Global Vision for Gas
The Pathway towards a Sustainable Energy Future

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- Charter members 79
- Associate mbrs. 38
Growing energy demand – need for all energy sources available

Source: IEA, The Golden Age of Gas, 2011 (the GAS scenario)
Natural Gas: Addressing the World’s Challenges

Key Global Challenges

- Population Growth & Resource Availability
- Economic Development & Employment
- Energy Poverty & Public Health
- Air Quality & Climate Change
- Mobility
- Affordability

Role of Natural Gas

- Abundant
- Feedstock and employment
- Reduce smog and pollution
- Low SO\textsubscript{x}, NO\textsubscript{x} and CO\textsubscript{2}
- LNG and CNG for transport
- CCGT low cost
Global Vision for Gas

Lays out a clear pathway towards a sustainable energy future

- Abundant
- Available & Accessible
- Affordable
- Adaptable
- Acceptable:
  - Sharply reduced greenhouse gas emissions.
  - Improved air quality and public health
Conventional reserves: plenty and more to come

Growing proven reserves

Global proven gas reserves have more than doubled since 1980, reaching 190 trillion cubic metres at the beginning of 2010

Source: IEA 2011
Natural gas reserves: plenty & more to come

Proven conventional reserves* are growing

In addition:
Unconventional gas has come within technological & economic reach

The total long-term recoverable conventional gas resource base is more than 400 tcm, another 400 tcm is estimated for unconventionals: only 66 tcm has already been produced.

* 190 tcm in 2010

- IEA-Golden Age of Gas 2011-
Resource Availability

What is the Global Availability of Natural Gas?
Global Natural Gas Recoverable Resources vs Demand
(Trillion Cubic Meters)

- Cumulative Historic Production: 93
- Proven Reserves: 187
- Conventional Potential: 217
- Unconventional Potential: 385
- Global Natural Gas Potential: 789

Chart does not include --
- Biogas
- Natural Gas Hydrates

Annual Demand Growth at 1 Percent: 3.5 Percent

Source: BP, IHS CERA, IEA.
Natural gas can contribute to better air quality and to mitigating climate change.

Natural gas is a clean-burning and low carbon fuel.

Carbon Dioxide Emitted During Electricity Generation by Fuel:

- Natural Gas: [Graph showing CO2 emissions]
- Crude Oil: [Graph showing CO2 emissions]
- Coal: [Graph showing CO2 emissions]

NOx and SOx Content by Fuel:

- Natural Gas: [Graph showing NOx and SOx content]
- Crude Oil: [Graph showing NOx and SOx content]
- Coal: [Graph showing NOx and SOx content]

Ad*: Power generation efficiencies assumed: Natural gas 55%, crude oil 37%, coal 39%
Gas for pairing with renewables

Fabulous renewable resources:
- Windpower needs wind
- Solar power needs sun

Ideal pairing resource
- Gas quickly in place when sun and wind temporarily is gone
Natural gas for transportation

Natural gas is applicable for most kinds of transportation
The Pathway towards a Sustainable Future

Meeting future global energy needs whilst addressing air quality and climate change concerns

Global Emissions Trajectory Base Case
Vision Pathway highlights various CO₂ abatement options and technology choices

Calculation for 2050

- Reductions from Greater Gas Use
- Reductions from Other Technologies
- Reductions from Both Greater Gas Use and Other Technologies
Gas Market Share of Primary Energy

- **1990**: 80% Natural Gas, 20% Primary Electricity
- **2010**: 70% Natural Gas, 30% Primary Electricity
- **2035 Base Pathway Case**: 60% Natural Gas, 40% Primary Electricity
- **2035**: 60% Natural Gas, 40% Primary Electricity
- **2050 Base Pathway Case**: 50% Natural Gas, 50% Primary Electricity
- **2050**: 50% Natural Gas, 50% Primary Electricity

- **Solid Waste and Biomass**
- **Primary Electricity**
- **Oil**
- **Coal**
- **Natural Gas**
The Vision Pathway Trajectory

Global Emissions Reductions by Sector

- **Base Case**: 60 (billion tons)
- **Power Generation**: 50
- **Transport**: 30
- **Industrial**: 20
- **Other**: 10
- **Residential and Commercial**: 5
- **Pathway**: 3
The Vision Pathway Trajectory

Global Emissions Reductions by Region

CO₂ Emissions (billion tons)

- Base Case
- Asia Pacific
- North America
- Middle East
- Latin America
- Africa
- Europe
- CIS
- Pathway
Requirements to realise the potential of gas / LNG for the future

**Politics**
- Conducive policy and regulatory framework
- Stable and predictable
- Consideration of cost of carbon

**Industry**
- Improve technologies used
- Establish trust with all stakeholders

**All**
- Realise the benefits and synergies of integrated energy concept solutions
Conclusion

Abundant

Available & Accessible

Affordable

5 Cornerstones of Natural Gas

Adaptable

Acceptable
Global Vision for Gas: The Pathway towards a Sustainable Energy Future

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