

Energy: Shale gas makes further inroads into Europe's energy mix

The rewards of shale gas are starting to outweigh the potential risks of getting the energy source out of the ground for a number of European countries. Reserves of the gas are now thought to be much larger in some states than previously estimated. In others, there is growing concern over the dominance in the market of the United States. Some are also keen to break their dependence on Russian conventional gas.



Dr. Frank Umbach

MANY of the shale gas fields in Europe are situated in areas where the geology makes it much harder to extract than those in the United States. They are also in places with much higher population densities than the US, and their service industries and infrastructure for the industry are much less developed. These obstacles have dissuaded, until recently, a number of European countries from developing their own resources, particularly where there is strong opposition over potential environmental risks.

But the balance is starting to shift, with more countries actively considering either starting shale gas production or expanding existing industries. The one major exception is France, where the debate over shale gas production is still raging. New geological analyses in Germany and the UK have confirmed that their shale gas resources are considerably bigger than previously estimated.

United Kingdom

The British government lifted a ban in December 2012 which had been in place since May after the British Geological Survey revealed there was an estimated 1,700 trillion cubic feet (tcm) of reserves, which is 200 times more than



Romania's Prime Minister Victor Ponta wants shale gas exploration to go ahead (photo:dpa)

previously estimated. Around 10-20 per cent of the newly estimated resources are considered to be economically recoverable.

The government announced a new gas generation strategy in December 2012 which will allow for the construction of 20 new gas-fired power plants. This would increase net capacity of total British powered plants by 5GW (gigawatt) by 2030.

The British Chancellor of the Exchequer, George Osborne, recently committed the UK to an exploration drive for shale gas in the UK by promising tax allowances for companies developing shale gas fields.

He also said he would develop proposals to

‘ensure local communities benefit from shale gas projects in their area’.

Energy companies expect it will take up to five years for production to get underway on a commercial scale.

A review by The Royal Society and Royal Academy of Engineering in the UK has concluded that the controversial process by which shale gas is extracted from the ground, known as fracking, can be managed effectively and enforced through strong regulation.

In Northern Ireland, shale gas deposits could be worth US\$121billion, according to a new study by the consulting company PwC.

Germany

The German government published a draft law in February 2013 allowing the development of shale gas using fracking technology under strict conditions: Environmental impact studies will be made mandatory for all projects.

The draft legislation outlaws any fracking activities in protected areas and near drinking wells, which covers around 14 per cent of German territory.

The legislation was a compromise between the environmental and economic ministries to put the topic of shale gas exploration in Germany out of the political agenda for the national elections to be held in the autumn of 2013.

But it is unlikely to satisfy opponents of fracking or its supporters.

Many opponents are more worried that shale gas exploration may hinder and constrain further expansion of renewables in the German energy mix than they are about concerns over the environment.

They say that it could further complicate Germany's transition to renewable energy sources, which is becoming increasingly expensive and undermining the competitiveness of German industry.

Supporters have criticised the compromise because of the demand that environmental impact studies have to be carried out even for geological studies and all individual test drilling sites.

They also fear that stringent regulation regimes

Estimated European shale gas reserves

United Kingdom: Up to 1,700tcm of total unconventional gas resources. Original estimates of recoverable shale gas reserves (with current fracking technologies) put them at 5.3tcm

Germany: 6.8 - 22.6tcm; with technically recoverable reserves of 0.7 - 2.3tcm (10% of total shale gas reserves). ExxonMobil estimate of Germany's exploitable reserves: 827bcm - conventional gas reserves in comparison: 150bcm

Bulgaria, Romania and Hungary: 538bcm of technically recoverable shale gas reserves

Ukraine: 1.2tcm of shale gas reserves and a total of 2.8tcm of all unconventional gas reserves, which includes coal-bed methane and tight gas. Kiev hopes that the country will produce 8 - 10bcm annually in 10 years and 20bcm per year within 15 years

Lithuania: 480bcm

Poland: 187tcf (technically recoverable shale gas reserves)

Spain: 2.05tcm shale gas resources (preliminary estimates) with a commercial value of 700 million euros

Turkey: 1.8tcm in the Trace and the Southeastern region; additional discoveries expected in East Anatolia, Ankara, the Toros Mountain (in the south) and the Black Sea region

might be introduced to make projects uneconomic and unattractive for investors. There is already growing concern over the future international economic competitiveness of Germany's petrochemicals industry, particularly in the light of cheap US gas which has significantly cut the price of ethane, the chemical used in the production of ethylene, the building block for plastics such as polythene. Ethylene

accounts for 40 per cent of world trade in chemicals by volume.

Poland

Poland, which is bidding to become Europe's leading shale gas producer, has a different challenge.

Unlike public opinion in Germany and France, the pro-shale gas policies in Poland are supported by more than 70 per cent of the population.

But its energy companies are concerned about the government's proposed tax of 40 per cent on

shale gas production, particularly as they have to lay out large capital sums in the first stages of exploration.

Faster development has been hampered by difficult geology, an uncompetitive service sector, poor infrastructure, lengthy permitting processes, an uncertain regulatory and tax environment, and a lack of rigs.

Preliminary costs per well have increased to US \$15 million, nearly three times the cost in the US.

But government and Polish industry representatives still expect that domestic shale gas production will be significantly cheaper than Russian conventional gas.

The government has granted 113 exploration licences to around 30 companies on an area of about a third of the Polish territory.

Spain

The Spanish energy ministry and the autonomous communities of Spain have granted numerous exploration permits in various autonomous regions, mainly in northern Spain, after recent discoveries of shale gas deposits.

Exploration licences of Spain's conventional and unconventional hydrocarbon resources have almost doubled in the last three years in the Asturias/Cantabria/Basque onshore and offshore

area. Preliminary estimates show that, if confirmed, shale gas reserves would meet Spain's gas demand for 39 years. There have also been discoveries in the offshore regions of Fuerteventura and Lanzarote in the Canary Islands, where shale gas deposits have reportedly been much larger than in peninsular Spain.

Romania, Bulgaria and Hungary have around 538bcm of technically recoverable shale gas reserves, according to US Energy Information Administration estimates.

“ Unlike public opinion in Germany and France, the pro-shale gas policies in Poland are supported by more than 70 per cent of the population

Romania

Romania's shale gas resources, if fully exploited, are predicted to be able to cover all its internal gas demands. Its conventional gas production has decreased continuously in the last decade.

The Romanian government has awarded the American multinational energy company, Chevron, exploration licences to pursue unconventional gas production in Constanta County in the south east in spite of local environmental concerns.

Romania's Prime Minister Victor Ponta has warned that Romania risks losing economic competitiveness over Poland and other countries if shale gas is not exploited. He wants to reduce Romania's dependence on expensive Russian gas, which costs US\$450 per 1,000 cubic metres. But he expects that the exploration and confirmation of existing or non-existing economically exploitable resources may take up to five years before a final decision to produce shale gas is made by the government.

Hungary's energy company, MOL, Canada's East West Petroleum and some others also obtained exploration licences for unconventional and conventional gas explorations in Romania at the end of December 2012.

There have been some finds of shale gas in Bulgaria, but the chance of exploration is uncertain following the resignation of the

government in the wake of mass protests over rising energy prices.

Turkey, Ukraine and Lithuania

The south eastern region of Turkey and the Thrace region have estimated shale gas reserves of 1.8tcm, which could satisfy Turkey's natural gas consumption with an annual production of 45bcm.

Ukraine is estimated to have around 1.2tcm of shale gas reserves.

Inadequate legal protection has deterred foreign investors in the past, but Kiev made a breakthrough shale gas deal with one of the leading global energy giants, Royal Dutch Shell, in January 2013. Shell is expected to invest an estimated US\$10billion which some observers say could increase to US\$50billion.

One of the other big companies interested in Ukraine is Chevron which won a tender for the rights to develop the Oleska field in western Ukraine in May 2012. But it has faced local and environmental opposition.

It is uncertain, at least in the short term, whether these unconventional projects alone can substantially reduce Ukraine's gas import dependence on Russia.

Lithuania could hold 480bcm of unconventional gas with around 120bcm recoverable, according to government estimates.

The potential of shale gas reserves is among the

highest of the central and eastern European and European Economic Community countries after Poland, Romania and Ukraine.

If these unconventional gas reserve estimates are confirmed, Lithuania, which consumed 3.4bcm in 2011, supplied by the Russian energy giant,

Gazprom, could provide for its own gas demand for the next 30-40 years.

But the new government is proceeding carefully in the light of local environmental protests.

Sweden and Russia

Sweden's national independent energy company, Gripen Gas, has recently discovered

large shale gas reserves lying just below the surface in its southern region, which makes their exploration and production easier and less costly to extract.

It can use traditional Swedish drilling technology to extract the gas, instead of the more expensive hydraulic fracturing technology.

Russia's energy ministry has taken the first steps towards developing the country's shale gas resources. It plans to produce a preliminary estimate of Russia's shale gas resources up to the end of 2014.

But most Russian experts are sceptical over whether its unconventional gas resources could be produced cheaply enough to compete with its conventional gas resources without greater foreign investment and the transfer of technologies from the US.

“ Preliminary estimates show that if confirmed, shale gas reserves would meet Spain's gas demand for 39 years