia

**COORDINATION COMMITTEE**

Vice Chairman
Mr Georges Liens
France

Chairman
Mr Ho Sook Weh
Malaysia

**IGU SECRETARIAT**

Secretary General
Mr Torstein Indrebo
Norway

Director
Mr Harald Riddervold

Senior Advisor / Web Master
Mr Erik Gorder

Vice President
Mr Jérôme Ferrer
France

Immediate Past President
Mr Ernesto A. López Anandón
Argentina

Secretary
Ms Ungku Amin Ungku Tahir
Malaysia
Energy demand is expected to grow in the foreseeable future.

- **Population**
  - Average growth of 0.9% p.a.

- **GDP**
  - Average growth of 2.7% p.a.

- **Energy demand**
  - Average growth of 1.2% p.a. 2005 - 2030

- 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!

Source(s): ExxonMobil 2009
The leading growth of energy demand is likely to be spearheaded by Non-OECD countries.

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
Power generation represents the largest and fastest-growing sector

### Gas End Use by Sector 2009
- **Power Generation**: 38%
- **Transportation**: 18%
- **Industrial**: 27%
- **Residential/Commercial**: 16%

### Gas End Use by Sector 2030
- **Power Generation**: 40%
- **Transportation**: 18%
- **Industrial**: 28%
- **Residential/Commercial**: 16%

<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>

- This is due to a radical shift to use less-carbon-intensive fuels such as natural gas to generate electricity.
- By 2030, it will account for 40% of all energy demand, representing 55% of the total growth in energy demand.

Source(s): ExxonMobil 2009, EIA/IEO 2009, PETRONAS 2009
2. Global Energy Scenario until 2030

**Fossil fuels will still dominate the 2030 energy mix**

**World’s Primary Energy Mix**

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

**CAGR Total World Fuel Consumption, 2010-2030**

<table>
<thead>
<tr>
<th>Fuel Type</th>
<th>% of total energy mix</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>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Year</th>
<th>% of Natural Gas</th>
</tr>
</thead>
<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>24%</td>
</tr>
</tbody>
</table>

Source(s): EIA/IEO 2009, PETRONAS 2009, ExxonMobil 2009
The comparison outlook of proven natural gas reserves

World’s natural gas proved reserves

- **Middle East**: 76.18 Tcm
- **Russia & CIS**: 56.86 Tcm
- **Asia Pacific**: 16.24 Tcm
- **Africa**: 14.76 Tcm
- **N America**: 9.16 Tcm
- **S&C America**: 8.06 Tcm
- **Europe**: 6.23 Tcm

**Top 3 gas producing countries**:

1. **Russia** = 44.38 Tcm
2. **Iran** = 29.61 Tcm
3. **Qatar** = 25.37 Tcm

**Proven gas reserves at end 2009**

<table>
<thead>
<tr>
<th>Region</th>
<th>Proven Reserves (Tcm)</th>
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<tr>
<td>Middle East</td>
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<td>S&amp;C America</td>
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<tr>
<td>Europe</td>
<td>6.23</td>
</tr>
</tbody>
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Asia Pacific’s natural gas proved reserves

- **Indonesia**: 3.18 Tcm
- **Australia**: 3.08 Tcm
- **China**: 2.46 Tcm
- **Malaysia**: 2.38 Tcm
- **India**: 1.12 Tcm
- **Pakistan**: 0.91 Tcm
- **Vietnam**: 0.68 Tcm
- **Myanmar**: 0.57 Tcm
- **PNG**: 0.44 Tcm
- **Other Asia Pacific**: 0.36 Tcm
- **Thailand**: 0.36 Tcm
- **Bangladesh**: 0.36 Tcm
- **Brunei**: 0.35 Tcm

**Proven gas reserves at end 2009**

<table>
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<th>Country</th>
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- **Total 2009 world’s proven natural gas** = 188 Tcm (~6,620 Tcf).
- **It represents more than 60 years of consumption at today’s rate.**

- **Total 2009 Asia Pacific proven natural gas** = 16.24 Tcm (~574 Tcf).
- **It represents more than 35 years of consumption at today’s rate.**

Source(s): BP Statistical Review of World Energy 2010
Some of these regional conflicts may escalate and cause gas security threat. The emergence of unconventional gas development as future “game changer”.

With the advent of LNG, natural gas has become a global commodity. Wider access to worldwide gas markets through LNG established.

Source(s): Petroleum Economist 2010, PETRONAS 2010, Shell 2010
The outlook of Asia Pacific’s natural gas balance

### Asia Pacific’s natural gas production vs. total consumption

**Average Annual Growth Rate (AAGR):**

<table>
<thead>
<tr>
<th>Period</th>
<th>Total Consumption</th>
<th>Production</th>
<th>Total Consumption</th>
<th>Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>1975-1990</td>
<td>10.4%</td>
<td>11.2%</td>
<td>2010-2015</td>
<td>5.5%</td>
</tr>
<tr>
<td>1990-2000</td>
<td>7.7%</td>
<td>6.8%</td>
<td>2015-2020</td>
<td>4.0%</td>
</tr>
<tr>
<td>2000-2010</td>
<td>5.6%</td>
<td>5.0%</td>
<td>2020-2030</td>
<td>2.9%</td>
</tr>
<tr>
<td>2008-2009</td>
<td>3.0%</td>
<td>5.8%</td>
<td>2009-2030</td>
<td>4.0%</td>
</tr>
</tbody>
</table>

**Source(s):** FACTS 2010, BP Statistical Review of World Energy 2010

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### Asia Pacific’s natural gas exports vs. imports

**Average Annual Growth Rate (AAGR):**

<table>
<thead>
<tr>
<th>Period</th>
<th>Imports</th>
<th>Exports</th>
<th>Imports</th>
<th>Exports</th>
</tr>
</thead>
<tbody>
<tr>
<td>1975-1990</td>
<td>14.5%</td>
<td>17.1%</td>
<td>2010-2015</td>
<td>6.9%</td>
</tr>
<tr>
<td>1990-2000</td>
<td>7.0%</td>
<td>5.3%</td>
<td>2015-2020</td>
<td>5.8%</td>
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<tr>
<td>2000-2010</td>
<td>6.2%</td>
<td>4.0%</td>
<td>2020-2030</td>
<td>4.1%</td>
</tr>
<tr>
<td>2008-2009</td>
<td>-2.7%</td>
<td>4.9%</td>
<td>2009-2030</td>
<td>5.5%</td>
</tr>
</tbody>
</table>

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**Asia Pacific Region’s Global Share of Fossil Fuel Energy, 2009**

<table>
<thead>
<tr>
<th></th>
<th>Reserves</th>
<th>Production</th>
<th>Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>NG</td>
<td>16.24 Tcm</td>
<td>438.4 Bcm</td>
<td>496.6 Bcm</td>
</tr>
<tr>
<td>Global share</td>
<td>8.7%</td>
<td>14.6%</td>
<td>16.8%</td>
</tr>
</tbody>
</table>

Aggregate gas consumption is forecast to post a robust AAGR of 4% from 2009 – 2030.

The region will marginally become a net importer of natural gas by 2015.

By 2030, LNG imports will comprise almost 32% of Asia Pacific’s total gas supplies.
The potential growth of natural gas demand will be gradually increasing in Asia Pacific

As the countries’ economies mature e.g. India, Pakistan and Vietnam, the role of fossil fuels will definitely grow.

Natural gas, the fastest growing fuel, is well suited to meet the incremental demand.

Source(s): FACTS 2010, APERC analysis 2009, IEA WEO 2009
Coal remains as the primary fuel in the overall energy mix. By 2030, natural gas will account for about 8% of the overall energy mix.

The industrial sector accounts for the biggest share of local gas consumption. Limited use of gas for power generation due to high prices and gas availability.
3. Regional market outlooks & developments

Brief overview of India’s natural gas scenarios

Coal and combustible renewable & wastes will continue to play their crucial roles in the overall energy mix.

By 2030, natural gas will represent about 10% of the overall energy mix.

Power generation sector accounts for the biggest share of local gas consumption.

Gas use by power generation sector will be heavily influenced by price.

Source(s): FACTS 2010, APERC analysis 2009
Coal and oil remain the primary fuels in the overall energy mix.

By 2030, the forecasted share of natural gas in the overall energy mix is still below than the Indonesian government’s stated goal of 30%.

Gas use by power sector is forecasted to slowly decline after 2012 due to the lack of available and contracted supply.

The industrial sector accounts for the biggest share of domestic gas consumption.
Challenges and implications

- Unprecedented growth in energy demand and energy import needs could be greater than expected.

- Increased living standards, continued economic growth and dependency on coal and oil may indicate that the emissions to escalate significantly.

- Lack of good infrastructure in-place and in dire need for substantial investments to bolster the local natural gas development.
To consider policies that will promote the greater use of natural gas and its derivatives for transport sector, such as compressed natural gas (CNG).

To generate significant potential for energy savings through efficiency improvements.

To coordinate concerted efforts to reduce the reliance on coal and oil besides starting to utilise more less-carbon-intensive fuels such as natural gas and renewable sources.
5. Closing Remarks

IGU Messages 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
“GAS : SUSTAINING FUTURE GLOBAL GROWTH”

Kuala Lumpur Convention Centre
4 to 8 June, 2012

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

CHARMING COUNTRY, COLOURFUL CITY

THANK YOU FOR YOUR KIND ATTENTION!