Fracking is a way of extracting natural gas (methane) from shale rock. At drilling sites, a mixture of water, sand and chemical additives is injected under high pressure to depths of several km (Figure 1). The process triggers tiny explosions that disintegrate the hard shale to release methane trapped inside. The gas flows out to the head of the well.

In the mid-1990s, technological advances in the process made fracking cost effective and the USA now produces nearly one third of its natural gas this way (Figure 2). Pennsylvania and North Dakota are among the new ‘goldrush’ states where, according to US media, housing shortages mean thousands of migrant rig workers sleep in their trucks. Other countries are rushing to map and exploit their reserves of this unconventional fossil fuel.

There are three lines of argument. Gas prices in the USA halved during the Gas flows out to the head of the well.

Fissures open so gas can escape

Well

Ground surface

Water, sand and chemical agents pumped down into shale layers

Shale

Sand holds fissures open so gas can escape

Figure 1 Shale gas extraction

- **Will it provide energy security?**
  - Exploitation of shale gas has big impacts for energy security at a time of concerns about peak oil.
  - Gas prices in the USA halved during the last decade. Some predictions show the USA as the world’s biggest hydrocarbon producer by 2020, overtaking Saudi Arabia and Russia.

- **What is fracking, and why is it so controversial?**
  - In this new regular series, taking an A-level geographer’s look at topics in the news, Simon Oakes explains the objections of the local protest group ‘Friends of the Ribble’.

- **Is it it safe?**
  - A typical US fracking well generates between 20 million and 40 million litres of used fracking fluid that can either be disposed of in underground reservoirs or stored in ugly open pits. There have been media reports of contaminated drinking water in places like Bradford County. Researchers have found that some of the 260 fracking chemicals used in the USA are known carcinogens. The French government has banned fracking.

**Controversy in the UK**

The British Geological Survey estimates that the UK has between 1,300 and 1,780 trillion cubic feet (tn cu ft) of shale gas (Figure 3). To put this in perspective, North Sea gas, now in decline, generates 1.3 tn cu ft annually. Only one-tenth of shale gas is recoverable but that could still equate to a century of North Sea gas supply.

- Most exploration has taken place in northwest England, where the Bowland shale holds between 400 and 500 tn cu ft of shale gas. Exploratory drilling near Blackpool in 2011 is believed to have triggered a magnitude 2.3 earthquake. This resulted in a temporary ban which was lifted in 2013 despite the objections of the local protest group ‘Friends of the Ribble’.

- There are also large reserves below southeast England’s Weald basin. This is a populated area with high property prices, and there have already been protests against drilling. One journalist pointed out that the population density of the USA is 34 people per sq km. In the UK it is closer to 257. That represents an extra 223 potential objections to a 15 metre fracking rig at the local picnic spot.

**Is it ethical?**

- Due to commitments to reduce carbon dioxide emissions, world leaders are keen to exploit shale gas. This has led to accusations of hypocrisy from environmentalists. Although its carbon footprint is smaller than that of coal, extraction and burning of shale gas make a considerable contribution to atmospheric carbon dioxide.

- In the current global economic downturn, the low cost of shale gas encourages national governments to abandon precious renewable energy solutions. At the same time plans to expand nuclear power have been dropped because of the Fukushima explosion.

- Supporters of fracking argue that a greater concern is the fact that one new coal-burning power station comes online every week in either China or India. Use of shale gas, rather than coal, would at least reduce the carbon intensity of global economic growth.

- Shale gas, they say, will help ease the transition to a low-carbon economy, serving as a bridge fuel until renewable energy sources begin to deliver.

**Box 1 Getting to grips with essay writing**

Should fracking get the go-ahead? Writing an A-level essay on a topic like this requires you to do more than just list costs and benefits. You need to approach the issue from different perspectives and pull all of the arguments together in your conclusion.

If you dig around online, you will find some great media essays and articles that analyse the ‘reward-blessings’ of shale gas and fracking.