



Introduction

You've probably come across the fracking in the news recently and wondered if the reality is as ugly as the word. Maybe you've heard about the new natural gas boom and wondered what shale gas and coalbed methane mean for our energy needs.

We are in the middle of a big push to exploit what's known as unconventional gas, as more convenient, conventional sources run out. However, even though natural gas burns with lower emissions than dirtier fossil fuels like coal, the means of getting at these new sources of gas are far from clean.

There is a growing body of evidence from the USA, where the unconventional gas industry is far more developed, that there are inherent and unacceptably high environmental and health risks associated with coalbed methane and shale gas extraction, whether or not fracking is used.

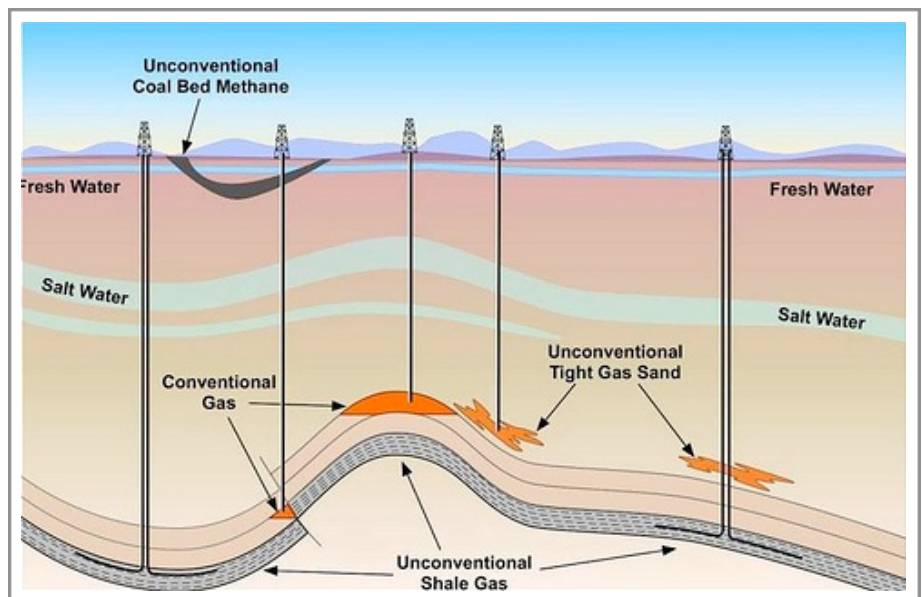
This guide will tell you a bit about unconventional gas and the technology involved in exploiting these resources, and the potential impacts on our environment and health. It will also explain why many environmental groups think it's a bad idea to exploit new sources of gas at all.

The guide also offers some practical advice on what to do if there are proposals to explore or develop unconventional gas in your area.

Un/conventional gas

Natural gas is a fossil fuel that is produced through the decomposition and heating of organic matter over many hundreds of thousands of years. Conventional gas extraction involves drilling vertically through rock formations into gas pockets, from which the gas rises through the borehole and is captured at the wellhead.

However, as these convenient and relatively easily accessed pockets dry up, the industry has been developing ways of extracting gas that is trapped inside the rock formations – known as unconventional gas. The UK has potentially vast reserves of unconventional gas trapped inside shale rock and coal seams. In Scotland, unconventional gas reserves are largely coalbed methane (CBM).



Unconventional gas extraction (Frack Off 2012)

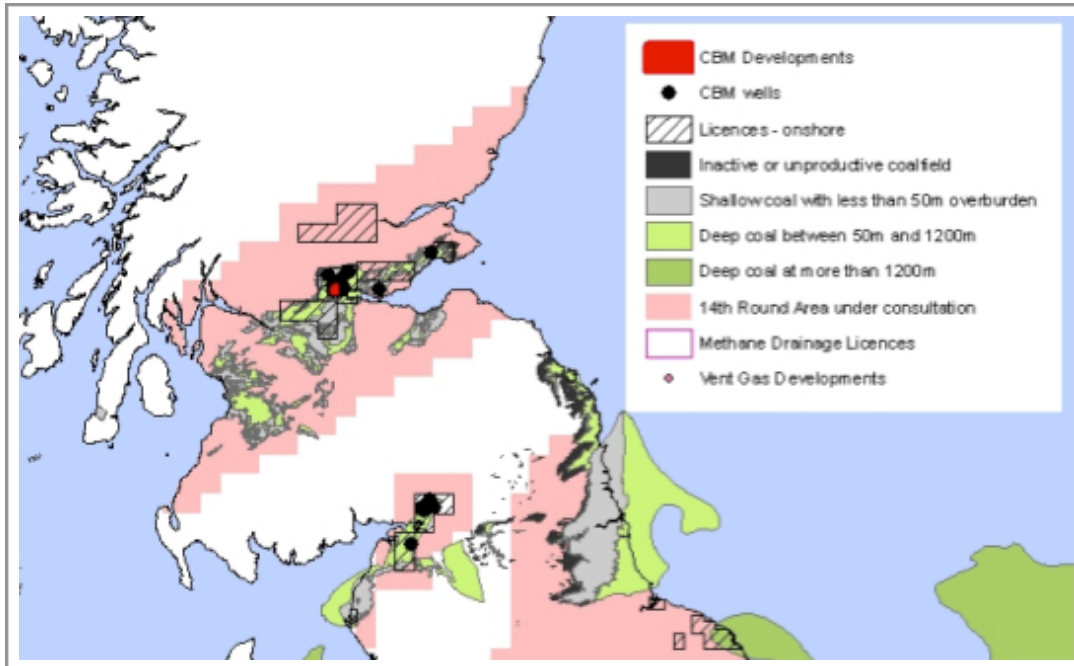
Fracking

Hydraulic fracturing – or fracking – is a technique that, combined with advances in horizontal drilling, has opened up potentially vast reserves of shale gas and coalbed methane across the globe. Fracking involves drilling deep in the earth, vertically and horizontally, and pumping a mix of water, proppants (such as sand) and chemicals (including highly carcinogenic benzene and formaldehyde) into the borehole under high pressure to ease the flow of gas for extraction. The amount of water and chemicals required varies depending on the permeability of the rock. It's an expensive process that is only economically viable when the price of fossil fuels is high.

What's going on in Scotland

In Scotland, there are some pockets of **shale that could produce gas**, but there is a lot more potential for **coalbed methane**, especially in the Central Belt, Fife and the Scottish Borders. The extraction process can vary, but carries similar risks to those related to the shale gas industry. Sometimes it is enough to drill vertically and horizontally into the seam, and pump out the water adsorbed in the coal, to get CBM gas flowing. Other times the seam has to be fracked to get at the gas.

Six areas are currently licensed for onshore gas exploitation in Scotland. Greenpark Energy (now owned by Dart Energy) has a fracking license for coalbed methane at a test site in Dumfries & Galloway. Dart Energy is developing a coalbed methane site at Airth, near Stirling. A third company, Reach CSG is hoping to exploit coalbed methane in North Lanarkshire.



The areas in pink will be tendered for exploration in late 2012 (DECC 2010)

However, later this year, the UK Department for Climate Change and Energy is due to start tendering exploration licenses covering the whole of the central belt of Scotland and Fife, as well as areas in the Scottish borders. This means the issue could affect more areas in the next few years.

Environmental impacts

The recent media focus has been on the impacts of shale gas extraction and fracking, and there's a tendency to use these terms interchangeably, as shale gas drilling almost always involves fracking. The impacts of CBM exploitation are similar to those of the shale industry, and there are serious environmental problems even with non-fracked CBM.

Water

Gas and chemicals may leak into groundwater. Methane and other substances naturally found within coal and shale, as well as the toxic chemicals used in fracking fluids (including highly carcinogenic benzene and formaldehyde), could find their way into groundwater and aquifers. A recent study found almost half the wells in one Australian CBM field to be leaking.

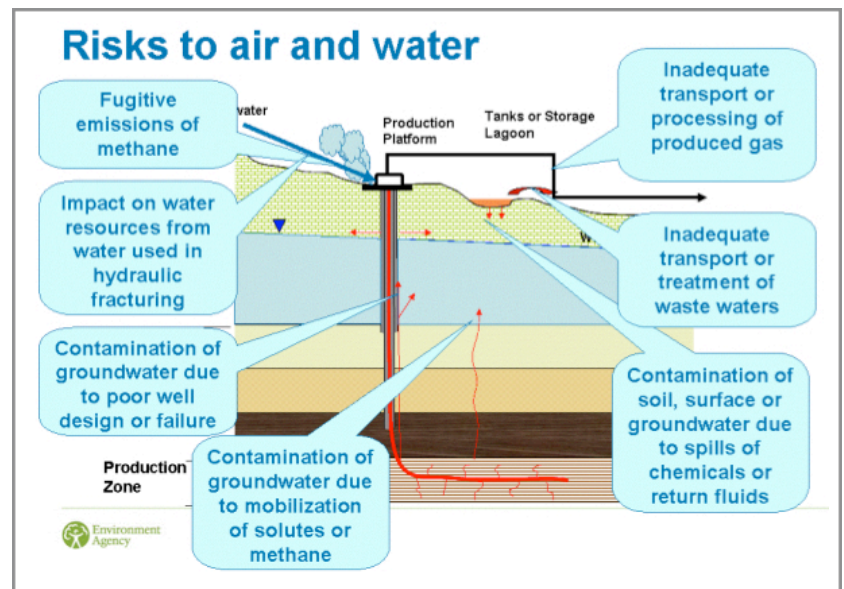
This can happen at various stages of the fracking process for different reasons. For example, there is increased mobility of particles of methane after drilling; frack fluid can be left behind in the well; leakages can occur through damaged well heads or borehole casing; frack fluid can be directly spilt, and wells can blow out.

Any of these events could contaminate water used for in the home or for agriculture, and have a negative impact on wildlife. Some communities in the USA have seen their drinking water being contaminated by methane and chemicals in this way, and there is evidence of leaks and spillages leading to the death of pets and farm animals.

Fracking requires a huge amount of water: a single shale gas 'fracture treatment' can use over 500,000 tonnes, which puts pressure on water resources. Fracking for coalbed methane requires less water than for shale because coal is more porous.

De-watering coal seams: when extracting coalbed methane, it is necessary to 'de-water' the coal seam. This water can be very saline, and contain other substances absorbed from the coal, which makes it difficult to dispose of. Extracting water from coal seams also risks depleting ground water, and increases the risk of subsidence.

Disposal of contaminated water; both the water pumped out of coal seams and any water used in a fracking treatment eventually needs to be disposed of. Much of this water is contaminated with substances from the coal or shale rock, or from fracking fluids. The volume of water used is considerable and can put significant pressure on local treatment centres.



Pollutant pathways associated with hydraulic fracturing (Environment Agency 2011)

Earth tremors

Fracking has been suspended at a site near Blackpool following an industry study that confirmed it was the likely cause of recent earth tremors. While this is worrying in itself, the most significant impact of these relatively low magnitude earth tremors is the potential damage they could cause to borehole casing. Damage to this casing would increase the risk of contaminated water or fracking fluid escaping into nearby earth and groundwater. Even very minor tremors pose risks such as possible damage to sensitive equipment in any nearby data centres.

Other environmental impacts

Like any industrial development, coalbed methane and shale wells have numerous local environmental impacts such as noise, lorry traffic and landscaping. Moreover, each CBM and shale development requires hundreds of wells at the commercial stage, so the cumulative local environmental impacts for each potential project are pretty significant.

The big picture: is unconventional gas a good idea?

There is scientific consensus that our climate is changing due to greenhouse gas emissions, caused by burning fossil fuels. No scientific body of national or international standing disputes this, and an increase in global temperatures is already causing extreme weather around the world, impacting on the poorest people.

In order to prevent the worst impacts of climate change, we need to stop burning fossil fuels as soon as possible, reduce our energy use and invest in renewable energy.

However, instead of taking this essential action, we are seeing many energy companies taking risky measures to extract 'marginal' fossil fuels as conventional sources become scarce. The oil industry is investing in incredibly destructive tar sands and deep water drilling. The gas industry is now using very risky methods to extract unconventional gas, prolonging our reliance on fossil fuels.

Unconventional gas also takes more energy to extract than conventional gas and carries an additional risk of methane leakage, or 'fugitive emissions' from fractures and well bores. Methane is a potent greenhouse gas, with a global warming potential of at least 25 times that of carbon dioxide over a 100-year period.



Typical Frack sites in the USA (Frack Off 2012)

The crucial point is that even if it was safe to extract this gas, it isn't safe to burn it in terms of climate change. Investing in unconventional gas now will lock us into to dangerously high greenhouse gas emissions and make it extremely difficult to meet our legally binding carbon reduction targets in 2050.

That's why Friends of the Earth Scotland is calling on the Scottish Government to suspend all ongoing unconventional gas activities, and put in place a moratorium on any new projects, until the problems outlined in this briefing are adequately addressed.

What you can do

Object to planning applications in your area

As with all developments, companies planning to explore or extract unconventional gas in your area will need to apply for planning permission. One thing you can do is to keep an eye on applications in your area and object to applications for gas exploration or extraction.

In Moodiesburn, North Lanarkshire, REACH CSG recently withdrew an application to develop CBM when 200 people objected to it. If people are aware of the potential problems early, it is easier to stop developments.

One challenge is finding out if an application is related to unconventional gas, as sometimes planning applications can be difficult to decipher. 'Frack Off' has a list of companies involved in fracking and unconventional gas extraction on its website: <http://frack-off.org.uk/bad-guys/>. If there is a planning application from any of these companies it's worth investigating further. In Scotland the companies who currently hold PEDL licenses are Dart Energy and REACH CSG. Sometimes however – as in the case of the Moodiesburn application – the planning permission can be submitted by a third party, e.g, the company that owns the land, rather than the company who holds the PEDL license, so it's worth keeping a sharp eye out.

Get together with others

Opposing unconventional gas in your area will be much easier if you join together with others in your area. You can plan activities together, make use of everyone's skills and contacts, and send a clear message to gas exploration companies that they are not welcome in your area.

- Contact Friends of the Earth Scotland to ask if there are any groups or activists in your area.
- Go to <http://frack-off.org.uk/> and enter your name and postcode to link up with others opposed to unconventional gas in your area.
- Hold a meeting, or a public screening of 'Gaslands' – a film about fracking in the USA <http://www.gaslandthemovie.com/>



Camp Frack 2011 (FoE EWNI)

Become a 'fracking free zone'

Some towns in the USA and Europe have declared themselves 'fracking free'. This is a smart way of pre-empting plans for unconventional gas, and warning potential developers that many local people will object to applications in the area. Later this year the Department of Energy and Climate Change will start issuing licenses for more exploration across the central belt of Scotland, so it's a good time to start raising awareness in your area.

To become a fracking free zone you should:

- Arrange talks for local community councils about unconventional gas, and ask them to sign up to your campaign, pledging that they will officially object to applications in the area.
- Speak to your local councillors and ask them to pass a motion against unconventional gas in the area. If a developer knows that the council is unlikely to grant planning permission they may not try.
- Feed into your council's local development plan, to ensure that unconventional gas is not part of the plan for your area.
- Spread the word about fracking in your area and ask businesses, schools, organisations and individuals to sign up, pledging that they will object to planning applications for unconventional gas.

Keep in touch

Friends of the Earth Scotland staff can help you to plan campaigns, start a group, get in the media and connect with other campaigners. We can also provide in depth briefings on this and many other environmental issues. Please get in touch on 0131 243 2700 to have a chat.