OPPORTUNITIES FOR THE NATURAL GAS INDUSTRY ON THE ROAD TO SUSTAINABILITY
European Gas Research Group

- research and technical innovation along whole gas chain
- 40+ years of European Gas Industry collaborative R&D
- effective Gas Industry network for information exchange
- 13 members from 10 countries, active in natural gas R&D (representing ~ 75 million consumers)

EC-funded Projects

DEO • CONRAD • DIGBUILD • VOGUE • MICROMAP • PRESENSE • LABNET • GIGA • COMBO
GERG
European Gas Research Group

- large European reservoir of specialist knowledge
- high quality research resource
- Programme Committees
  - General Studies
  - Transmission & storage
  - Distribution
  - Utilisation
- dedicated multi-disciplinary Project Teams
- highly effective lobbying with strong Brussels network
- EU-funded collaborative R&D

EC-funded Projects
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Failing to meet the targets!

- demanding EU policy targets
- keys to change believed to be:
  - new & renewable energies
  - energy efficient technologies
- taxation to enforce change in consumer behaviour

EU greenhouse gas emissions - with and without Kyoto

Source: EC, DG TREN
Sixth R&D Framework Programme (FP6)

Priorities 2002-2006

1. Life sciences, genomics and biotechnology for health
2. Information society technologies
3. Nanotechnologies and nanosciences
4. Knowledge-based multifunctional materials and new production processes and devices
5. Aeronautics and Space
6. Food quality and safety
7. **Sustainable development, global change and ecosystems**
8. Citizens and governance in a knowledge-based society

Source: EU, DG Research
Sustainable development, global change and ecosystems

Targets

- Reducing energy intensity by 18% by 2010;
- Achieving a European Community target of 18% of electricity consumption from co-generation by 2010;
- Doubling the share of renewables to 12% by 2010;
- Contributing to the policy of security of energy supply;
- Making a concrete input to the European Climate Change Programme.

Source: EU, DG Research
EU30 Energy Demand: Business as Usual

Source: EC, DG TREN
EU 6th R&D Framework Programme

BUDGET
(€ x 10⁹)

Opportunities for the Gas Industry

- Energy savings and energy efficiency
- Renewable/natural gas hybrids
- Gas turbines
- Alternative motor fuels (NGV, etc.)
- Fuel cells
- New technologies for hydrogen
- Capture & sequestration of CO₂

Source: EC, DG Research
CHP - a key technology

EU potential (2010) for:
- 900-1,000 TWh/year
  (~ 30% of electricity demand)
- 150 X10⁶ tonnes/year reduction in CO₂ emissions

However:
- EU electricity production from CHP reduced since 1998
- decline of small scale CHP since liberalisation

Capstone gas-fired microturbine (30kW)
Decline of CHP in EU

For example:

- 15% closure in the Netherlands
- Downturns in the U.K. and France
- European Environment Agency believes that the share of CHP in the EU has diminished since 1998
Enough Natural Gas?

(MJ x 10^{18})

Methane hydrates

- A tantalising prospect
  - vast resources?
  - sequestration solution?
  - potential for radical change?
- Minimal EU R&D Programme!

Source: World Energy Assessment, UNDP
DEO
Domestic Energy Optimisation

To demonstrate:

- energy efficient technologies;
- effective combinations of technologies;
- houses with optimised energy systems:
  - energy efficiencies of 85 - 90%
  - primary energy reduction of 50%
  - CO₂ emission reduction of 33%

Source: Gasunie
MICRO-MAP
Mini & Micro-CHP Assessment and Development Plan

- an objective evaluation of products, markets and players, to enable investors and decision makers in energy companies and manufacturing industry to position themselves to exploit the new opportunities and to accelerate the development of the mini- and micro-CHP market in Europe
PRESENSE
Pipeline Remote Sensing for Safety & the Environment

Source: European Space Agency
PRESENSE

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PRESENSE

- Gas pipeline operators & remote sensing specialists
- Satellite surveillance of the European high pressure pipeline grid
- Priorities:
  - 3rd party interference
  - soil movement
  - methane leakage
- Integrated pipeline management system to:
  - improve safety & efficiency
  - reduce survey costs
CH$_4$ leak imaging

Portable / vehicle mounted

Infrared differential absorption spectroscopy:

- passive
- active, laser-based

Remote optical methane leakage detection
GIGA
Ground penetrating radar for high precision pipe location

GPR & Horizontal Direct Drilling:

- increased efficiency and safety for natural gas distribution
- potential for reduced CH$_4$ leakage
- improved quality of life by reducing:
  - traffic congestion, and;
  - noise pollution

Source: Ingeneria dei Sistemi (IDS)
A hydrogen system for Europe...?

Source: EC, DG TREN
...is an ambitious FP6 Integrated Project which will:

- examine the barriers that exist to, and the advantages that might accrue from, the addition of hydrogen to the existing natural gas system;

- define the technical and socio-economic conditions under which hydrogen can be injected in natural gas;

- develop a roadmap from the existing situation to a hydrogen economy;

- motivate all stakeholders to welcome hydrogen.

Source: Gasunie
NATURALHY - the scope

Natural gas

Hydrogen production

100% H₂ area

Source: Gasunie
Climate change is a reality

Source: Radiative forcing of climate change, WMO 94
Value of GERG R&D Programme

€ x 10^6