Natural Gas - Supporting Social and Economic Development

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The global energy future

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

The world needs energy services:
- Reliable, clean, affordable, safe

Balanced and robust policies 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)
Gas is available - and widely distributed.

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

Source: World Bank
Natural gas fueling the global economy – offers a wide range of applications

- Fuel for Gas District Cooling
- Fuel for Residential
- Fuel for Commercial
- Fuel for Automotive
- Fuel for Industry
- Fuel for Power Generation
- Fuel for Petrochemical Feedstock
Natural Gas – competitive & affordable

Comparison of generation cost
(10 eur/T CO2, 10 usd/mmbtu gas, 100 usd/mt coal, cap cost EIA 2013)

Levelised cost of electricity ($/MWh)

Source: ConocoPhillips
Natural gas partnering with renewables

Society needs energy 24 hours / 7days

<table>
<thead>
<tr>
<th></th>
<th>Gas</th>
<th>Wind</th>
<th>Solar</th>
<th>Hydro</th>
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</thead>
<tbody>
<tr>
<td>Capacity utilisation</td>
<td>90-100%</td>
<td>30-40%</td>
<td>10-25%</td>
<td>Drought</td>
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*Natural gas easy to turn on and off*
Gas fired power – clean burning and affordable

Electricity 24 hrs/7 days – no blackouts

- Gas turbine 350 MW – 1 million households (2800 kwh/year)
- 350 MW turbine requires 600 million cm/year (8000 hours)
- Technology scaleable, proven and affordable
- Environmental friendly
  - Lower GHG than coal and diesel, less air pollutants
Natural gas for transportation (CNG/LNG)

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

Fleets

Economics & environment – the main drivers

Maritime
Electric cars – increasing in urban areas

- Particles/soot
- Noise
- Local air quality

Less

- CO2?

How is the electricity produced?
Access to energy – key to social and economic development

- Food supplies – farming/irrigation
- Clean water supply
- Industry & job creation
- Health services & education

*Gas – supports all sectors of society*
Enhanced domestic use of gas in Africa

Offer potential for:

• Economic and social development
  – Jobs, government income, trade

• Reduced deforestation

• Reduced gas flaring

Gas: provides energy access in a sustainable way
A robust and sustainable energy policy

- Energy efficiency & savings
- Enhance use of gas in power generation and transportation
- Phase in renewable energy

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

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