***IS NATURAL GAS STILL A BRIDGE TO THE FUTURE?***

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**Overview**

Natural gas was until recently considered as the bridge to the future, the bridge to a transition towards a decarbonised economy.

Close to 90 % of energy consumption in the world (excluding wood and biomass in emerging countries) is made up of fossil fuels: oil, coal and natural gas. Most energy forecasts predict an increasing consumption of fossil fuels in the next years despite the “Copenhagen consensus “ : to avoid the dramatic consequences of climate change, the increase in the temperature of the planet should be limited to 2° Celsius by the end of the century. To achieve this objective, CO2 emissions must be reduced by 50% before 2050. Most “developed” countries have CO2 emissions reduction targets of more than 70% to allow emerging countries to dispose of quantities of fossil fuels in line with projected economic development.

Natural gas is, by far, the cleanest fossil fuel. Natural gas combustion does not emit pollutants except some quantities of CO2. For the same production of electricity, CO2 emissions are half of those of coal generation and 30% versus oil. So natural gas could be the bridge towards decarbonised energy. Decarbonised energy is a crucial element to help fight climate change.

Today, the situation of natural gas varies from region to region. In the US, production of natural gas is increasing fast, with the huge growth of shale gas production which has striking consequences on domestic industry: very low natural gas costs represent less than $ 3/MMBTU or less than $ 18 /barrel of oil equivalent. More than one million jobs were created and the impact on the US GDP is remarkable including a strong recovery of the petrochemical industry. Ten years ago, the production of natural gas was expected to fall dramatically while the demand was expected to increase which triggered the construction of a number of LNG regasification terminals on the US coastline. In 2015, the production of tight and shale gas – which came as a surprise – fully reversed the situation and the US will be a LNG exporter by the end of this year.

What is the situation elsewhere? In Europe, the large development of renewables, especially in Germany, has transformed the energy scene. Sizeable amounts of electricity are coming from wind mills and solar panels. When and where there is wind and the sun shines, wind mills and solar panels supply most of the power requirements. This electricity is produced at a high cost, has a priority on the grid. But when wind mills and solar panels are not producing enough, electricity must be produced from fossil fuels. Gas should be the fuel of choice but as a matter of fact, more and more coal is used to produce electricity. Coal has been replaced in part by natural gas (due to the low domestic price of gas) in the US and this coal is exported to Europe where it is still cheaper than gas. The situation of the power industry in Europe is financially critical due to the high production cost of power from renewable whilst prices are decreasing due to the excess production of renewables. Most German power producers, E.On and RWE especially, are in a very tight situation and so decided to separate “old” and ”new” activities to better manage the situation.

In Asia, the potential demand for gas is huge. In China, coal consumption is close to 2 billion tons of oil equivalent while the demand for natural gas is only 160 million tons of oil equivalent. More than 75 % of electricity is made from coal. 20 to 30 new coal power plants (about 1 GW each) are built every year. Despite the sizeable number of dams and nuclear plants under instruction, coal will remain a dominant fuel. But replacing coal with clean fuels, including natural gas, is a priority for the Chinese government, because of the large worrisome pollution situation in the main cities. China could import very large quantities of gas from Russia, from Central Asia (Turkmenistan, Kazakhstan), from Australia and even from the US. Imports from East Africa could also develop in the future if and when LNG facilities are built. But due to transportation costs, gas is relatively expensive compared to coal which is abundant and relatively cheap to produce in China and in India.

Africa could become a large market for natural gas. Whilst this fuel is widely used in Algeria and in Egypt, its consumption is extremely limited in sub Saharan Africa where it could be a very attractive fuel for electricity generation. Only 30 % of the population has access to electricity in this region. Out of nearly one billion inhabitants more than 600 million do not have any access to electricity. The population could reach 2 billion inhabitants in 2050, and more than 1 billion persons critically need to get access to electricity to enable the economic development of the region. Natural gas, which is readily available in many countries, should be used for electricity generation.

What will be the future of gas?  LNG exports from the US could reach 80 bcm of gas or more by 2020. This is more than Qatar exports. Large facilities should come on stream soon in Australia. Mozambique and Tanzania in turn have huge reserves and potential exports are certainly several dozen billion cubic meters.

**Methods**

The paper will review in detail the reserves and potential production of natural gas / LNG in the major producing (existing or potential) areas: US, North America, Russia, Africa, Australia and will have a look at the potential production of shale gas in some countries with large reserves but where production development is now limited.

**Results**

Different scenarios can be envisaged for the future. Most studies forecast a strong increase in natural gas demand, the consumption of which will develop faster than other fuels and especially of the other fossil fuels – oil and coal. Different strategies will be developed.

**Conclusions**

The future of natural gas is bright due to the characteristics of gas (cleanliness, absence of pollution) and countries like China and India where the gas demand, although important, is just a small fraction of the total energy mix, should become very large gas consumers.

Yes gas will be the fuel of the future especially if a carbon tax is enforced all over the world

**References**

IEA, EIA, and other publications