Trends and Perspectives of the Global Gas Industry

Torstein Indrebø
Secretary General of IGU

China International Pipeline Exhibition & Conference 2013
Langfang, China, Sept 12-14, 2013
IGU represents more than 95% of the global gas market

* Status as per March 2013

Founded in 1931
www.igu.org

IGU members

81 Charter members
40 Associate members
The IGU flagship events

- World Gas Conference
  - Paris 2015
- IGU Research Conference
  - Denmark 2014
- LNG Conferences
  - LNG 18 Australia in 2016
  - LNG 19 China in 2019
- World Shale conference with CWC
  - Houston 2013

For the gas industry by the gas industry
The global energy future

Drivers:
- Rising population & middle class
- Economic development and job creation
- Public health: urban air quality
- Climate change

The world needs:
- Secure, clean and competitive energy
- Safe energy

Balanced and robust solutions required
Growing energy demand – need for all energy sources available

• Oil and coal declining in the long run whereas gas and renewables are increasing

Source: IEA, The Golden Age of Gas, 2011 (the GAS scenario)
Global energy mix development
(ExxonMobil)

Source: Smit, Energy Transitions (1800-1960)
Unconventional gas – abundant resources

Technology – driving supplies

Proven conventional

Unconventional

Coal bed methane

Tight gas

Volume

Gas resources for more than 250 years (IEA)
Unconventional Gas - overview

The production process

- Site development and preparation
- Vertical drilling
- Horizontally drilling
- Hydraulic fracturing
- Recycling of wastewater
- Well completion and operation

Source: Total
US Oil and Gas Production (IEA)
- need for new infrastructure
Gas is available - and widely distributed

Remaining global natural gas resource

200+ years
Based on current demand, the world has over 200 years of natural gas available.

Source: IEA
World Natural Gas Prices

Source: World Bank

Cost of export from US to Asia/Europe:
*Henry hub plus 6 USD/mmbtu*
Natural Gas Production: China to be 3rd largest producer in 2035

Source: IEA WEO 2011
World loves electricity!

Global increase by 2035 more than 50%

Source: ExxonMobil
Natural gas in the power sector

...clean-burning and affordable

Carbon dioxide emitted during electricity generation by fuel

<table>
<thead>
<tr>
<th>Fuel</th>
<th>CO2 emissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Gas</td>
<td>400</td>
</tr>
<tr>
<td>Crude Oil</td>
<td>800</td>
</tr>
<tr>
<td>Coal</td>
<td>1000</td>
</tr>
</tbody>
</table>

NOx and SOx content by fuel

<table>
<thead>
<tr>
<th>Fuel</th>
<th>NOx (g per kWh)</th>
<th>SOx (kg per toe)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Gas</td>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td>Crude Oil</td>
<td>5</td>
<td>25</td>
</tr>
<tr>
<td>Coal</td>
<td>10</td>
<td>30</td>
</tr>
</tbody>
</table>
Natural gas enables renewable energy

Society needs energy 24 hours / 7 days

<table>
<thead>
<tr>
<th></th>
<th>Gas</th>
<th>Wind</th>
<th>Solar</th>
<th>Hydro</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production capacity</td>
<td>90-100%</td>
<td>30%</td>
<td>10-15%</td>
<td>Drought</td>
</tr>
</tbody>
</table>

Natural gas easy to turn on and off
Natural gas for transportation

Less
- Particles/soot
- Noise
- CO2
- NOx - smog

Fleets

Maritime

Gas price lower than oil price
Natural gas provides sustainable growth

- Economic development and job creation
- Build on existing energy infrastructure
- Gas industry contributes to public finances
Adaptability of natural gas

- **Gas-fired generation technology directions:**
  - Capture carbon through retrofit technology
  - Partnership with renewables
  - Greater inclusion of carbon-neutral biogas

- **Gas pipeline and storage systems provide future options for:**
  - CO$_2$, Biogas, Hydrogen
Gas demand by region

Source: IEA 2011
China’s diversified gas supply sources

China 2012:
Production  107 bcm
Consumption  144 bcm
Source: BP Statistics 2013

Turkmenistan supplies 30 bcm/yr plus

Myanmar supplies 10 bcm/yr plus

Source: SHWE Gas Movement

Source: IHS CERA, various sources.
Imports via LNG Regasification Terminals

China 2012:
LNG imports 20 bcm

Source: BP Statistics 2013
Creating Trust for Gas

- Recognition by policymakers
  - National, EU, G20, UN
- Dialogue with climate NGOs
- Licence to operate

GHG Emissions Spectrum

Image of Gas
Policy to foster investments in gas pipelines

- Long term perspective – 20-50 years lifetime
- Pipelines need long term supplies and demand – Supply security and demand security
- Regulated tariffs must encourage investments
- Risk management: technical, market and political

Financing normally based on long term contracts
The benefits of natural gas are many

- Affordable and competitive
- Available via pipe and LNG
- Acceptable environmentally
- Adaptable to future technology

Gas: The fuel of today and tomorrow!
Thank you for your attention!