IGU Overview and Natural Gas in a Climate Change Perspective

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14-th International Oil & Gas Forum
Oil & Gas 2010
Kiev, Ukraine
IGU represent 95% of global gas sales

75 Charter members
36 Associate members
IGU covers the Gas Industry Value Chain

- Working Committees
- Programme Committees
- Task Forces

Source: IGU 90813-5
IGU Cornerstone events

Networking - Knowledge - Dialogue

The IGU Research Conference
IGRC 2011 in Seoul, Korea, October 2011

The IGU World Gas Conference
Kuala Lumpur 2012
Paris 2015

Co-sponsor of LNG Conferences
LNG 17 in Houston, USA, April 2013
Energy Challenges and Energy Realities

- Rising population – from 7 to 9 billion in 2050
- Human strive for a better life
- Technological progress
- Climate change concerns
Public and policy perceptions

Clean Energy
- Solar
- Nuclear
- Wind
- Natural Gas

Fossil Fuels
- Oil
- Coal

GHG Emissions Spectrum

Source: IHS CERA/IGU
ABUNDANT

ACCEPTABLE

AFFORDABLE
ABUNDANT:
Plenty of reserves. and more to come

In addition:
Proven conventional reserves* are growing
Unconventional gas has come within technological & economic reach

The total long-term recoverable gas resource base is more than 850 tcm, only 66 tcm has already been produced.

- IEA-WEO2009 -

* 185 tcm in 2008
Worldwide shale potential

A 2007 study showed 688 shale formations in 142 petroleum basins.

Source: Schlumberger
ABUNDANT
Global gas trade
enhancing also energy security
ABUNDANT: Accessible

North Stream (mise en service en 2011) Gazprom, E.ON, BASF

20 % du gaz russe à destination de l'Europe transitent par le gazoduc Yamal

80 % du gaz russe à destination de l'Europe transitent par le gazoduc Brotherhood

South Stream (à l'étude pour mise en service en 2013) Gazprom, Eni
Currently there is 160 bcm/yr of existing LNG regasification capacity; 23 existing plants in 8 countries.

5 projects are under construction with a total capacity of 30 bcm/yr:

- “GATE”, The Netherlands  
  - due 2011, 12 bcm/yr
- “Grain 3”, UK  
  - due 2010, 7 bcm/yr
- “Nynäshamns”, Sweden  
  - due 2012, 0.3 bcm/yr
- “OLT Toscana Offshore”, Italy  
  - due 2011, 3.8 bcm/yr
- “Fos Cavaou”, France  
  - due 2011, 6.6 bcm/yr
Gas is the cleanest-burning fossil fuel

Gas plants emit:
- 50% less CO2 than a modern coal plant
- 60-70% less CO2 than an old coal plant

There are still hundreds of old coal plants in operation today
ACCEPTABLE: Complement to renewables

- Wind power is intermittent
- Nuclear cannot match this variability
- Gas is the cheapest and most flexible back-up option for wind power

Source: Shell/ Pöyry
**AFFORDABLE:**
Attractive economics for electricity producers

- Gas plants more energy efficient than coal plants - 55-60% vs. 34-42%
- Gas has much lower capital costs per MW installed:
  - 50% of coal
  - 20% of nuclear
  - 15% of wind
- key for cash-strapped economies!

### Cost Comparison

<table>
<thead>
<tr>
<th>Source: DECC (Mott MacDonald) June 2010</th>
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<tbody>
<tr>
<td><strong>USD/ MWh</strong></td>
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<tr>
<td>Wind Offshore (75 km)</td>
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<tr>
<td>Wind Offshore (25km)</td>
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<tr>
<td>Wind Onshore</td>
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<tr>
<td>Nuclear</td>
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<td>Coal</td>
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<td>CCGT</td>
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CCGT: Combined Cycle Gas Turbine
Total Cost = Capital + Fuel + Operating
AFFORDABLE:
Fuel switching potential

Percentage of lignite and hard coal in power generation

- **Poland**: 93%
- **China**: 79%
- **India**: 68%
- **Denmark**: 55%
- **USA**: 51%
- **Germany**: 51%
- **World**: 39%

2005 Data
A robust climate-friendly energy strategy

- Enhance energy efficiency and savings
- Increase the use of gas in power generation
  - Gradually replace coal with gas
- Phase in cost effective renewable energy
- Develop Carbon Capture and Storage for gas and coal

Pick the "low-hanging fruits" first!
Policy messages needed to build trust in natural gas

- Policy documents to reflect role of natural gas
- Regulations to support infrastructure investments

Gas: Green, abundant, affordable, secure
Gas: Part of the long term energy solution
Messages about gas and climate

- Cleanest fossil fuel
- Developed and easily transferable technology
- Affordable – No large subsidies required
- Mitigate CO2 emissions at low cost
- Enables wind and solar

Natural Gas - part of the climate solution
IGU is creating arenas for sustainable solutions

- Ministerial Gas Forum
  2nd IEF – IGU Ministerial Gas Forum,
  Doha, Qatar, 30 Nov 2010

- UN Climate Change Conference
  (COP16), Cancún, Mexico
  IGU Worldwatch Gas Symposium, 5 December
The IEF-IGU Ministerial Gas Forum

Second Ministerial Gas Forum
Doha, Qatar - 30 November, 2010
“The Role of Natural Gas in a Sustainable Energy Future”
Natural gas CARES for the World

C - Clean
Natural gas is clean. Natural gas produces less nitrogen oxides than coal, and more than 50% less CO2. Natural gas produces no sulphur and no solid waste.

A - Affordable
Natural gas is the affordable choice. 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 - Reliable
Natural gas does not require subsidies. Unlike heavily subsidized renewable technologies, natural gas use allows countries to affordably reduce their emissions.

E - Efficient
Natural gas is available now. Gas is readily available from a variety of sources, both pipeline and LNG. The environmental benefits of gas can be realised immediately.

S - Secure
Natural 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.

Natural gas is efficient. Modern gas-fired power plants are 40% more efficient than coal plants.

Natural gas saves time. Gas-fired plants require less construction time than nuclear or coal plants.

Natural gas is abundant. Global production will increase over the next 20 years, with growing supplies from both conventional and unconventional resources.

Natural gas is safe. The natural gas sector has the best safety record in the industry.

It is time to act. It is time to choose Natural Gas.

International Gas Union
The Voice for the Gas Industry Worldwide
www.igu.org

25th World Gas Conference
“Gas - Sustaining Future Global Growth”
Kuala Lumpur, Malaysia
4-8 June 2012
www.wgc2012.com
ABUNDANT

ACCEPTABLE

AFFORDABLE

Thank you for your attention!
Thank you for your attention!

**Selamat Datang!**