



Shale Gas: Will it ever become a global success story?

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The energy sector has gone through significant changes during the past few years. One of the major consequences of these changes is the increased instability and uncertainty about the future. If a few years ago, the main concern was “peak oil” and the assumed insufficiency of energy resources in the long term, today it is rather the increasing number of technological choices and the difficulties in picking the right solution. The increasing number of national and international regulations and treaties makes the choices even more complicated. This is not to forget the currently estimated 1.2 billion people around the world who still lack access to commercial energy, despite the easing pressures on energy resources due to new discoveries, resource reassessments and improving efficiencies. The rapidly growing demand for energy all over the world clearly indicates that all technologies and fuels are needed to meet this demand, be it coal, oil, nuclear, hydro and other renewables or shale gas. As it happens, shale gas can also help secure further deployment of wind power, as gas is often used to back up wind capacity when the wind is not blowing.

The recent revolution in the energy sector which began in the United States and was caused by the development and wide deployment of fracking technology used to extract shale gas, produced spectacular results in terms of price reductions of natural gas prices. It has changed business models, project financing schemes and the mindsets of top executives all over the world. Many countries have begun prospecting and exploratory activities looking for gas shales, and many of them have found significant resources which could change the structure and performance of their energy industries. However, more often than not they have also found unexpected hostility from the population concerned about potential – though unconfirmed – threats to the environment or safety in producing areas. It is worth noting that in the US the main shale gas activities are taking place in sparsely populated areas, and have so far not lead to significant public protests. The situation is totally different in many European countries which have gas shale potential but are also densely populated with a fairly well-informed citizenry.

Energy is one of the most essential social and economic needs. Therefore, any developments in the energy sector should be taken seriously, as most of them have a wider economic and social impact. To build the wind turbine several hundred tonnes of steel and concrete are needed. This will help keep the domestic industries going. Shale gas

can provide several economic benefits. It is going to create a lot of jobs, boost tax revenues and relax the dependence on gas imports. In addition, the availability of shale gas will depress gas prices. Even if it has no major impact on prices it will still bring benefits to tax revenues, jobs and the balance of payments.

Shale gas resource base and current developments

It is believed that the shale gas resource base is both large and wide-spread around the world. However, the resource has not yet been quantified on a national level in the majority of countries. The most credible studies put the global shale gas resource endowment at about 16,110 trillion cubic feet (tcf) or 456 trillion cubic metres (tcm). It is assumed that nearly 40 per cent of this endowment would be eventually recoverable. The US and the CIS countries of the former Soviet Union together account for over 60 per cent of the total estimate. European reserves, on the other hand, are not very impressive at slightly over 7 per cent of the global reserves, and China and India on current estimates hardly reach a 2 per cent share each.

It should be emphasised that these are best estimates available today and they can change significantly when proper assessments will be performed. The US provides an enlightening case study. In 2007, US shale gas resource base was estimated at 21.7 tcf, and only a year later it jumped up to 32.8 tcf. At the end of 2008, shale gas accounted for 13.4 per cent of US proved reserves of natural gas, compared with 9.1 per cent at the end of 2007.

How does fracking work? The process combines horizontal drilling with hydraulic fracturing. In this procedure, a well is sunk to a depth somewhat less than that of a known shale gas deposit and then gradually deviated until the drill-bit is running horizontally through the shale bed. Once drilling has been completed, the rock surrounding the horizontal bore is perforated in a number of places and artificial fracturing induced by the high-pressure injection of water combined with special additives and sand – called a proppant – to keep the fracture open.

Pad drilling is another emerging technology, where multiple wells are drilled and completed from a single location. This minimises the need for roads and reduces the overall footprint of production, especially important in populated areas or farmland and other environmentally sensitive areas. It also allows for a higher level of sophistication in material handling.

Economics and markets

At present, only a few dozen gas shales have properly assessed production potentials, and most of those are in North America. The initial capital investment requirement related to exploitation of shale gas is significant. In addition, considerable investment is required for processing, transport and distribution of shale gas. Nevertheless, even if capital costs may be significant, shale formations may still be worth exploiting for both financial and strategic reasons.

Large international oil companies (IOCs) seem to believe in the long-term economics of shale gas, as ExxonMobil, Total, Shell, CNPC, Reliance Industries and others have acquired significant stakes in shale gas resources in North America. These acquisitions, which will require further investments over a period of several years, demonstrate the value the oil industry places on the future of shale gas. The increasing participation of oil majors in North American shale gas exploitation brings positive implications for the use of best practices and technologies in drilling and processing, which will make the exploitation of shale gas cleaner (poor casing practices by small exploration companies has been the cause of much of the challenging environmental issues). Furthermore, the IOCs will most likely lead exploration activities worldwide.

While work on shale gas has, to date, been very largely concentrated in North America, and especially the US, other parts of the world are now following suit, and preliminary resource assessments are being conducted in a number of countries and regions.

What the overall assessment demonstrates

The emergence of shale gas as a potentially major source of energy has been accompanied by a flurry of publicity, both for and against further development of shale gas. The identified benefits of shale gas include:

- Potentially enormous resource base;
- Lower carbon emissions than from other fossil fuels;
- Applicability of the technology throughout the world;
- Improved diversity and security of supply for gas-importing countries;
- Extension of production in some existing gas fields and opening-up of new fields.

On the other hand, the drawbacks include:

- Uncertainty over costs and affordability;
- Questions about the environmental acceptability of the technology;

- Poor reporting of decline rates;
- Potential shortages of equipment;
- Local opposition to shale gas development.

Shale gas will not dramatically change the energy sector of any country, as it is only one of the components in the complicated structure of national energy value chains. But it is certainly a significant factor which should be properly assessed in the development of national energy policies. □

A well drilling rig works in the eastern plains of Colorado to reach the Niobrara Shale formation

