

SHALE GAS The Opportunity for the UK

Laura Hughes Commercial and Projects Director

In partnership wit





•

•

•

- The Case for Gas
- The Operating Environment
- Cuadrilla's Approach





Even in the most positive outlook for energy efficiency and renewables, UK natural gas demand will endure

Natural gas flow chart 2015 (TWh)





- Majority of natural gas used for heating, cooking and industry
- Less than 25% used for generating electricity
- Under the greenest scenario we'll still be consuming the majority of today's natural gas requirement in 2040

^{Gas} UK running out of gas, warns National Grid

3

Cuadrilla

LANCASHIRE FIRST



Domestic shale gas could plug the gap between declining North Sea production and imports...





- Over 50% of UK's gas is currently imported
- Indigenous Shale Gas could provide up to 50% of the UK's natural gas requirements by 2035



...and help achieve UK emission targets



Committee on Climate Change analysis and Professors Mackay and Stone note that UK shale gas could offer a 50% production emission saving compared to LNG and long distance pipeline supplies...





Bowland Shale has long been identified as prospective...



LANCASHIRE FIRST



substantial premium to US



6

approvals for projects of

national significance



7

...with very significant volumes, identified through independent assessment





- The 2013 study by the British Geological Survey assessed the resource potential of UK shales
- Bowland Basin estimate: 1,329 trillion cubic feet
- In context, current UK annual gas consumption: ~2,500 billion cubic feet
- So, even with a small percentage recovery of in-place volumes, this could be a very significant contributor to UK gas for decades



Shale Gas development is low impact relative to alternatives

- US shale development is not a good analogue
 - Different rocks
 - Different geography
 - Different drivers





• An equivalent capacity windfarm to a single 5 acre wellpad would occupy approximately 3,000 acres







A complex consenting regime has emerged in the UK





Induced seismicity monitoring requirements and controls are tough



Cuadrilla

PUTTING LANCASHIRE FIRST





Blackpool seismicity in context of recent UK reading

Cuadrilla

LANCASHIRE FIRST

BGS Summary of 100 Days of Seismic Events as of 2018-10-26





Different limits are used in other jurisdictions





Micro seismicity in context

15:05

. . .

•1	I EE 🗢
	10
	4

Lancashire For Shale @LancsForShale

Researchers at the University of Liverpool say the 1.1 ML microseismic event linked to @CuadrillaUK #fracking at over 2 km under #Lancashire would induce the same ground movement at the surface as dropping three saucepans on the floor datacat.liverpool.ac.uk/609/2/ Seismic%...



O

0

3,176 views

101

Tweet your reply

	ML @ 2.5km	PPV (mm/s)	Description
	2.1	1.86	A toddler playing (on a wooden floor)
	1.9	2.855	A desk fan turned on at full power
	1.8	1.909	Three people jumping
	1.7	3.991	A capsule coffee machine
	1.6	1.281	One person walking up steps
	1.5	2.055	A honeydew melon dropping
	1.5	1.745	A large bag of shopping dropping
	1.4	0.128	A tumble dryer
	1.4	2.699	A small pumpkin dropping to the floor
	1.4	1.374	Two people jumping
	1.4	2.088	A football being bounced (hard)
	1.4	1.978	A 500ml shower gel dropping on the floor
	1.3	1.98	A 2.5kg bag of potatoes dropping
	1.2	0.252	Someone marching past
	1.2	1.725	A can of cola dropping on the floor
	1.2	1.184	A tin of beans dropping on the floor
	1.2	0.097	Bouncing a tennis ball
	1.1	1.042	Three pans dropping to the floor
	1.1	1.194	1kg of flour dropping to the floor
	1.0	0.642	A network storage computer
	1.0	0.781	A large frying pan dropping to the floor
	0.9	0.845	A football being bounced (softly)
	0.9	0.073	One person walking past
	0.8	0.042	One person jumping
	0.8	0.205	Crowd of people passing (end of lecture)
	0.7	0.235	Building site (piledriver 15m away)
	0.6	0.039	Sitting down on an office chair
	0.6	0.281	A door slamming
	0.5	0.184	Mixed traffic (busy road)
	0.4	0.176	A coach passing (nearside)
10	1 Pichan	0.015	Dropping a small frying pan
-	2 Pro	0.032	Delivery van arriving
	121-1	0.037	Closing a window
	19 × 1	0.026	Train passing below (tunnel)
1	State And	0.011	Washing machine on spin cycle
Nie.		0.039	Small car passing (nearside)
1	E.M.	0.009	Phone vibrating
The state	1.38	0.006	Washing machine on wash cycle
12		0.014	Bus passing on opposite side of the road
-	415	E0.	

University of Liverpool Nov/18



The reality of the operating environment

0.05

Coiled tubing *definitely* attached to

coiled tubing support tower

We are continuing to test our shale gas exploration well and the coiled tubing remains clearly and visibly attached to the coiled tubing tower above the well. We have completed a series of smaller fracks along the length of the horizontal well to gather data to assess the micro-seismic response of the shale rock 2km below the surface. We have said many times in recent days and weeks, to both local people and any media who have asked for an update, that we are now analysing that data as well as drawing on expert advice to determine how we can further optimise our hydraulic fracturing programme within the very rigorous operating boundaries of the micro-seismic traffic light system. These updates have included the reassurance that there are no issues with well integrity and there are equally no problems with the impermeable membrane underlying the site.





- Protesters
- Fake news
- Logistics





This is how we're doing it...





Bowland shale







First hydraulic fracturing in UK since 2011





Monitoring



PUTTING LANCASHIRE FIRST





The ePortal sets new standards for communication with the wider public

- Seismicity portal updated daily
- Pro-active communications across all channels
- Community Liaison Group



Cuadrilla

LANCASHIRE FIRST



Putting Lancashire First



- Active drive to procure locally wherever possible
- Close collaboration with local Chambers of Commerce to connect with local business community
- Work with suppliers who don't have experience of Oil & Gas Operations in order to achieve our industry's standards





Lancashire Shale Gas has the potential to transform UK Energy

- There is a clear imperative to assess the viability of domestic gas production in the UK
 - To ensure energy security and tackle climate change
- A complex regulatory system is in place
 - Multi-agency consents and unprecedented levels of scrutiny
- Cuadrilla is on the cusp of demonstrating the potential for shale gas production in Lancashire



Cuadrilla

ANCASHIRE FIRS



Questions?