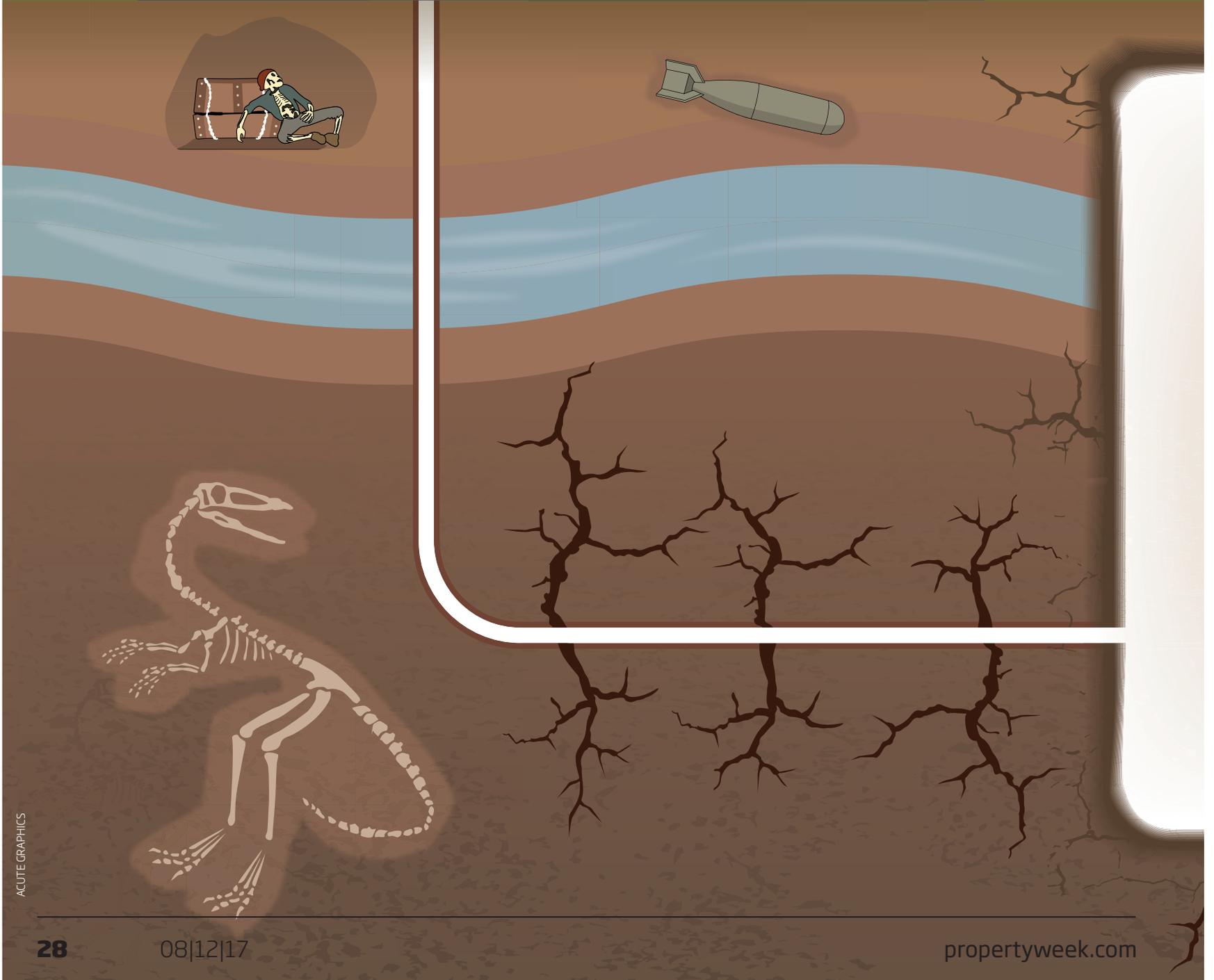
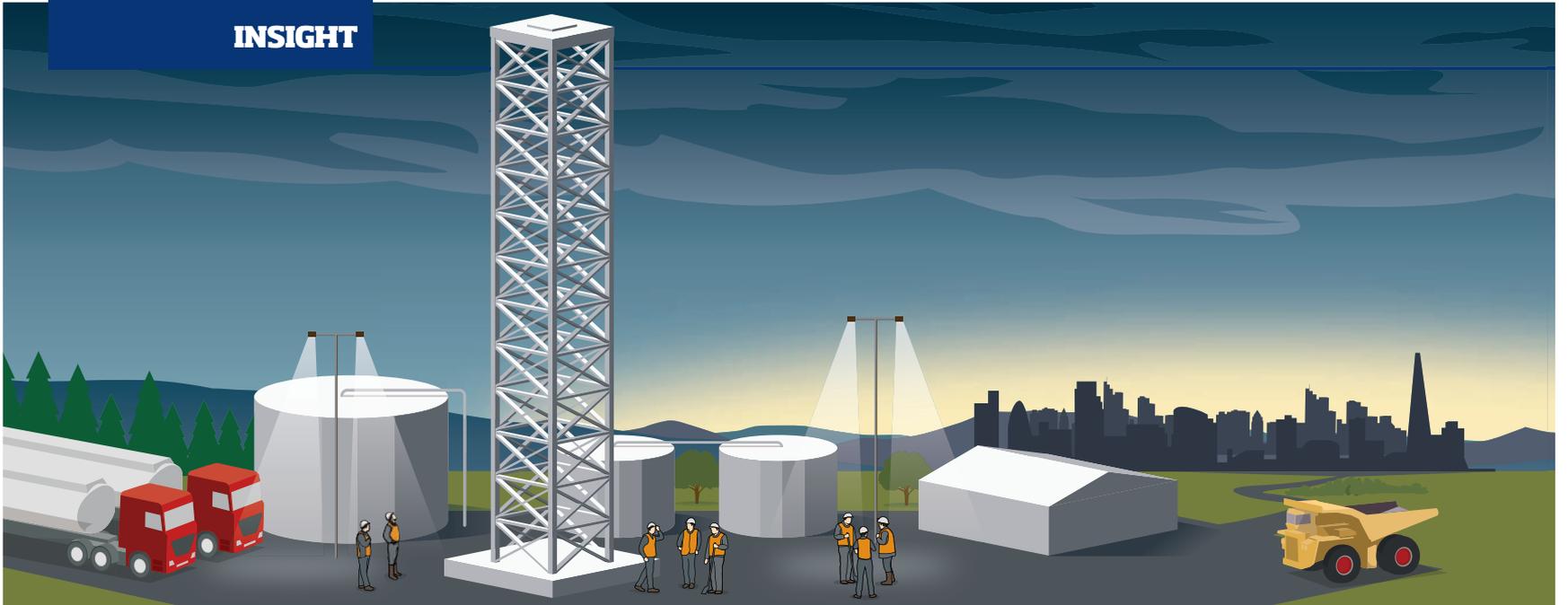


INSIGHT



ACUTE GRAPHICS

# BACK FRACK OR SACK IT?

■ In 2011, fracking hit the headlines when it was blamed for two earthquakes. But recently, there has been an increase in exploratory activity. **Emanuele Midolo** asks if 2018 will be the year fracking finally takes off

**I**n the middle of a remote field, large green water tanks and prefab blocks painted in a bright cobalt blue are scattered around a drilling rig, which stands 30 metres tall. Apart from these, some electric generators, water pumps and trucks coming and going, there is not much to see. That's because all the action here happens underground - up to 5km under in some cases.

Welcome to Preston New Road in Lancashire, where Cuadrilla Resources started drilling for shale gas last month, having secured planning permission to hydraulically fracture - or frack - last October. Opponents argue that fracking is a Pandora's box that if opened will trigger earthquakes, poison our water and set our land on fire.

It has not helped that two earthquakes occurred near Cuadrilla's Preese Hall site in Lancashire, in 2011. Indeed, they led to a moratorium on fracking in England and Wales and brought the controversial method to public attention, stymying subsequent attempts to use it - notably by the same company in Balcombe, West Sussex, in 2013.

In Scotland, the authorities went a step further and this October permanently banned any activity relating to shale gas, while last

month London mayor Sadiq Khan said he would block it in the capital. In England and Wales, however, the moratorium was lifted in 2012 and since then, exploratory activity has quietly been resumed. So is fracking finally poised to take off on an industrial scale?

The first time a well was fracked on shore in the UK was actually way back in 1964, by BP in Airdrie. But it wasn't until 2000 with the advent of new technologies and techniques such as 'horizontal drilling' that people started talking seriously about a shale gas revolution - and not until 2010 was the first well hydraulically fractured in England.

In August of that year, Cuadrilla started shale gas exploration at Preese Hall, drilling to a depth of 9,200 ft - more than 10 times the length of London Bridge. Nine months later, in May 2011, two earthquakes were registered in the area, measuring 1.5 and 2.3 on the Richter scale, prompting Cuadrilla to stop its operations on site.

A report by the Department of Energy & Climate Change conducted in conjunction with the British Geological Survey concluded that the two quakes were induced by hydraulic fracture processes.

The government decided to temporarily ban

fracking in the UK, introducing a moratorium on exploratory work. That was lifted a year later and a 'traffic light system' was introduced meaning that if a quake of 0.5 magnitude or above is detected, operations have to be stopped and hydraulic pressure must be reduced.

"It is a good start," says Richard Davies, professor of energy at Newcastle University and founder of Researching on Fracking in Europe (Refine). "We'll only know whether it's too strict or too lax once fracking starts. It's probably too strict, because a 0.5 event is very small."

## Increased interest

Despite its strictures the system has not deterred companies from exploring new sites. According to planning data collected by Groundsure, shale gas exploration is ongoing in at least 24 sites across England and Wales, with some 74 separate planning applications submitted between 2010 to Q2 2017.

Most of the shale gas operations are in the North West, where Groundsure highlights seven sites, all operated by Cuadrilla. The other regions are the South East (with six sites), Yorkshire & the Humber (five), the East Midlands (three), Wales (two) and the South West (one).

Of course, planning applications are not all related to fracking. "They might be for monitoring boreholes or a range of different things, but not necessarily for operational wells," >>

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« says Steve Thompsett, executive director at UK Onshore Oil and Gas (UKOOG), the representative industry body for fracking. "There is a very limited number of shale sites currently proposed."

Ken Cronin, UKOOG chief executive, adds that players such as IGas are in the process of working up planning applications for new potential sites in the North West, while other companies are preparing to conduct exploratory work in Nottinghamshire.

Only two companies have actually received permission to frack: Cuadrilla at its 3.8-acre Preston New Road site and Third Energy at Kirby Misperton in Yorkshire.

"We are currently in the main drilling phase," says a Cuadrilla spokesperson. "Drilling commenced in August 2017 and two horizontal wells will initially be drilled. This exploration work will help us to determine how much gas could be commercially extracted from the shale underlying Lancashire."

In May 2016, Third Energy got planning permission to frack at Kirby Misperton, North Yorkshire. "Our work takes advantage of an existing well where we will be completing a series of fracks and testing their potential to flow gas in commercial volumes," says the company, adding that these activities "will deliver a considerable boost to the local economy".

**Protester arrests**

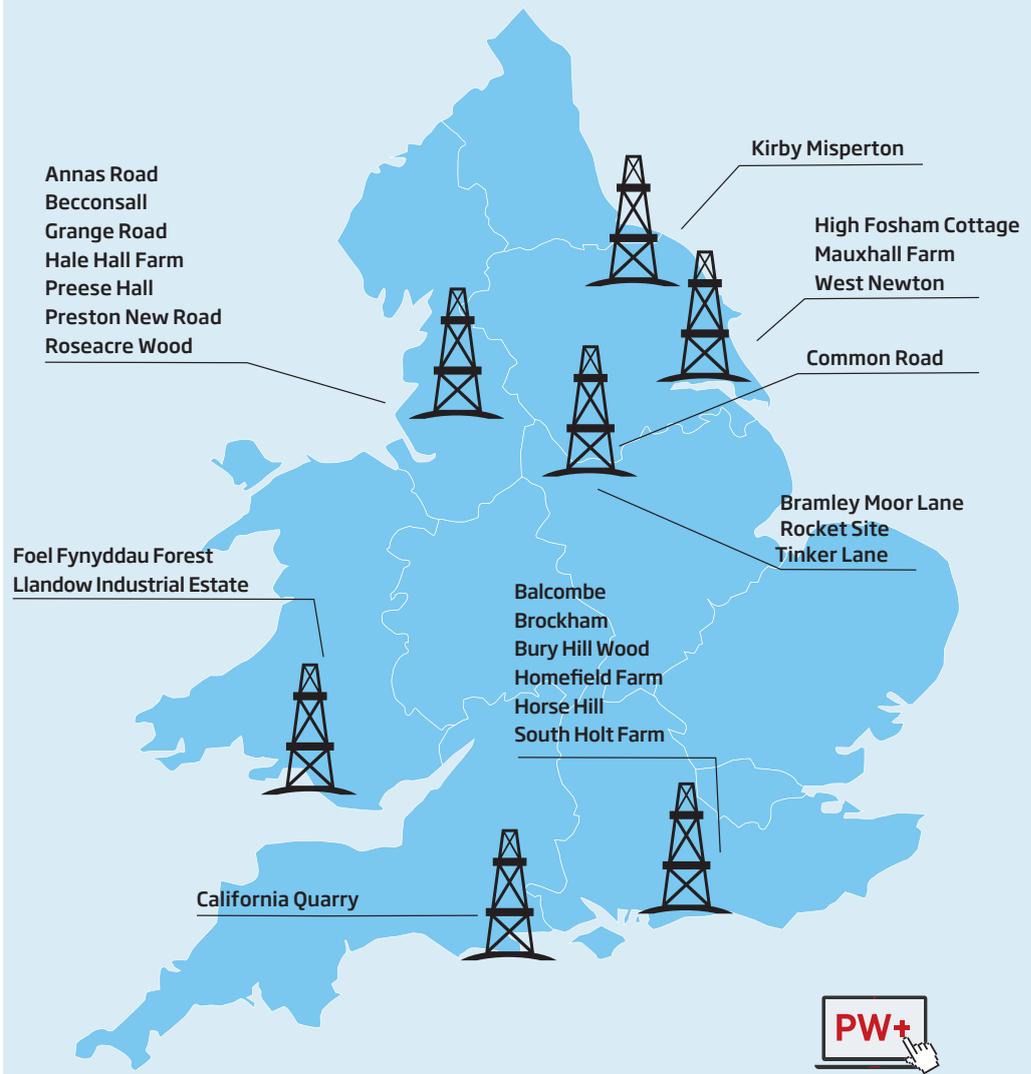
That won't win over the anti-fracking campaigners, who have descended on both sites to oppose the drilling. This week, protesters conducted a 'slow walk' protest at Kirby Misperton, and almost 70 people have been arrested protesting at the site since May last year. Meanwhile, at Preston New Road, there were 96 arrests in July alone, according to Lancashire police.

"We don't need a new fracking industry; we can't afford it," says Guy Shrubsole, a campaigner at Friends of the Earth, which opposes fracking on the basis that fossil fuels such as shale gas and oil emit greenhouse gases, contributing to climate change. "It's unnecessary and dangerous and has been forced upon local communities. We've been in close touch with people on the ground to see what's going on there and what we can do to help."

Many opponents have voiced concern about the link between energy exploration and earthquakes. Their fears have been stoked by events in Oklahoma in the US. Before 2008, only one or two 3.0-magnitude earthquakes were recorded a year in the state. In 2015, there were on average two a day, an escalation in frequency that American geologists attribute to fracking, which started on a massive scale in the area around that period. More precisely, they say that it is due to the disposal wells that result from fracking.

Some experts say the earthquake threat is overstated - or more accurately that the level of seismic activity relating to fracking is. "Drilling a well does not cause earthquakes," says Davies. "Fracking a borehole where you're pumping water underground can cause small earthquakes. The biggest we know was 4.6 magnitude, in Canada,

# Shale gas exploration sites



Source: Groundsure

but most are way smaller than that. Larger events are generally triggered by wastewater disposal."

Another major concern is toxicity. Fracking is generally considered a cleaner option than coal, but the inconvenient truth is that like any other fossil-fuel-related activity, it is not 'green'.

Arsenic, lead, bromide and other poisons are hidden inside the shale rock. There are also what are called, in jargon, naturally occurring radioactive materials (NORMs). All these toxic elements are released by the fracking process and in the US there have been reports of aquifer contamination or leaks of methane into the water supply.

Experts, however, claim that the contamination

is no greater than that produced by any industrial waste. Fracking fluid for example is not, as some

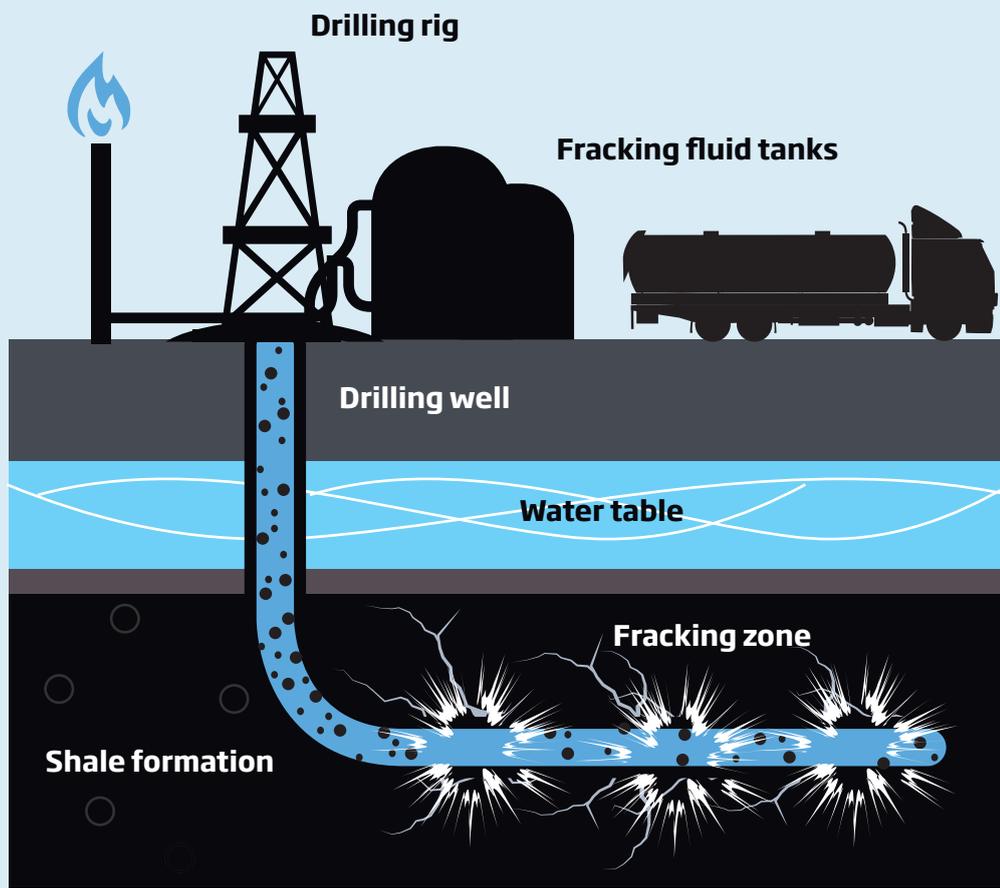
believe, in itself toxic. It is in fact composed of 95% water, 4.5% sand and just 0.5% chemicals, which are used to improve efficiency and counter the threat of adverse chemical reactions. Cuadrilla, for example, uses polyacrylamide, a gel used in contact lenses.

**Land use**

Where there is legitimate cause for concern is around land use. The Infrastructure Act 2015 gave permission to oil and gas companies to drill underneath property "not owned by the operator".

"This can affect you as a landowner whether

**“ Geologically, there is a big difference between resource and reserve ”**  
**John Underhill, Heriot-Watt University**



## WHAT IS FRACKING?

Hydraulic fracturing, or 'fracking', is a mining technique invented in 1947 in the US. It is the process of artificially fracturing shale rock in order to extract the natural gas trapped inside it. Shale gas is mostly composed of methane, a natural gas

used for electricity and heating.

The process is called 'hydraulic' fracking because extraction is achieved by using a pressurised mix of water, sand and chemicals. A well pumps the fluid at high pressure into the ground. A 'proppant' - the sand - helps to keep open the 'fracks' within the rock, which allows the gas to flow easily.

or not there is any extraction or exploration or prospecting on your land or neighbouring land," says Alan Somerville, energy, infrastructure and sustainability partner at Cushman & Wakefield. "Changes to planning legislation mean that companies could theoretically extract gas from your land without even requiring permission to do so."

UKOOG, however, insists that there are "very strict rules" about how far underground companies have to drill - generally more than 1,000 metres. "This ensures that drilling does not disturb the landowner in any way," says Cronin, adding that fracking companies must inform landowners if they start drilling underneath their land.

Somerville advises landowners to get involved in the local planning process, just to be safe. They should also be aware of how the fracking process

works. There are typically two stages: exploration and production.

The first is a prospecting phase where the oil company evaluates whether there is any shale gas present, and if so how much. For this, companies would need to take a short-term lease (up to five years) and would pay landowners a modest fee. If the site is deemed suitable for extraction, the company would look to enter into a longer-term lease (up to 20 years or more).

Unfortunately, it is difficult to calculate the financial upside at the outset. "Fracking has been talked about for years and years," says Somerville. "Most landowners are not convinced that you can accurately estimate that return."

The question is: can anyone - and are the upsides quite as big as advocates suggest?

John Underhill, chief scientist and professor of

exploration geosciences at Heriot-Watt University, does not think they are and argues that the fracking opportunity has been "overhyped".

"Geologically, there is a big difference between resource and reserve," he says, claiming that the actual reserves are much smaller than the figures suggested. In the UK, shale gas and shale oil are depressured and too cold to be extracted, he argues. "These companies are 55 million years too late. On an industrial scale, I would suggest that the geology is against them."

However, the pro-fracking camp maintains that further exploration is needed before any conclusions can be drawn. "It's simply not sensible to comment on the certainty of production until we have drilled exploratory wells and investigated," says Cronin. "Until we've done this, speculation is just that: speculation."

### What now?

Energy companies are keen to get that exploration work done as soon as possible. Cuadrilla submitted a new planning application in October to flow-test and monitor the existing exploration oil well at the site in Lower Stumble, Balcombe. The consultation ended last week and Cuadrilla hopes to get temporary permission for six months of exploratory work.

At Preston New Road, the firm's geologists are currently analysing samples of shale rock before the actual fracking can begin - hopefully in early 2018.

Meanwhile, Jim Ratcliffe's Ineos has applied to the government's Oil and Gas Authority for permission to conduct shale gas exploration within the Clumber Park in Nottinghamshire, after the National Trust refused access to the 3,800-acre national estate citing a "presumption against fracking".

The application will be monitored with interest. At the moment, the government's stance on fracking is not clear. Theresa May recently declared that shale gas had "the potential to power economic growth in this country". Other MPs, however, remain sceptical and the issue is not exactly at the top of the political agenda at the moment.

It soon could find itself higher on the government's priority list, though, given the momentum gathering behind the anti-fracking movement. The imminent prospect of large-scale fracking activity prompted Friends of the Earth to launch a 'Ban Fracking Now' campaign last month and so far, 33,048 people have signed its petition calling on the prime minister to stop all shale activity.

At Preston New Road, the site is still relatively quiet. A resident told local press that the drilling sounds "like an elevator going up and down". It may not be quiet for much longer.

"Fracking could happen any time now," says Shrubsole. "These companies just need to get final-stage consent before actual fracking could begin."

Whether 2018 is the year that happens remains to be seen. ■