

# Introduction

Cuadrilla is a UK company based in Staffordshire. Formed in 2007 as a privately owned exploration and production company, our focus is on bringing together experts to release natural resources, such as those in Lancashire.



Cuadrilla team with Mark Menzies MP, Energy Minister Charles Hendry, DECC Senior Geoscientist and Environment Agency's Local Area Manager.

Cuadrilla's management team have each played leading roles in the drilling and/or fracing of more than 3,000 natural gas and oil wells. Cuadrilla has local connections – one of its founders, and now the man in charge of geology is Dr Peter Turner. Born in Oswaldtwistle, it was Peter who recommended the Bowland Basin as Cuadrilla's first area for exploration due to his extensive knowledge of the area's geology.

With exploration of natural gas from shale still in its infancy, the Government believes that the UK is well placed to become the leading player in an emerging energy industry that will increase the country's self-sufficiency and secure investment and jobs for local communities across the country.

## Why we are doing this?

**Renewable sources are estimated to account for at best 15% of our energy use by 2020. Gas (with its low carbon content relative to alternatives such as coal and oil) is well positioned to be the 'transitional fuel' that gives us time to develop more effective renewable energy sources.**

A typical wellhead would generate the same power as about six 100 metre wind turbines, but takes up only a fraction of the space and is only a couple metres high.

Declining production in the North Sea has made the UK a net importer of gas since 2004. This makes it important to take the opportunity to develop shale gas to reduce our dependency on volatile international energy markets, such as those in the Middle East and Russia.

As a relatively untapped energy resource, natural gas from shale has significant potential to boost the UK's gas production and reduce the UK's dependency on foreign energy sources. The more the UK can rely on its own energy sources the more stable prices should be.



Cuadrilla's work team at the Grange Hill site.



The well head at our Elswick site .

# What Cuadrilla is doing

**Cuadrilla drill about 9,000ft (approx two miles) down into the ground, with several metal and cement casings between the bore and the surrounding ground.**

After a process called hydraulic fracturing, we gradually extract the gas that's been stored in the rock for hundreds of millions of years. It's all regulated by the Environment Agency and Health and Safety Executive, as well as needing permits from government and the council's planning permission to ensure it's safe for people and the environment.

Cuadrilla's exploration activity at a site lasts for no more than a year. During this time, a temporary rig is in place during the drilling stage (around four months) before this is moved on to another site. A 22 metre structure will be in place during the 'fracing' phase (around three months) which is removed from the site once this is complete. If the site is developed as a permanent energy generator, then each generator will be as small as a portacabin and well-screened for its lifetime.



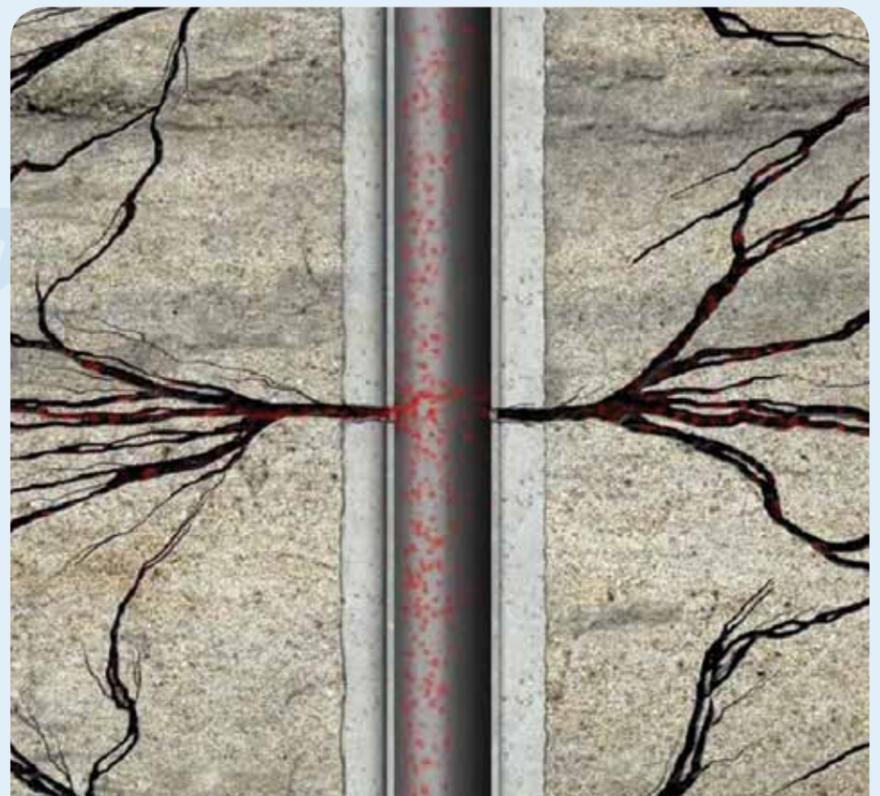
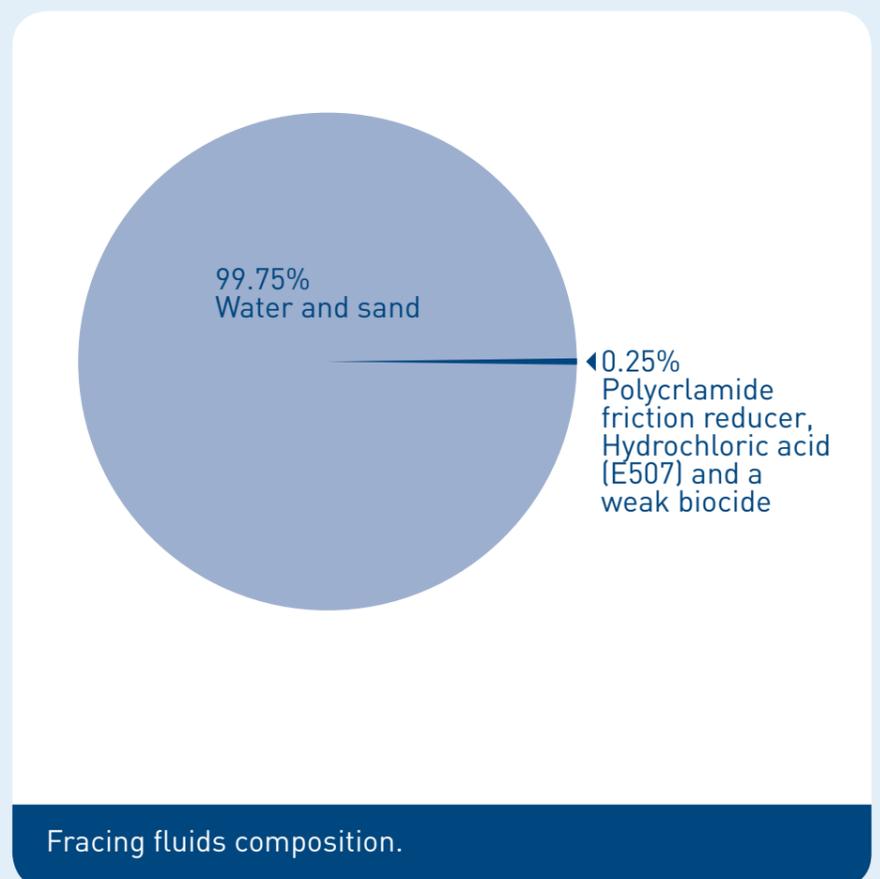
Cuadrilla's first site at Preese Hall, Weeton.

# Hydraulic fracturing – fracing

**Hydraulic fracturing (fracing) is the process of creating fractures in underground shale rock formations to release the natural gas trapped inside.**

Fracing fluid – 99.75% water and sand – is released at high pressure into the formation to create millimetre-sized cracks in the rocks. These cracks are held open by sand particles contained in the fluid, allowing the gas to flow into the wellbore and be collected at the surface.

The fracing process involves several rounds of fracturing lasting a few hours each; these are spaced out over several weeks while readings are taken and assessed. Once fracturing is completed the well can go on to produce for 30-50 years, as at Elswick. To minimise the amount of fracturing time required and to ensure site integrity, we undertake extensive studies in advance of the operation to plan the process thoroughly.



Following the fracing process, shale gas is released into the well bore .

# Safety measures in place – water

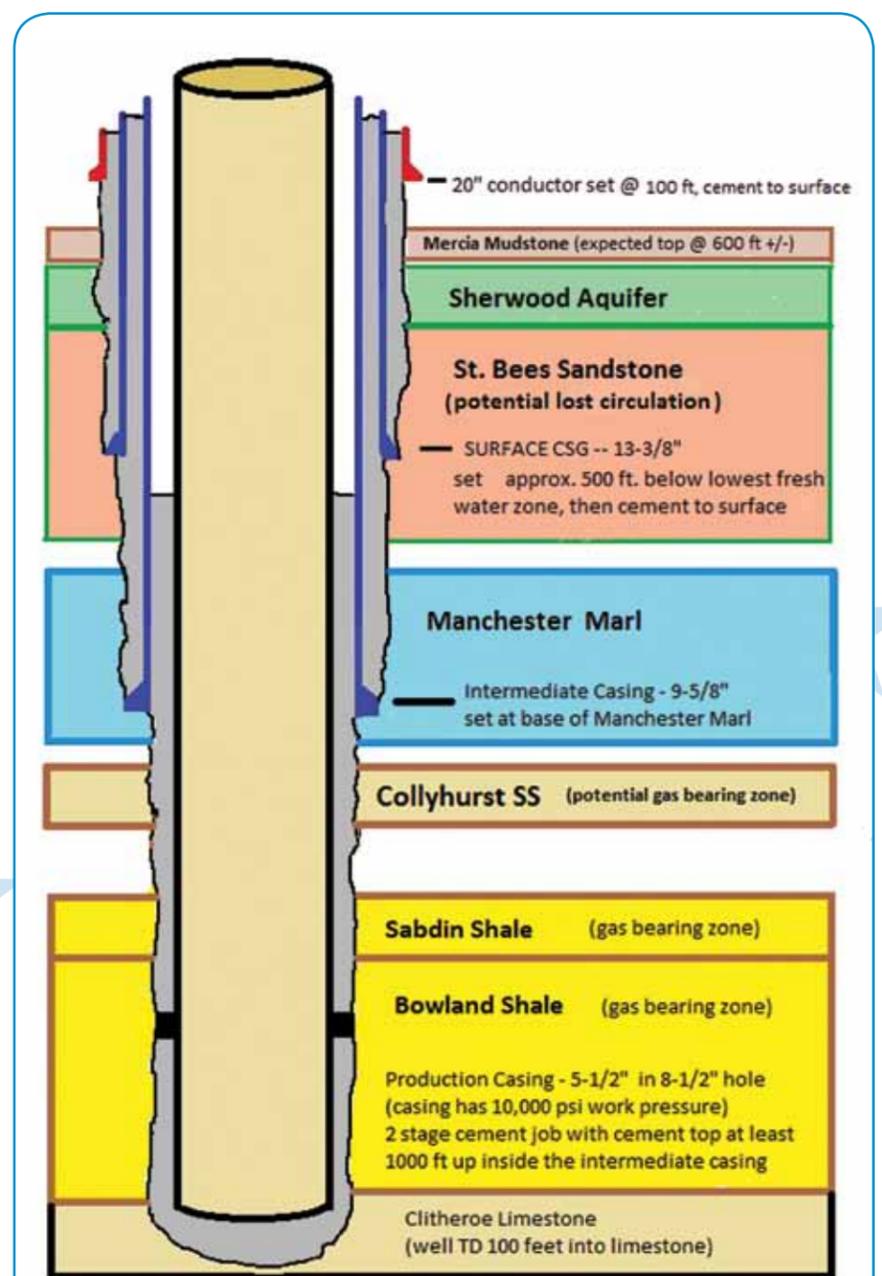
Cuadrilla’s wells have been designed according to industry best practice. An independent well examiner will check the wells, and only when they have reviewed the well design will Cuadrilla send this for review to the HSE.

The casing process takes place several thousand feet below the layers of aquifers. The site itself is protected by an impermeable membrane to guard against any on-surface spills.

In a statement to Utility Week, a respected trade publication, United Utilities said,

“ **THE BOREHOLES WE USE ARE LOCATED TO THE NORTH OF PRESTON, AT LEAST 20KM FROM BLACKPOOL, AND ARE DRILLED TO A DEPTH OF AROUND 150 METRES. THE BOWLAND SHALE GROUP IS BOTH Laterally AND VERTICALLY SEPARATE FROM THE FYLDE SANDSTONE AQUIFER.**

**UNITED UTILITIES HAS HAD NO INDICATIONS FROM THE ENVIRONMENT AGENCY THAT THERE WOULD BE ANY RISK TO OUR GROUNDWATER SOURCES FROM THIS DRILLING OPERATION.** ”



**Groundwater Protection:** With our exploration well design we have 3 separate strings of casing cemented across the Sherwood Aquifer to prevent any possibility of contamination from well fluids or natural gas. Additional protection is added if we put a well into production.

# Ongoing monitoring

Alongside permission being granted from the Government and Lancashire County Council, Cuadrilla's operations are subject to regulation from the HSE and the EA. As well as fulfilling regulatory requirements, an independent company continuously monitors drilling operations. Every week, we are required to give the HSE a detailed list of the operations from the previous week.

The EA independently tests the flowback water following the fracing. In addition, the environmental waste haulage company and the licensed disposal site will also test the waste water.

Cuadrilla now works with the British Geological Survey (BGS) to monitor seismic activity in the area. We have also commissioned the renowned Applied

Environmental Geophysics Research Group, at Keele University, to set optimally placed seismometers to monitor ground movements around Cuadrilla's active well sites and the surrounding area. This will provide additional data, available in real-time, to the BGS and Cuadrilla. All information received will be publicly released by the BGS.



The impermeable membrane runs under the site and prevents any potential spills from leaching directly into the groundwater.



Cuadrilla CEO, Mark Miller, with Fylde MP, Environment Agency's Head of Climate Change, Environment Agency's Local Area Manager and Minister for Energy.

# What's in it for the area?

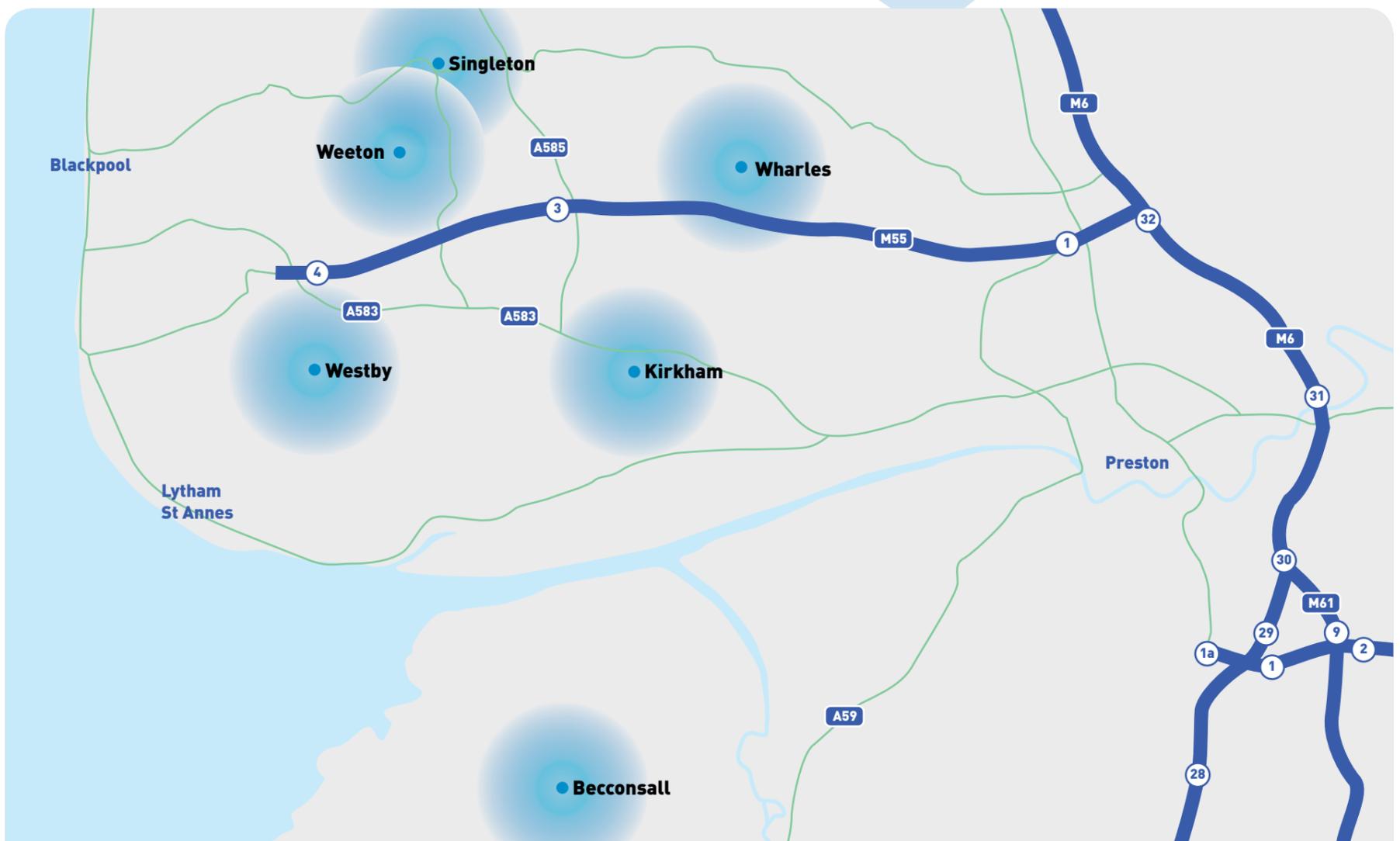
In the short term, many businesses around our active well sites in the Fylde along with those in the surrounding area have benefited from Cuadrilla's local work.

“ **LONG TERM, WE WOULD WANT A PROJECT LIKE SHALE GAS TO ACT AS A TRIGGER FOR ECONOMIC REGENERATION. IF THIS OPERATION RAISES CONFIDENCE IN THE TOWN AND PRIVATE SECTOR BUSINESSES ARE WILLING TO INVEST, WE WILL HOPEFULLY SEE A HUGE CHANGE.** ”

**Rob Green**

Head of Commercial Development at Blackpool, Fylde and Wyre Economic Development Company

Experience suggests that around 10% of Cuadrilla's annual expenditure on a project like this goes into the local economy, which in the Fylde has been over £1 million. As the project develops, we'll have a better understanding of the exact amount to be invested in the area, including the potential number of jobs supported by Cuadrilla.



10% of Cuadrilla's spend goes into many local businesses – more than £1m so far for just the first two sites in Fylde.

# What happens now?

At the moment, Cuadrilla is simply exploring how much gas there is and how easy it is to extract. We will have to go back to the Government and the County Council for permissions to set up permanent facilities.

In the meantime and as part of our commitment to being a good neighbour, we will be issuing newsletters and holding site visits to make sure the community is directly informed about our operations.

In addition, we will continue to keep surrounding communities informed through regular updates and meetings with their elected representatives.

We have a dedicated Freephone Information Line and email to answer any queries you may have about what Cuadrilla is doing.

## Contact us

You're very welcome to contact us and we look forward to hearing from you!

Community helpline 0800 170 1115

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LICENSE GRANTED FROM CENTRAL GOVERNMENT TO EXPLORE

TEMPORARY PERMISSION GRANTED FROM LOCAL COUNCIL

ENGAGE WITH THE LOCAL COMMUNITY

DRILL THE WELL TO A PROJECTED DEPTH

FRAC (WHICH MINUTELY FRACTURES THE ROCKS TO EXTRACT THE GAS)

MEASURE THE GAS RELEASED

MEASURE THE COMMERCIAL VIABILITY OF THE WELL

APPLY TO CENTRAL GOVERNMENT FOR PERMANENT EXTRACTION LICENSE

APPLY TO LOCAL AUTHORITY FOR PERMANENT PLANNING PERMISSION

ENGAGE WITH THE LOCAL COMMUNITY

IF PERMISSION IS GRANTED, CONSTRUCT WELL-SCREENED PERMANENT FACILITIES

START GENERATING ELECTRICITY