

SHALE GAS: A TIMELY NEW SOURCE OF ENERGY, BUT AT WHAT PRICE?

The upheaval in the Middle East and North Africa together with Japan's nuclear disaster mean shale gas will become more important to the US and Europe. Nevertheless, there are concerns over the risks it poses to the local environment.

By Mike Scott

The global gas market has been transformed over the last few years. At a time when renewable energy is struggling for finance, the oil market is transfixed by events in the Middle East and the future of nuclear energy is once again open to question as a result of the recent earthquake in Japan, the gas market is a relative haven of tranquillity.

The reason - shale gas reserves in the US. These have long been known about, but are only now viable thanks to advances in the technology of horizontal drilling and hydraulic fracturing.

The US has discovered that far from being reliant on imports for its gas needs it has enough gas to last it 90 years, according to the US Department of Energy. It recently more than doubled its estimates of recoverable shale gas reserves to 827 trillion cubic feet, the energy equivalent of 140bn barrels of oil.

In Europe, one of the first shale gas projects is being undertaken by US group Cuadrilla Resources near Blackpool in Northwest England. According to the company, Lancashire has the potential to provide up to 10% of the UK's gas supply and transform the UK's energy future.

The impact of US shale gas has already been felt far beyond its borders. Europe had grown

increasingly nervous about the prospect of having to rely on Russia for its future supplies as the North Sea ran dry and in the face of competition for resources from Asia. This nervousness seemed well-founded as Russia demonstrated its willingness to exploit its gas reserves as a political tool, disrupting supplies to Europe in the course of disputes with its neighbour Ukraine.

Now, suddenly, the continent has an alternative gas supply as there will no longer be the demand in the US for European LNG imports and there is the prospect of developing local shale gas resources in countries ranging from the UK to Hungary.

Poland, in particular, appears to have significant reserves of the gas – an estimated 1.4 trillion cubic metres and a number of incentives to develop them. It wants to reduce reliance on its neighbour and rival Russia for gas and, as the most coal-intensive economy in the EU, it also wants to switch to less carbon-intensive fuels to meet EU emissions targets.

The prospect of competition for resources in Asia is also receding as Australia ramps up shale gas production and countries such as India and China prepare their own shale gas strategies.

The Obama administration is enthusiastic about this new source of energy supply because it is onshore, increases American energy security, creates jobs, raises the tax take and offers the prospect of helping to reduce the US economy's reliance on coal and therefore its greenhouse gas emissions.

And yet it is not unalloyed good news. There is growing concern about the environmental consequences of the shale gas industry, which has been the subject of an Oscar-nominated film, *Gasland*, a front-page story in the *New York Times* and numerous shareholder resolutions.

In January this year, investors including the New York State Comptroller, Domini Social Investments and Trillium Asset Management filed resolutions with nine oil and gas companies, pressing them to "disclose their plans for managing water pollution, litigation and regulatory risks that are increasingly associated with ever-expanding fracking in the United States". Those targeted are among the most significant natural gas players - ExxonMobil, Chevron, Ultra Petroleum, El Paso, Cabot Oil & Gas, Southwestern Energy, Energen and Anadarko and Carrizo Oil & Gas.

"Oil and gas firms are being too vague about how they will manage the environmental challenges resulting from fracking," says New York State Comptroller Thomas DiNapoli. "The risks associated with unconventional shale gas extraction have the potential to negatively impact shareholder value. I urge companies working in this field to share their risk mitigation and management strategies with investors and the public."

Environmental risks stem largely from poor construction of wells, which can

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lead to drinking water contamination, well blowouts and gas leaks, and from inadequate wastewater recycling and management practices, says the Investor Environmental Health Network, which helped co-ordinate the resolutions. Drilling also creates local air pollution.

Fracking produces millions of gallons of wastewater and in certain resources including the massive Marcellus shale, which stretches from Tennessee to New York, the water that comes out of the wells is naturally radioactive. It also contains a number of other chemicals, but many companies refuse to divulge exactly what is in their fracking fluid, citing commercial confidentiality.

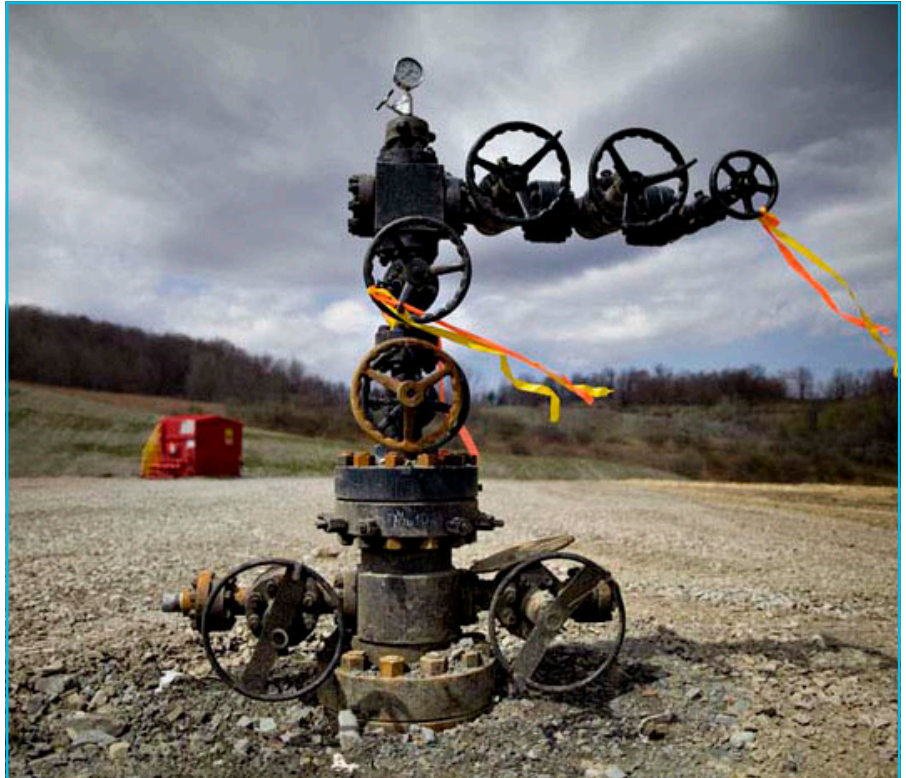
This stance is likely to be untenable in the long run and a number of companies have published details of their fracking liquid, including BHP Billiton and Cuadrilla. "I think ultimately people will have to disclose things like their fracking liquids," says Greg Hammond, energy partner at law firm Akin Gump.

In the US, four companies are facing lawsuits for alleged water contamination in Pennsylvania. New York State adopted a temporary moratorium on new permits for fracking. Philadelphia's city council has urged a ban on fracking in the Delaware River Basin until environmental studies have been completed, and Pittsburgh, which sits atop gas deposits, has banned fracking within city limits.

"High profile water contamination incidents, new litigation, and public protests that include calls for moratoria on natural gas permitting all suggest sizeable and rising business risks to companies and attendant threats to shareholder value," says Richard Liroff, executive director of the Investor Environmental Health Network.

Outside the US, France has introduced a temporary moratorium on shale gas and shale oil exploration until a report on its impact is published. In Canada, the province of Quebec has also banned development pending a review, hitting hard the shares of a number of project developers.

The UK government has so far resisted calls to delay exploration but concerns



Cleaner than coal? The emissions may be lower but the extraction process poses a real threat to groundwater.

Source: Daniel Acker/ Bloomberg.

have been expressed, most notably in a report from the Tyndall Centre for Climate Change Research, which called for a moratorium. "Information on health and environmental aspects is of variable quality and only now is any systematic effort being undertaken to better understand these issues," the report said. "The potential for hazardous chemicals to enter groundwater via the extraction process must be subject to more thorough research prior to any expansion of the industry being considered."

Exploration should be safe as long as it is carried out properly, stresses Alan Edwards, a director of oil and gas consultancy SLR, which has advised on a number of shale gas developments in the US. However, part of the reason for unease, he says, is that "there is currently little baseline information – we are not completely sure what the issues are".

Companies need to ensure they have sufficient wastewater disposal options available to them, they need to be sure what is in the water, and they need to ensure that they do not contaminate water supplies.

Contamination could happen via gas seepage, whereby gas is released from the shale but does not go up through the well, says Edwards. There is little evidence so far that this has happened, but it is a potent fear that can translate into severe disruptions for developers. As Shell discovered in trying to store CO₂ under the Dutch town of Barendrecht, public opinion can force companies to abandon projects.

With memories of the Deepwater Horizon disaster still raw, further oversight and therefore higher cost seems inevitable, says Deloitte's Rick Carr. "My feeling is that there will be increased regulation," adds Edwards, "we are just not sure of the nature of that regulation."

There is little to suggest that shale gas will play a key role as a transition fuel in the move to a low carbon economy, the Tyndall Centre's report adds. "Without a meaningful cap on emissions of global GHGs, the exploitation of shale gas is likely to increase net carbon emissions. Rapid carbon reductions require major investment in zero-carbon technologies and this could be delayed by exploitation of shale gas."

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This view is backed up by the International Energy Agency. Chief economist Fatih Birol pointed out at the launch of the IEA's World Energy Outlook 2010 that a decade-long global gas glut would create a "major barrier" to the development of renewable energy and other low-carbon projects.

In Europe there is currently limited pipeline infrastructure to support shale gas and it would likely be difficult to build any because of cross-border disputes and the likelihood of protests by environmental groups, Carr points out.

Europe has deeper and more geologically complex shale basins and a higher level of environmental scrutiny because of the continent's higher population density. This will "drive requirements for a smaller operational footprint and more environmentally-friendly fracking techniques," Carr adds. In addition, states rather than private landowners control mineral rights, so landowners have less incentive to co-operate with developers than in the US.

However, regardless of the potential for shale gas in Europe, any potential gas glut may disappear now that Japan's

nuclear capacity has been crippled and that gas markets in the Middle East are so uncertain. Ironically, in the end, the re-evaluation of nuclear power following the earthquake in Japan and events in the Middle East may well end up providing a boost for both shale gas and renewables.

"Everything else that is going on puts the risks from shale gas into perspective," says Hammond. "There is a reaction against nuclear, there are problems with deepwater drilling and the problems in the Middle East are self-evident. We are seeing a reassessment of risks across the board." ■

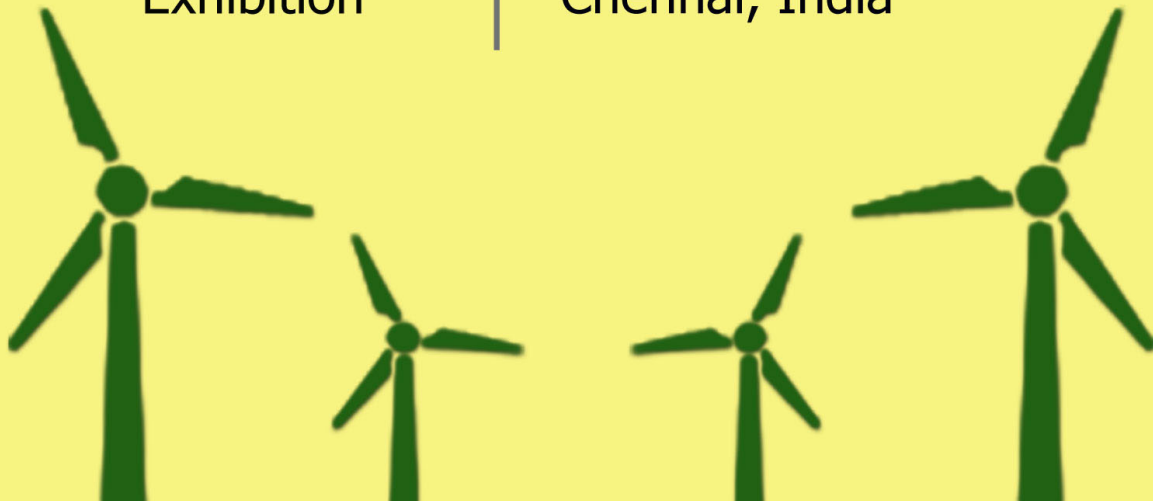
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