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## FRACKING IN THE UK: PLANNING AND PROPERTY ISSUES

*Peter Jones, Daphne Comfort and David Hillier*

*'Shale gas has the potential to turn the world's energy on its head. It's abundant, it's cheap, it burns cleaner than fossil fuels. And it's being found almost everywhere. But for shale gas to become the game-changer that some analysts predict, the industry has to surmount tremendous reputational and regulatory hurdles.'* (KPMG 2011).

### **Abstract**

**Purpose** – Large scale shale gas reserves have recently been discovered under many parts of the UK and development pressure for detailed exploration and possibly the production of these reserves by hydraulic fracturing, popularly described as fracking is growing rapidly and seems to have UK Government support. With this in mind the aim of this briefing note is to offer a general review of the possible development of shale gas reserves by fracking within the UK and to explore a number of the planning and property issues associated with such development.

**Design/Methodology/Approach** – The briefing note begins with an outline of the characteristics of shale oil and fracking and of the initial developments within the UK and discusses the planning and property issues associated with such developments. The note is based upon information drawn from the Internet, principally national and local government sources, business organisations and environmental and community pressure groups, and on visits to a small number of sites of exploratory fracking.

**Findings** – The note reveals that planning application for exploratory and production fracking will be determined at local authority level rather as Nationally Significant Infrastructure Projects determined by the Secretary of State. In determining planning applications local authorities have received planning guidance from the UK Government and will need to consider a wide range of environmental factors but some critics suggest that the guidance is not comprehensive and that it is weighted in favour of granting permission. A number of property issues are also identified possible effect of fracking on property the prices, the availability of mortgages and insurance of properties.

**Originality/Value** – This paper provides an accessible review of the development of shale gas resources by fracking within the UK and as such it will be of value to planners, developers, land and property professionals and students.

**Keywords** Shale Gas Resources, Hydraulic Fracturing (Fracking), Opposition Groups, Planning Issues, Property Prices.

## **Introduction**

The UK Government is committed to *'increasing the deployment of renewable energy'* (Department of Energy and Climate change 2011), which will help to *'make sure the UK has a secure supply of energy, reduce greenhouse gas emissions to slow down climate change'* and *'stimulate investment in new jobs and businesses'* (Gov. UK 2013a). However the discovery of potentially large deposits of shale gas within the UK may increasingly test this commitment. Although *'the assessment of shale gas resources is in its infancy in the UK'* (Gov. UK 2013a) and the *'the consensus is that shale gas will not be a "game changer" as in the US'* where *'the rapid development of shale gas resources has transformed the world gas market'* (Richards et. al 2013). Nevertheless there is growing excitement in Government circles and amongst energy companies about the scale of onshore shale gas reserves within the UK. In June 2013, for example, the British Geological Survey's announced that there was an estimated 40 trillion cubic metres of shale gas (more gas than produced from the North Sea) in and around the Bowland Basin, in the North of England (Gov. UK 2013b). At that time Michael Fallon, the Energy Minister, suggested that *'shale gas represents an exciting new potential energy resource for the UK and could play an important part in our energy mix'* (Gov. UK 2013a) and in January 2014 the UK Government announced that local authorities would be able to retain 100% (as opposed to the previous 50%) of any business rates from shale gas developments (Gov. UK 2014). However the potential commercial development of the UK's shale gas resources by hydraulic fracturing, popularly referred to as fracking, is being accompanied by growing concerns about the environmental and community impacts associated with the exploitation of these resources and a growing number of land valuers, property management companies and consultancies, chartered surveyors, estate agents, property and investment management companies are taking an increasing interest in such developments. With this in mind this briefing paper offers a general review of the possible development of shale gas resources by fracking in the UK and explores a number of planning, property and land issues associated with such development. The paper is based upon information drawn from the Internet, principally national and local government sources, business organisations and environmental and community pressure groups and on visits to a number of sites of exploratory fracking activity.

## **Shale Gas and Fracking**

Shale gas, mainly composed of methane, is often referred to as *'unconventional gas'* to differentiate it from *'conventional gas'* which is usually found in sandstones or limestone reservoirs. Traditionally within the UK shale has not been seen as a reservoir rock, rather as a source rock, in which gas, and oil, are stored some 1,000 -4,000 metres below the ground surface, before migrating into sandstone or limestone where it has been commercially exploited in the conventional manner. By contrast shale gas is produced by systematically fracturing shales, which releases the gas and allows it to flow. This process typically involves drilling a borehole down into the earth and then using a mixture of water and chemicals (which increases the efficiency of the process by reducing friction), pumped at high pressure into the shale to open up narrow fractures, which in turn creates paths for the gas to flow into the borehole and hence back to the surface. Once the fractures have been created small particles of sand are often pumped into them to keep them open.

Fracking had its origins in the US and it is here that it has been most extensively developed. The technique was first employed with nitroglycerine in shallow oil wells in the US in the middle of the nineteenth century but hydraulic fracturing dates from the late 1940's, initially on an experimental basis on a gas field in Kansas in the US and then on a commercial basis in Oklahoma and Texas. The fracking of shale rocks first took place on a demonstration basis in the 1970's but it was early in the 21<sup>st</sup> century before the technique began to be employed on a large scale commercial basis. Since then developments in drilling and exploitation technology have seen dramatic growth in the fracking of shales for gas within the US. By 2012 shale gas was estimated to account for some 40% of total US natural gas production (US Energy Information Administration 2013a) and shale gas resources are now being exploited in West Virginia, Pennsylvania and New York State in the east across to Colorado and New Mexico and from Michigan in the north and as far south as Texas.

Globally the US Energy Information Administration (2013b) has estimated that the total technically recoverable shale gas reserves are some 2066 trillion cubic metres with China, Argentina, Algeria, the US and Canada accounting for some 53% of this total. While the term technically recoverable resource is used to describe the volume of shale gas that could be produced with current technology, three factors, namely the cost of drilling and establishing wells, the volume of gas produced from a well during its lifetime and the price received for the gas, affect the economics of recovery and some of these factors will inevitably change over time. China has the largest shale gas reserves in the world but many of these are located deep below the surface in mountainous rocky desert areas and installing the necessary production equipment and the construction of new pipelines to connect these areas to the existing gas network seems likely to impede the commercial exploitation of these reserves.

### ***Commercial Development of Shale Gas in UK***

Within the UK there are several areas where the rock formations have the potential to produce shale gas. These include large areas of North West, Central and Eastern England associated with the Carboniferous Bowland shales of the Pennine Basin, the Weald, southern and eastern England associated with Jurassic formations and in parts of South Wales, Central Scotland and Northern Ireland, in association with much older rock formations. The commercial development of these resources involves two distinct stages, namely the exploration phase and the production phase. In regulatory terms the exploration and production phases are covered by the conventional UK licensing regime for oil namely a Petroleum Exploration and Development Licence (PEDL) which permits a company to pursue a range of gas, and oil, exploration activities subject to receiving the necessary drilling and development consents, meeting health and safety regulations and obtaining planning permission.

The exploratory phase involves drilling down to the shale deposits, hydraulic fracturing using a 25 metres high structure known as a 'well-over-rig' and the flow testing. To date, Cuadrilla, a privately owned UK exploration and production company have played the leading role in the exploration phase. The company began exploration drilling at Preese Hall at Weston in Lancashire in 2010 but following some seismic activity associated with exploratory hydraulic fracturing the company suspended exploration and plugged the well.

In response the Government announced moratorium on fracking in July 2011 but following further investigations and consultations permission was given to resume fracking in December 2012. Cuadrilla is also actively involved in exploratory drilling, and in obtaining planning permission for such drilling, elsewhere in Lancashire and at Balcombe in West Sussex. Another company, Dart Energy, have submitted planning applications for exploration in the Falkirk and Stirling area of central Scotland and they have also acquired planning permission for exploratory fracking in Dumfries and Galloway.

Once the commercial viability of shale gas resource is established then companies may apply for permits and planning permission for commercial production. When the fracturing process is completed the initial rig and fracturing equipment are removed and the wellhead would be up to two metres above the ground level and the production company would normally screen and landscape the production site. At the time of writing the possibility of large scale shale gas development certainly seems to have attracted major media attention in the UK and as discussed below the battle lines are being drawn up by those supporting and opposing this development but KPMG (2013) has argued that *'the UK is many years away from any kind of commercial shale industry.'*

### ***Planning and Property Issues***

The excitement in UK government and energy industry circles about potential shale gas reserves has been accompanied by the establishment of a growing number of environmental and community groups seeking to oppose the proposed fracking of shale gas resources. The pressure group Gasfield Free Mendips, for example, argues that *'fracking for shale gas' is 'an unacceptable energy option for the Mendips that threatens the safety, health, landscape and water quality for the people and livestock in all communities across the Mendips'* (Gasfield Free Mendips 2013). More specifically this pressure group argues that a large number of toxic chemicals will be used in the gas exploration process, that the complicated and fragile geology of the Mendips creates greater risk of leakage and pollution into watercourses through caves and smaller aquifers and that between 20% and 40% of the contaminants, hazardous and potentially radioactive water used in the extraction process flows back to the surface and requires treatment before disposal. While a number of UK Government departments and bodies, including the Department for Energy and Climate Change, the Environmental Agency and the Health and Safety Executive, have regulatory environmental responsibilities for shale gas development it is the planning system that *'controls the development and use of land in the public interest'* { Department for Communities and Local Government (2012). Given the scale of recent estimates of shale gas reserves local planning authorities in many parts of the UK seem likely to face a growing number of applications for shale gas exploration and production.

However the National Planning Policy Framework (NPPF) for England and Wales published in 2012, for example, does not explicitly mention fracking and thus it offered nothing by way of specific guidance for local planning authorities. That said the NPPF stressed the need *'to help increase the supply of renewable and low carbon energy, local authorities should recognise the responsibility on all communities to contribute to energy generation from renewable and low carbon sources'* (Department for Communities and Local Government 2012). At the same time the NPPF also emphasized that *'planning policies*

*should....promote the development and diversification of agricultural and other land based businesses'* (Department for Communities and Local Government 2012). More generally the NPPF also emphasised that planning decisions concerning large-scale (energy) infrastructure projects can be removed from local authority jurisdiction and considered as part of a new Nationally Significant Infrastructure Projects (NSIP) regime first introduced in 2010. Such projects are reviewed by the Planning Inspectorate at the national level with a recommendation then being made to the Secretary of State who will ultimately be responsible for determining whether to grant or refuse planning permission.

However in July 2012 the UK Government announced that that the NSIP regime would not be extended to embrace onshore gas developments and the following month the Government published planning practice guidance for onshore oil and gas. This guidance provides advice on the planning issues associated with three identified phases of hydrocarbon extraction namely, exploration, appraisal and production, lists some 16 environmental issues which should be addressed by planning authorities, and stresses that planning authorities must ensure that shale gas development is appropriate to its location and that it does not have an unacceptable adverse impact on the natural or historic environment or human health (Department for Communities and Local Government 2013). More specifically Lancashire County Council (2013) which was one of the first local authorities in the UK to receive planning applications for exploratory fracking for shale gas resources, has identified a number of planning issues which might be relevant when considering planning applications for shale gas fracking namely *'noise; visual intrusion; landscape; ecology; traffic; waste management; potential discharges to water courses and ground water; potential pollution from drilling and operations; perceptions of risk to health from contamination of ground and surface water; perception of risk of induced seismic activity;'* and *'perception of risk of subsidence.'* This list essentially mirrors the environmental issues identified in the planning practice guidance mentioned above but this guidance also identified a number of issues that planning authorities can *'leave to other regulatory regimes'* on the assumption that *'these regimes will operate effectively.'* These issues include *'the mitigation of seismic risks', 'well design and construction', and the operation of surface equipment on the well pad', 'mining waste', 'chemical content of hydraulic fracturing fluid', 'final offsite disposal of water' and 'well decommissioning.'*

While the guidance sought to provide greater clarity about the planning process for shale gas exploration and extraction it was not universally well received. Pinsent Masons (2013), a UK based law firm with specific expertise in energy and natural resources and real estate, for example, in arguing that the guidance is not comprehensive, suggested that *'there are areas where some in the industry may find that guidance is lacking: for example, in its failure to tackle key questions such as how planning boundaries should be drawn for directional and horizontal drilling once the appropriate rock formation is reached, how to deal with issues where the surface and subsurface are in different ownership and the way in which the guidance deals with the consideration of alternatives in the context of need and demand.'* More generally Pinsent and Mason (2013) argue that the Government's decision not to treat applications for shale gas developments as NSIP's could be seen *'as a lost opportunity'* which would have allowed such applications to enjoy *'the benefits of the streamlined examination procedure and the possibility of wrapping up other consents.'* In a similar vein Sector (2013) a Legal Director at Addleshaw Goddard, where real estate is a core

area of business, has argued that the Government's decision to determine planning applications for shale gas at the local level *'may prove wide of the mark if the ongoing publicity war about shale gas in the UK favours local action groups.'* That said Pinsent and Mason (2013) note that the Government intend to keep this situation under review and they suggest that *'it may be possible for a developer to argue that their particular project should have NSIP status.'*

Within the planning profession some critics have argued that the new planning policy guidance is weighted in favour of granting permission and a principal planner at Savills, the UK's leading estate agency, has been reported as arguing that the guidance was akin to a presumption in favour of the development of shale gas resources and more specifically that *'rather than just introducing controls over how decisions would be made, the guidance implies that government wants to see them go through'* (Planning Resource 2013). More critically Friends of the Earth (2013) has criticized this guidance, arguing that it *'will ride roughshod over local concerns about shale gas exploration and development with little regard for the impact on the wellbeing of local people or the environment'* and that it is *'little more than a carte blanche to dispatch dirty energy companies into the British countryside to start sinking thousands of new fracking wells.'* More specifically Friends of the Earth (2013) argued that the planning guidance for local authorities on fracking is *'not fit for purpose'* because *'it undermines UK commitments to help secure radical reductions in greenhouse gas emissions'*, *'it fails to ensure groundwater pollution is prevented'* and *'it doesn't specify that comprehensive Environmental Impact Assessments are conducted for all applications.'*

The major public protests and debates widely reported during 2013 about the development of shale gas resources by fracking in various parts of the UK have principally been focused on the range of potential environmental impacts identified in the planning practice guidance mentioned above, but if planning permissions for exploration and development are granted in growing numbers then a number of property issues may begin to loom large. Within the US, where the exploitation of shale gas is by fracking, as mentioned earlier, much more widespread, media, professional and trade sources suggest that the proximity to fracking is certainly having an impact on property values and on potential purchasers' perceptions. On the one hand largely anecdotal media reports (Resources Media 2013) suggest that residential property values have been reduced by between 3% and 70% at a range of locations across the US while emphasising the need to collect data on changing property values in a structured and systematic manner. On the other hand research reported to have been undertaken at Duke University (2014) suggested mixed results in that that houses within a one mile radius of fracking developments had experienced a 11% boost to property values, largely due to lease payments, but more generally while householders that had access to piped water had experienced an increase in their property value those that depended on ground water had seen a decrease in the value of their property.

In addition to changes in property prices proposals for, and the development of, fracking operations for shale gas, may also have other property impacts. There is some evidence from the US, for example, that insurance may become increasingly important. In July 2012 the Nationwide Mutual Insurance Company, one of the largest insurance and financial services organisations in the US, issued a press release emphasising that *'Fracking-*

*related losses have never been a covered loss under personal or commercial policies', that 'from an underwriting perspective we do not have a comfort level with the unique risks associated with the fracking process to provide coverage at a reasonable price insurance' and risks potentially associated with fracking 'are not part of our contracts and this is common across the industry' (Nationwide.com 2012). There are also emerging problems with mortgages and media sources (Resources Media 2013) suggest that a number of mortgage providers are increasingly unwilling to offer mortgages if shale gas rights have been sold to an energy company within 300 feet of a residential property or within 300 feet of property boundary lines.*

While the main weight of current evidence about property issues is from the US there are signs of growing concerns about such issues within the UK. In the wake of the announcement of the potentially large shale gas deposits across a broad swathe of northern England in July 2013, for example, a leading firm of surveyors argued it was *'just too early to gauge any adverse effect on house prices or demand'* but warned that *'house prices could fall by as much as 30%,'* (Mortgage Solutions 2013). More practically the firm argued that *'for the moment it is important not to over react but surveyor reports should offer an appropriate comment in localities where this (fracking) could assume greater importance'* and suggested that it was *'vital for surveyors in affected areas to be alert to any market reactions.'* At a local level the pressure group Residents Action on Fylde Fracking (2013) have expressed fears that *'there is a very real risk of substantial land subsidence'* which *'will result in a negative impact on our property prices.'* However in Amec's (2013) *'Strategic Environmental Assessment for Further Onshore Oil and Gas Licensing'* commissioned by the Department of Energy and Climate Change and published in December 2013 *'the likely significant effects for shale oil and gas exploration and production for local communities'* made no mention of possible decreases in residential property prices. In some parts of the UK landowners have registered claims for mining and hunting under ancient rights of ownership and while the pursuit of such claims for shale gas development may be complex and problematic, concerns have been expressed by homeowners in such areas about the impact of these claims on house prices and the availability of mortgage loans (Politics.co.uk 2014).

## **Conclusion**

Within the UK the development of shale gas resources is at the exploratory stage but the development pressures for the commercial development of shale gas reserves by hydraulic fracturing are rapidly gaining momentum in a number of areas. Opinion is sharply divided about the potential benefits and costs of such development. While the UK Government and the business community have generally been keen to stress the economic benefits the development of shale gas could bring nationally and locally, a range of environmental organisations and local community and environmental groups are bitterly and vociferously opposed to such development. These groups are mobilising against shale gas exploration and production, they are generally very well organized at the grassroots level and they have already taken direct action in an attempt to stop exploratory drilling activity. Their case draws not only on a wide range of research evidence but also taps into powerful community emotions, they have harnessed information and communication technologies and social media to good effect and they have taken direct action in an



attempt to stop exploratory drilling activity. The UK Government has sought to assuage many of the environmental concerns outlined earlier and has stressed that shale gas development '*must be done in partnership with local people*' and that it wants '*to encourage a shale industry that is safe and doesn't damage the environment,*' (GOV. UK 2013b.) While a number of government departments and bodies have regulatory responsibilities for shale gas development it is the planning system that is seen to have primary responsibility for determining whether the exploration for, and the subsequent exploitation of, shale gas reserves goes ahead. That said there is a body of opinion that suggests that the current planning policy guidance issued to local planning authorities by the UK Government is at best flawed and at worst weighted in favour of development and there are concerns that such development could have a major impact on property prices and values. As such local authority planners, private sector planning consultants, chartered surveyors, land valuers, and property management consultancies and investment management companies will want to maintain a watching brief on the development of shale gas resources by hydraulic fracturing.

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