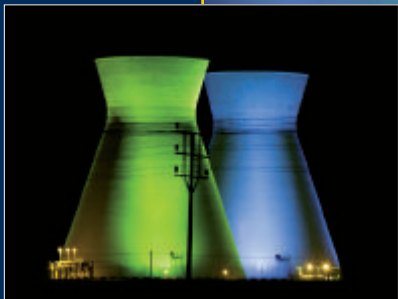
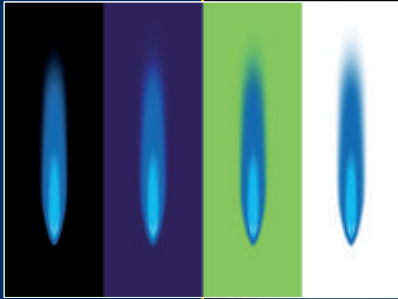


The Role of Natural Gas in a Sustainable Energy Market



euro  gas

The role of natural gas in a sustainable energy market



Europe's energy policy is focused on creating a sustainable, secure and competitive energy market, to ensure the wellbeing of European consumers. We see natural gas as a vital element in this, because of both its positive environmental

advantages as a source of energy and the abundance of gas reserves in many parts of the world. Gas is a key player in current energy policy, and we believe it will be an important contributor to the energy market of the future.

2

Fossil fuels in the current policy framework



One of the important topics in discussions of future energy policy is the issue of the sustainability of fossil fuels and the part they play in the energy market.

As far as natural gas is concerned, being the most environmentally friendly and sustainable fossil fuel, it can make a major contribution towards the Kyoto objectives and beyond. The use of natural gas contributes to the diversity of energy sources, and so helps to ensure Europe has access to the energy it needs. Gas companies are therefore

committed to ensuring a competitive, secure and non-discriminatory energy market in which gas can play a full part.

Gas companies endorse the action the EU is taking to combat climate change and to develop a more sustainable energy policy. If we are going to make a difference in the battle against climate change, we must make use of all the available sources of energy as efficiently as possible, whether as primary sources of energy or as a means of generating electricity.

What is the role of natural gas?

At present, natural gas accounts for 24% of European energy consumption and its market share is expected to grow. Gas has the advantage of being easy to transport (via pipelines or in liquid form) and it is very easy to control when being used. This makes it the fuel of choice as a means of distributing energy.

Natural gas also produces very low emissions of



CO₂ and also low levels of pollutants. Of all fossil fuels, natural gas has the lowest CO₂ emissions per unit of energy. It has no pollutant-forming components, it is free of sulphur dioxide (SO₂) and particulates in combustion, and emits very low amounts of nitrogen oxide (NO_x) when burned.

For these reasons, we are confident that natural gas will be increasingly important in the European

energy market - in electricity generation, in households, industry and commerce, in hybrid applications with renewables and in transport.

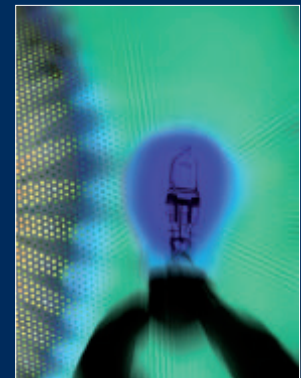


Efficiency of gas in conventional power generation

Natural gas accounts for 20% of primary energy used in electricity production in Europe. Among the advantages of natural gas fired power stations (Combined Cycle Gas Turbines or CCGTs) are their ease and low cost of location, speed of construction, and flexibility in use.

The high efficiency of CCGTs offers major environmental benefits. Replacing a coal plant which is 30-40% efficient with a CCGT which is 50-60% efficient reduces primary energy consumption drastically, and can more than halve the plant's CO₂ emissions.

Replacing a third of the coal-fired power stations in the EU by CCGTs has been estimated to save a third of the EU's overall CO₂ emissions. CCGTs will continue to play an important part in a balanced mix of generating facilities as older plants are phased out. Greater use of gas in CCGTs is certainly an environmentally attractive option while renewables are developed to widespread commercial scale.



Combined heat & power and industry

In addition there are great benefits to be gained from the use of natural gas in combined heat and power (CHP) applications. Gas can be used in this way in major generation plants, by business, in commercial applications such as swimming pools and in micro-CHP applications in domestic and



other buildings. A CHP typically utilises 90% of the primary energy content in the fuel. So gas can be used to improve overall conversion efficiency and at the same time reduce distribution network losses and improve network stability.

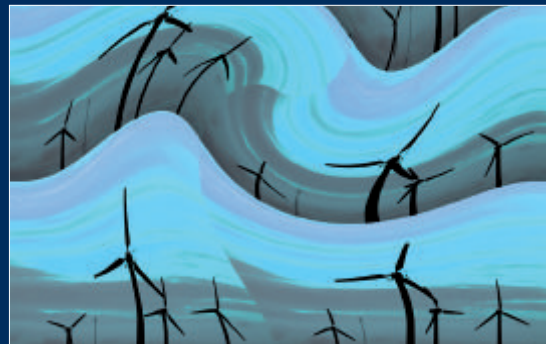
Natural gas is greatly appreciated by industrial consumers in numerous applications. Innovative technological developments including the development of new burner types offer process advantages and low emissions.

4

Natural gas and renewable energy sources

The EU's energy and climate policy supports sources of renewable energy, and it is likely these will play an increasingly important role by 2020 and beyond. As we seek to make the best use of renewables and technologies such as carbon capture and storage, the role of natural gas should not be overlooked. Natural gas makes an effective contribution to meeting emissions targets when used to replace other fossil fuels within the energy

mix, and can be used to good effect in combination with intermittent renewable sources such as wind or solar. Thus renewables are not to be seen as a substitute for fossil fuels such as natural gas – a sustainable energy market requires a diverse mix of environmentally-friendly fuels, within which gas, alongside renewables, has an important role. In the battle against climate change we have to make the best use of all energy sources.



An example of hybrid application Natural Gas / Solar energy / **Gaz de France**

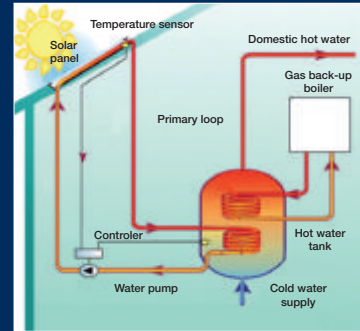


Photo and diagram © Gaz de France

One example of a collective housing programme meeting the «high quality standard», with space heating by natural gas condensing boilers and hot water provided by a combination of roof-top solar panels and natural gas.

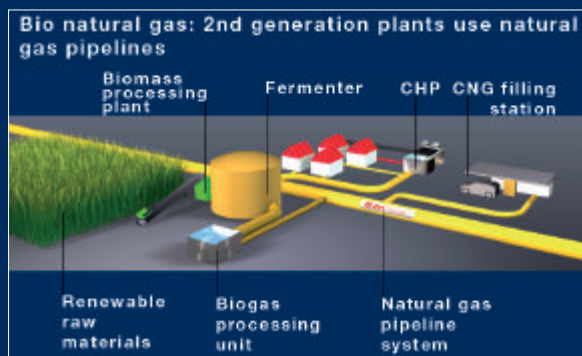
Biogas (gas from biomass)

Biogas offers similar advantages to natural gas but also has the great advantage of being a renewable energy source produced from waste matter or

crops. Recent technological advances and reduced production costs have given new impetus to this environmentally friendly energy source.



A schematic example of a network where both natural gas and biogas are utilised - **E.ON Ruhrgas**



Diagram, E.ON Ruhrgas



Energy efficiency and building standards

Gas accounts for 35% of the energy used by European households, and its popularity continues to grow. Direct use of gas can play a positive role environmentally, for example by developing micro-combined heat and power facilities. Using high efficiency boilers (which are around 90% efficient) - particularly in new buildings - is more than twice as effective in terms of reducing carbon emissions as converting the gas into electricity and using it to

heat dwellings, once electricity network losses are taken into account.

Eurogas also sees potential in the use of natural gas in hybrid applications, in conjunction with renewables such as solar. Used in this way, natural gas complements the environmental attractiveness of renewables, while ensuring continuity of energy supply for the user.



6

How gas suppliers can encourage energy efficiency

Gas suppliers have regular and direct contact with end-users of gas, and so are ideally placed to encourage them to improve energy efficiency in their homes, offices and factories. They can offer innovative products and tariffs, work with technology providers to develop new low-carbon technologies, and may also be involved with financial incentive schemes to encourage end-users to take measures to improve energy efficiency.



In industry, gas used in combination with smart technology enables the production of high-grade goods in an energy efficient, cost effective and environmentally friendly manner.



Natural gas and transport

In transport, natural gas can play an important role in reducing greenhouse gas emissions and improving local air quality. In industrialised countries, road transport accounts for about 60% of CO₂ emissions; it is the second largest source of hydrocarbons and NOx and a major source of local pollution, which is detrimental to the health of those living in large cities. Natural gas is already used in business fleet operations in a number of member states, and can be used in a large range of private vehicles from different car manufacturers.

The use of natural gas in vehicles results in substantial reductions in greenhouse gas emissions, producing around 20% lower greenhouse gas emissions compared with petrol equivalents and up to 80% reduction in CO and NOx. Comparing Natural Gas Vehicles (NGV) with diesel engines, emissions of particles are reduced by more than 85%, with no increase or a reduction in CO₂ emissions (the main greenhouse gas). Also, NGVs produce lower levels of noise and vibration.



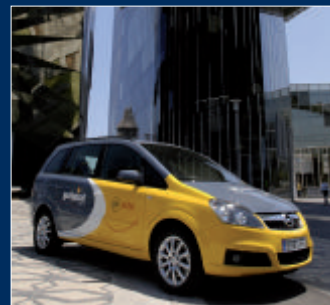
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Photos 3 and 4 - **Gas Natural** • These pictures show some cars in Spain running on natural gas.

Conclusion

Gas is the cleanest of fossil fuels, controllable and efficient in distribution and use. It already plays a positive role in environmental terms by displacing more polluting forms of energy used in power generation, heating and transport. Through its use in Combined Heat and Power production, in new applications and in combination with renewables,

it will continue to offer major environmental and technological advantages. Climate change means we have to make the most efficient use of all available energy sources. The challenge for energy policy is to create a framework within which natural gas can play its full and important part.

All photos without legend, except the photos on the cover and except the photos of the first chapter « The role of natural gas in a sustainable energy market” have been provided by Mr. Jean Schweitzer • jean@energypicturesonline.com • www.energypicturesonline.com



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