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Can shale gas transform Europe's energy landscape?

By David Buchan

CENTRE FOR EUROPEAN REFORM

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★ Shale gas is a divisive issue in Europe because it highlights the growing tension between the EU's energy and climate policies.

★ Shale gas could be valuable in providing much-needed gas to complement renewables in Europe's low carbon strategy. However, while strict regulation can minimise the risks of pollution, extracting shale gas would be an intensive industrial operation in a continent that is mostly densely populated.

★ Without financial support, shale gas is unlikely to be cheap enough to squeeze coal out in power generation, as it has done in the US.

★ Shale gas production might make a difference to the energy security of individual EU member-states, but it is unlikely to do so for the region as a whole. At best, it will slow the increase in Europe's dependence on imported gas. It will not, therefore, be the game-changer in terms of energy security that it has been in the US.

The issue of shale gas sharply divides Europeans. With economies across the region in the doldrums, and energy and climate policy in some disarray, shale gas looks to some like a heaven-sent get out of jail free card. At first sight, it appears to press all three buttons of energy and climate policy – competitiveness, security of supply and a cleaner alternative to coal.

Shale gas offers the hope of cheaper, US-style, gas prices, and hence a way to prevent energy-intensive industry from crossing the Atlantic to the US. It promises to weaken Russia's ability to impose high, oil-indexed prices for its gas in many European markets, especially in Central and Eastern Europe, where countries have little or no other source of supply. And, for these price-related reasons, it would help relatively clean gas win back some of the share of power generation that it has recently lost to dirtier coal and lignite. In short, its proponents argue that shale gas would allow Europeans to become masters of their own destiny.

The issue of shale gas has become part of a wider debate about the perceived conflict between Europe's competitiveness and its unilateral climate policy. This debate is increasingly cast in terms of 'cheap shale gas versus expensive renewable energy'. In this debate, the contrast is made between an economically depressed Europe and an America that has both embraced shale gas and avoided saddling itself with a burdensome climate policy. The fear that Europe's energy-intensive industries will migrate to the US in search of cheaper input costs is voiced, among others, by the EU's energy commissioner, Günther Oettinger. "We need industry, and we cannot be the good guys for the whole world, if no one is following us [in climate policy]" he told a conference jointly hosted by the Commission and the German Marshall Fund in May.

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However, any or all of the above benefits of shale gas depend on it being at least as cheap in Europe as conventional gas imported from areas other than Russia.

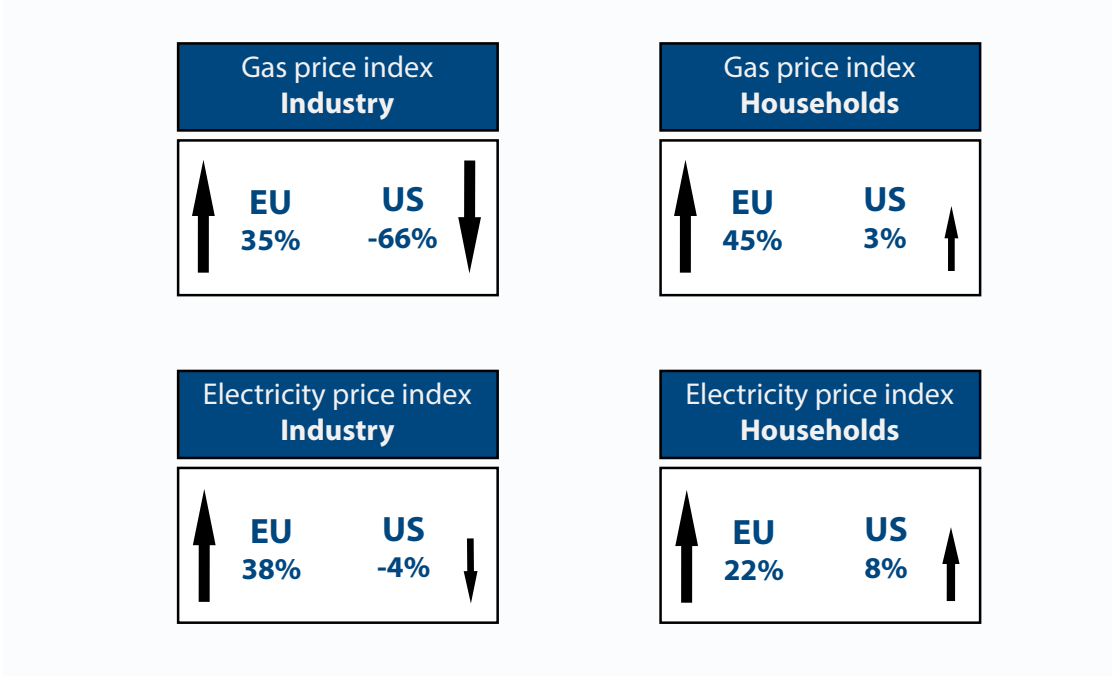


Chart 1: Trends in energy price indexes 2005-12

Source: IEA Presentation of José Manuel Barroso to the European Council, May 22nd 2013.

Moreover, before shale gas could prove its cost competitiveness at scale in Europe, it would have to win widespread public acceptance. This will not be easy. Shale gas has acquired a bad image with the public, largely because of the air and water pollution risks associated with 'fracking' (the hydraulic fracturing required to release gas from shale rock). Such risks have been well aired by shale gas' detractors. Shale operators may be able to build on US experience, and convince European publics that pollution risks can be avoided by following good practice. But even if they can, there are other side-effects that are largely unavoidable, because extracting shale gas is a more intensive industrial activity than extracting conventional gas. "Once drilling starts, it is generally a 24-hour-per-day operation, creating noise and fumes from diesel generators, requiring lights at night and creating a regular stream of truck movements", says the International Energy Agency (IEA). It adds that "drilling operations can take anything from just a few days to several months".[1]

So there are sharply contrasting costs and benefits to be weighed in deciding whether, and how, shale gas development should go ahead in Europe. Because decisions on a country's energy mix are a national prerogative, it is up to individual states in the EU to decide whether or not to allow shale gas development (as it is in the US). So far, EU institutions have stayed on the touchline (as has the federal government in the US). However, in the past year the European Parliament has passed several resolutions which broadly affirm the right of all member-states to exploit shale gas, but call on them to do so under strict regulations that might require amending or extending existing EU environmental legislation. In response, the European Commission will propose by the end of 2013 a pan-EU framework designed to give shale gas developers a positive signal, but also to close any gaps in the EU's environmental legislation and its enforcement. This paper examines what that EU role should be. It starts, however, by discussing what shale gas is, how much Europe is estimated to have, and what is currently being done to exploit it.

"Extracting shale gas is a more intensive industrial activity than extracting conventional gas."

What is shale gas?

The first distinction to be made is between conventional and unconventional gas. Conventional gas is found in well-defined fields or pockets into which only drilling is required in order to release commercial volumes of gas. Unconventional gas, by contrast, is found in layers of rock which, because of their low permeability, usually require extra or unconventional treatment to release any volume of gas.

Shale gas, which is found in relatively impermeable rock known as shale, is one of three forms of gas described as unconventional. The two others are coal bed methane

1: IEA, 'Golden rules for a golden age of gas', 2012.

(CBM), which is found in coal seams, and tight gas, which is closely related to shale gas except that it has migrated into reservoirs that are sizeable but fairly impermeable and so hard to access. While CBM is clearly a separate category in terms of deposits and extraction methods, there is no clear boundary between shale gas and tight gas; both almost always require hydraulic fracturing.[2] Therefore, the issues discussed in this paper cover tight gas, but for convenience the term shale gas is used to cover both.

Shale gas is extracted by hydraulic fracturing. This involves the high-pressure pumping of fracking fluid – a mix of water and proppants (sand or ceramic beads), plus some friction-reducing chemicals and biocides (to kill bacteria) – down a well and into the shale rock. The pressure fractures layers of the gas-bearing rock and the proppants keep the fractures propped open to allow the gas to escape back up to the well.

How much shale gas does Europe have?

There are four extensive onshore shale gas basins in the EU: from eastern Denmark and southern Sweden down into south east Poland and up into the Baltics; from northwest England through the Netherlands into northern Germany; from southern England into the Paris basin in France (which also has reserves in the south); and from Slovakia and Hungary through Romania and Bulgaria to the Black Sea.

Estimates of the volume of recoverable gas in Europe vary widely, because little test drilling has been carried out to date. A literature review of 50 sources by the EU Joint Research Centre (JRC) in 2012 found that the high, best and low estimates of technically recoverable shale gas in the EU were, respectively, 17.6, 15.9 and 2.3 trillion cubic metres (tcm), compared with 47, 20 and 13 tcm in the US. With more test drilling, these reserve figures will probably rise, as happens in the world of conventional oil and gas. How much of this will end up being produced is another matter. As Florence Gény points out: "Compared to North America, European unconventional gas basins tend to be smaller, tectonically more complex, and geological units seem to be more compartmentalised. Furthermore, [European] shales tend to be deeper, hotter and more pressurised …and with generally more clay content".[3]

> *"Estimates of the volume of recoverable gas in Europe vary widely, because little test drilling has been carried out to date."*

Further exploration in Europe may also reveal shale oil. The latter is what is now being extracted in very large quantities from the Bakken shale in North Dakota and the Eagle Ford shale in Texas, using fracking to free the oil from the layers of shale. However, because oil is one big global market, this extra US domestic oil has little effect on the US domestic oil price, which is roughly the same as the world price, although it enhances US security of oil supply. In the same way, any shale oil in Europe would affect the security of Europe's oil but not its price.

The current piecemeal approach

Since the exploitation of shale gas is a national prerogative, it is perhaps unsurprising that a wide variety of policies have developed across Europe.

At one extreme, two countries, France and Bulgaria, have passed laws that ban fracking (as has New York state until 2015), and therefore effectively shale gas exploitation. These two countries have also revoked any exploration licences that had earlier been granted. The French move was significant because the IEA estimates that France has the second largest shale gas potential in the EU after Poland. The initial exploration licences were granted for France's promising south east basin, which is relatively shallow, probably contains liquids that can be profitably sold as oil, and has low levels of clay. However, this region, stretching from Provence down to the Riviera, also lives off its tourist industry – which is deeply opposed to fracking. The ban cut short any thorough examination of fracking in France. The French environment and industry ministries commissioned a study on fracking, which preliminarily recommended that drilling continue, under strict controls, while more information was gathered. However, the final report was never issued because the French parliament banned fracking in June 2011. Part of the French argument against fracking is that the development of new hydrocarbon resources has no place in an energy policy that seeks to meet climate change targets – an argument which is also made at EU level by environmental NGOs.

At the other extreme, Poland has been determined to try to make the most of its considerable shale gas potential, mostly in order to improve its energy security. Poland is a relatively small user of gas, but it is under pressure from the EU to cut its carbon emissions by reducing the over 90 per cent share accounted for by coal in its electricity

2: The IEA gives separate estimates of the technically recoverable reserves of shale gas as 208 trillion cubic metres, tight gas 76 tcm and coal bed methane as 47 tcm.

3: Florence Gény, 'Can unconventional gas be a game-changer in European gas markets?', OIES, 2010.

generation. Poland produces a small amount of its own gas, but the rest of its consumption is met by imports from Russia, under a long term contract with Gazprom which is linked to the oil price and lasts until 2022. Keen to exploit its geological potential, in 2007 Poland started the process of granting concessions: 109 have now been awarded to some 30 foreign companies, and a further 32 concessions to three Polish companies. The first well was drilled in 2010. Since then 42 others have been drilled, far more than in any other EU state.

Poland had hoped to begin producing gas by 2015 and to drill more than 300 wells by the end of the decade. But the results so far have been disappointing. Industry enthusiasm, fuelled by an estimate by the US Energy Information Administration in 2011 that Polish unconventional gas reserves amounted to 5.3 tcm, has subsequently waned. Last year the Polish Geological Institute cut this estimate by 90 per cent to 346-768 billion cubic metres (bcm). Large North American energy companies were quick to get into Polish shale exploration, perhaps to make up for their slowness in cashing in on the US shale bonanza. But in 2012 ExxonMobil pulled out of Poland, claiming the country had the wrong sort of shale (too much mud) for their technology, and in spring 2013 Marathon and Talisman followed suit, citing uncertainty over geology and tax policy. Among the majors, this leaves only Chevron of the US and Eni of Italy in Poland. Determined to persevere, the Polish government has put together a consortium of state-controlled oil, mining and electricity utilities to maintain shale gas exploration. The government is also planning to ease environmental regulations and lower tax rates.

The other EU states sit somewhere between France and Poland on the shale gas spectrum. As so often on energy and environmental issues, Germany is divided. Some test drilling has taken place in northern Germany. In Chancellor Merkel's CDU-FDP coalition, the economics and environment ministries managed to reach a joint position to allow strictly-regulated fracking. But this position is stalled in cabinet. This is because some CDU members want fracking banned around Lake Constanz, but the FDP, which has fewer misgivings about fracking, fears that a ban there would lead to bans in other regions with similar drinking water protection as Lake Contanz. The SPD and Green opposition parties control the Bundesrat (upper house) which has urged tighter controls on fracking, as well as the states of North Rhine Westphalia and Lower Saxony, home to Germany's largest shale deposits.

Romania has shifted from opposition to shale gas to allowing Chevron to carry out test drilling near the Black Sea, but the government has given no approval for exploiting shale gas or fracking. Romania's environment minister explained in May 2013 that "to reach exploitation, we need to see if we have this resource and where we have it".

The British approach might be described as 'hastening slowly' towards shale gas development. This is partly the result of Britain's coalition government having effectively two energy policies. George Osborne, the Conservative chancellor of the exchequer, sees US-style shale gas development as a cheap alternative to expensive renewables. This is precisely the argument resisted by successive Liberal Democrat ministers at the Department of Energy and Climate Change. The latter are not against shale gas per se, but fear that misplaced perceptions about its cheapness and abundance will distract attention and investment from renewables and energy efficiency, as well as the long term goal of getting out of fossil fuels.

"The other EU states sit somewhere between France and Poland on the shale gas spectrum."

Confidence in shale development was shaken when fracking by Cuadrilla Resources, a British energy company, in the Bowland Shale near Blackpool in northern England caused two small earthquakes; a report commissioned afterwards by Cuadrilla concluded there was a "highly probable" link between the fracking and the earthquakes. As a result, shale operators in the UK are now obliged to assess the geological risk of fracking provoking what is called 'induced seismicity'. Nevertheless, shale gas development has broad support in Parliament. In 2011, a parliamentary inquiry concluded that fracking posed no direct risk to underground water supplies, provided that drilling wells were constructed properly. Earlier this year, the parliamentary energy and climate change committee urged that shale gas development be speeded up, so that, for instance, it could be done offshore before all the oil and gas rigs in the North Sea are decommissioned. And in June 2013 the government published a report by the British Geological Survey which greatly increased its central estimate of the gas held in the Bowland Shale (which runs right across the north of England) to 36.8 tcm. This is 471 times the annual consumption of the UK, though only 10-15 per cent of it might be recoverable.

Even onshore, development is proceeding slowly in the UK. This year Cuadrilla is drilling a vertical test well in the UK's southern basin in Sussex, and another company, IGas, is drilling two more wells in the Bowland Shale. According to the Onshore Operators Group, ten companies are considering drilling some 20-40 wells by 2015 – some of them for exploration, others for fracking. Curiously, all these companies are small, even though the UK has several major oil and gas companies. This reflects a paradox: although the UK has all the industry operators (in its offshore hydrocarbons sector), the gas grid infrastructure, the liquid spot market for gas, the regulatory framework, and the capital markets that would

be needed for rapid shale gas development, progress has been slow. This probably reflects two factors: first; the UK's own climate change commitments (which go beyond what is required by the EU); and, second, widespread Nimbyism at local level (as has been the case for onshore wind turbines, local resistance to intensive shale gas development is strong).

What role should shale gas play in EU energy policy?

There are many reasons for the EU to look favourably at gas. Its relative cleanness (compared to other fossil fuels) and the flexibility of rapid-reaction gas turbines make gas the ideal complement to intermittent renewables in a low carbon system. "Without gas, renewables have no chance" is Oettinger's blunt view.

However, gas is having a terrible time in the EU market at the moment. Half of the (mostly Russian) gas that Europe consumes is still sold on long-term contracts indexed to the oil price, which remains high. This gas is losing market share not only to imports of liquefied natural gas (LNG) but also to coal (especially from the US, where it has been edged out of the domestic market by the shale-induced drop in the US gas price). In addition, in those EU markets where renewables account for a high share of total energy generation (like Germany and Spain), the average utilisation of gas-fired plants has dropped to a very low level.

From an environmental perspective, it would be ideal if the recent substitution could be reversed and shale gas could supplant coal. According to the Commission, if domestic shale gas were to replace coal, this would reduce carbon emissions by 41-49 per cent. Even if domestic shale gas simply replaced imported conventional gas, there would still be a reduction in emissions of up to 10 per cent, because of carbon leakage in the long distance transport of pipeline gas. Only if shale gas replaced domestic conventional gas would there be an increase of up to 5 per cent in emissions, largely because of the greater energy input needed to extract gas from shale as distinct from conventional reservoirs.

What role should the EU play in regulating shale gas? The IEA makes a clear link between good regulation and good prospects for shale gas. It argues that good regulation would increase the availability of gas, which in turn would lower gas prices and thereby increase demand for gas relative to coal and so reduce carbon emissions. The idea that good regulation could set off a virtuous circle is plausible in a region like Europe that has shale gas potential but is, in general, environmentally anxious about exploiting it.

However, a lot of activity associated with shale gas is already effectively regulated by EU directives that are transposed into national law. True, there is no specific EU legislation on shale gas, or fracking. The 1994 Hydrocarbons Licensing directive is only aimed at preventing discrimination on grounds of nationality in the award of licences by member-states. They are free to set the conditions for all other aspects of exploration and production of gas and oil, though a new directive on offshore rig safety is now wending its way through the EU institutions. But with existing directives on mining waste, water protection and water depletion, air pollution and bio-diversity, the EU has environmental legislation covering almost all the possible side effects of fracking for shale gas. The environmental impact assessment directive sets out the assessment and consultation procedures which all member-states have to carry out for individual projects. Perhaps more important in relation to an activity like shale gas drilling that can be extensive as well as intensive, the EU's strategic environment assessment directive requires member-states to address all environmental concerns in an integrated way – in other words, to forecast and take into account all the cumulative effects of shale gas exploitation.

"A lot of activity associated with shale gas is already effectively regulated by EU directives."

There may be some ambiguities and gaps in these EU laws which the Commission could deal with by proposing either amendments to existing legislation, or specific new legislation for shale gas, as it did for Carbon Capture and Storage (CCS). A key feature of the CCS directive clarified who bears future liability for stored carbon. Likewise a shale gas directive would presumably assign responsibility for any pollution or leaks from abandoned shale gas wells. But, even if there is no need for new EU legislation, the EU needs to give some policy guidance, drawing on US experience, to answer the following questions.

(i) Will fracking be environmentally safe?

There is no reason why fracking should not be safe, given good regulation strictly enforced. A major risk that must be taken into account is water contamination. Gas-bearing shale usually lies thousands of metres below underground aquifers from which drinking water is usually drawn. So the danger of hydrocarbons disturbed by fracking leaking up into aquifers may be minimal (this would appear to be the rationale for

fracking being exempted in 2005 from provisions of the US Safe Drinking Water Act). However, because hydraulic pressure does the fracturing, shale gas production can use up to ten times as much water as conventional gas production – anywhere between 10,000 to 25,000 cubic metres to complete the fracking for a single shale gas well, compared to as little as 2,000 cubic metres for a conventional well. Much of this water – the basis of the fracking fluid – will stay underground. But as the flow-back water returns up the well there is a risk of it leaking into aquifers unless wells are properly sealed. Once at the surface, flow-back water needs to be securely stored, before being recycled for future fracking, or cleaned of chemicals used in fracking and of any traces of metal and minerals, sometimes weakly radioactive, which have leached from the shale rock. None of these water contamination risks are particular to shale exploitation, but they are magnified by the scale of water used (though in the US more recycling of waste water is gradually reducing water use).

If shale gas supplants coal, this will be positive for the climate. However, shale gas produces more greenhouse gas emissions than conventional gas, for two reasons. The first is the use of heavy diesel engines for well drilling and high-pressure pumping of fracking fluid. The second is the emission of 'encapsulated gas' which rises with the flow-back water before it evaporates into the air. Methane, the main component of natural gas, is a more powerful greenhouse gas than carbon dioxide, especially when vented, unburned, into the air rather than flared. This source of emissions could be eliminated through the use of separators at the wellhead, an approach advocated by the IEA at minimal additional cost. If the extraction of shale gas were to become widespread, the emissions that occur when gas is transported over long distances would be reduced because gas would be consumed closer to where it is produced.

(ii) Will shale gas be environmentally disruptive?

Shale production is intensive, over both space and time, which is why it is not ideally suited to densely populated areas in Europe or the US. While the average spread of wells in a conventional gas field might be one conventional gas well for every ten square kilometres, the IEA says, the average for shale operations is one for every square kilometre. As for the pace of activity, "the economics of unconventional gas depend on the ability to drill many wells on a continuous basis as quickly and cheaply as possible".[4]

Shale operations generate a great deal of road traffic in order to transport drilling rigs and possibly tonnes of water, chemicals and sand to make up the fracking fluid. Mark Robeck and Michael Bennett of the US law firm, Baker Botts, are enthusiastic supporters of shale gas. But in their experience, it takes on average more than 1,000 truckloads, mainly of water, to get one shale well started, and then some 350 truckloads a year to keep it going. They concede that the process of delivering water to a single well can do as much damage to a road as 3.5m car trips. In discussions about what shale operators might provide in the way of compensating benefits to local communities, building new roads is sometimes mentioned. But the US experience is that shale operations involve repairing existing roads, not building new ones.

"Shale production is intensive, over both space and time, which is why it is not ideally suited to densely populated areas in Europe."

In the US, local communities are more exercised about noise and traffic than pollution risks. The lesson for Europe, therefore, would be the value of putting money and planning into logistics and infrastructure before any shale drilling. Most of the shale-rich areas of northern Europe have reasonable water supplies, and laying a pipeline to carry water could avoid thousands of truck-trips. Nor would there be quite the same financial incentive in Europe to drill multiple wells on the surface. In the US, the owner of the land also owns the mineral rights – and overall this has been one of the great drivers for shale development in the US. But this pattern of private oil and gas ownership also encourages the drilling of numerous individual surface wells so that each and every landowner on the surface can be sure of actually getting his or her fair share of gas up from underground, rather than run the risk of a neighbour siphoning it off. In Europe and the rest of the world, where mineral rights reside with the state, the more optimal practice of drilling multiple wells from a single surface site would be the norm. This would reduce the visual impact of shale gas development and simplify traffic logistics.

(iii) Will shale gas be as cheap in Europe as in the US?

The consensus is that the costs of extracting shale gas will be higher in Europe than in the US, because Europe's shale layers are generally deeper, its regulations will probably be tougher, and its oil and gas service sector is less competitive and more oligopolistic than its North American counterpart. One estimate is that European shale costs would be two to three times higher than in the US, with a breakeven price in the range of US$8-16 per thousand cubic feet.[5] The report by the EU's Joint Research Centre in 2012 suggested a European breakeven price of US$5-12 for the same unit of gas, compared to a range of US$3-7 in the US. Costs would rise if shale operators and regulators were to follow the

4: Florence Gény, 'Can unconventional gas be a game-changer in European gas markets?', OIES, 2010.

5: Florence Gény, 'Can unconventional gas be a game-changer in European gas markets?', OIES, 2010.

IEA's 'golden rules' for unconventional gas exploitation. The agency estimates that adherence to its golden rules would raise costs by an average of 7 per cent (representing an additional US$560,000 on a US$8m well). In an ideal world, Europe would not be alone in following such rules: unlike in climate policy, therefore, it would not be the only region to pay a cost premium for responsibly exploiting shale gas.

(iv) Could Europe simply import the cost advantage of cheaper US gas?

It is unlikely that the EU could take advantage of cheap gas in the US by importing it. Some EU companies, including Centrica of the UK and Total of France, have asked the US government for permission to export gas from the US. The Obama administration has begun to rule on these requests, with two large export facilities approved to date and the expectation of more to follow. However, the ultimate pace and scale of approvals remain uncertain. Permission to export US gas to Europe would be granted more readily if the US and the EU were able to conclude a broad transatlantic free trade agreement, as Washington and Brussels have proposed, or even conceivably just a sectoral agreement on free trade in energy.

But, even if there were free trade in gas, it is not clear that the cost advantage of US gas would survive the journey across the Atlantic. In order to make this transaction worthwhile, the difference between the price of gas in the US and Europe would have to be greater than the sum of the cost of liquefying US gas, transporting it across the Atlantic and 're-gasifying' it in Europe.

So far, the US shale gas phenomenon has affected Europe only indirectly. It has diverted LNG once intended for the American market to Europe (and even more to Asia, where Japan has greatly increased gas imports to offset the closure of its nuclear reactors following the Fukushima accident). The arrival of more LNG in Europe has intensified the pressure on suppliers of pipeline gas to Europe to lower their prices, which have been traditionally indexed to the oil price. Norway and the Netherlands have allowed most of their customers to opt out of oil-indexed contracts and to buy their gas at cheaper spot market prices. Gazprom of Russia has tried to hold its customers to its traditional oil price formula, but is now grudgingly giving price reductions to its biggest customers. The other indirect effect has come through US shale gas pushing US coal out of the American power generation market and into Europe. This influx of cheap US coal has been out-competing gas, which is also being edged out of the European power market by increasing supplies of renewable energy.

"It is not clear that the cost advantage of US gas would survive the journey across the Atlantic."

Eventually, Europe might also feel the direct impact of US shale gas. Initially, any US LNG exporters are likely to seek the higher prices they can get in Asia. Sometime after 2015, however, they will face competition for Asian customers from a coming wave of new LNG supply from Australia and East Africa. American LNG that was surplus to Asian requirements could then end up in the European market. Such indirect and direct effects of US shale gas would put downward pressure on European gas prices. This would be useful to the European economy, but not to any incipient European producers of shale gas who, with their higher costs, might struggle to compete.

Energy prices and economic growth

Much of the European debate has been framed in terms of opting for cheaper US-style shale gas instead of expensive renewable energy. The divergence between high energy prices in the EU and lower ones in the US is undoubtedly a worry. As the Commission notes with alarm in its March 2013 green paper on the future of energy and climate policy, in 2012 industry gas prices were more than four times lower in the US than in Europe.[6] It cites IEA data which show that, for the 2005-12 period, electricity prices charged to industry rose by an average of 38 per cent in real terms in west European countries, while in the US they decreased by 4 per cent, mostly because of lower gas generation costs.

Like much of European industry, the Commission's response to this growing transatlantic divergence in energy prices has been to urge development of shale gas. But a divergence in prices is not an automatic reason to jettison Europe's climate and clean energy policies. The green paper says that "it is clear that higher ETS [Emission Trading Scheme] prices and policies to expand renewables generation capacity by providing support or preferential treatment to bring them to the market could increase electricity prices". So far, it is not clear that this is case. The cost of ETS allowances is too low to have much of an impact on electricity prices. And research in the UK shows that increases in domestic electricity and gas bills in recent years (2000-11) have been primarily driven by the rising cost of energy commodities rather than energy policies.

Moreover, before panicking over price divergences with the US, it is worth remembering that competing on the basis of cheap energy is not always self-evidently

6: 'A 2030 framework for energy and climate policies'. COM (2013) 169.

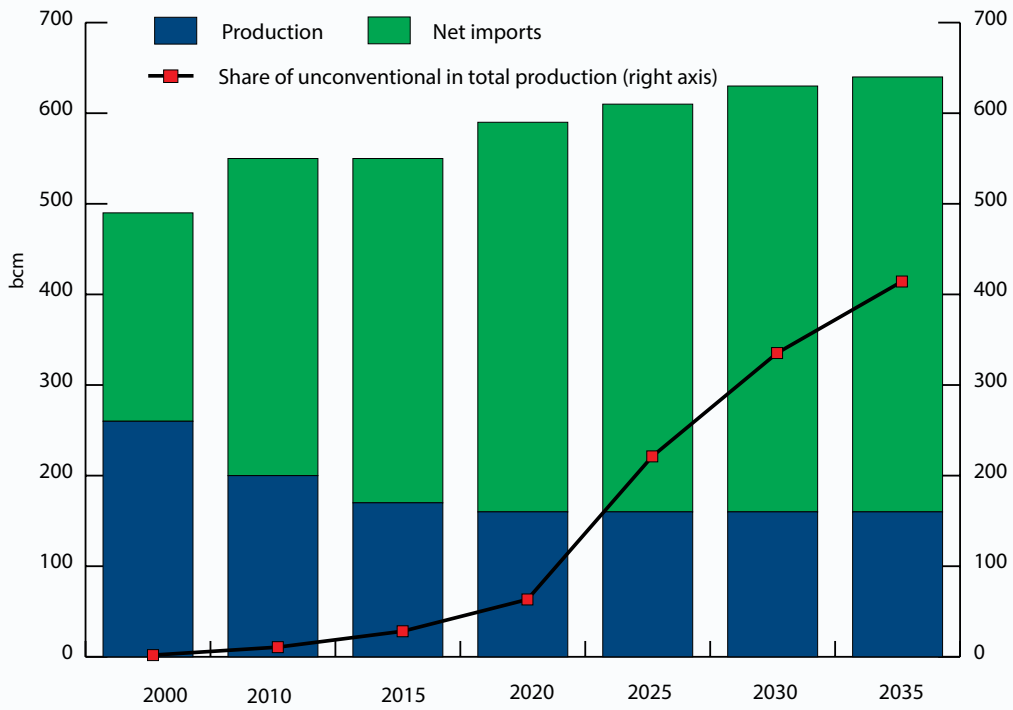
sensible. During the post-war period, Europe and Japan successfully competed with the US in cars and all sorts of energy-using appliances; it was Detroit that needed a government bail-out, not the European car industry. Higher prices have driven efficiency in products that sell around the world. Countries can adjust to higher energy prices by shedding jobs in energy-intensive sectors (in which energy is a significant cost in the manufacture, not the use, of a product) and gaining jobs in sectors providing energy-efficient appliances and services. As the Commission's green paper also comments, "the EU is a frontrunner in clean and more energy-efficient technologies, products and services and eco-technologies which together are expected to generate some 5 million jobs in the period up to 2020".

At the same time, it is true that the availability of affordable energy has driven growth and industrialisation over the past two or three centuries.

At present, Europe's energy-intensive industries – that is, sectors such as chemicals, petrochemicals and aluminium – all worry that they will lose jobs and market share to US companies. Industry associations such as Eurofer for steel, and Cefic for chemicals, see salvation in shale gas in Europe. They point out, for instance, that gas accounts for 35 per cent of energy used by Europe's chemical industry, while for fertiliser makers, gas represents 60-80 per cent of the total cost of the product. Nowhere is the clamour about competitiveness louder than in Germany. And this matters politically, because Germany currently exercises the greatest influence on Europe's decisions (or indecisions). Significantly, when the president of the European Commission, José Manuel Barroso, addressed an EU summit in May on the topic of energy, he chose to highlight the issue of competitiveness by using a chart that showed energy input costs for German industry only.

A European model for the exploitation of shale gas?

Europe could usefully learn from US experience and mistakes. One lesson from the US, already noted, is to take an earlier view of the cumulative effects of shale development by, for instance, planning infrastructure. This is necessary, even though consideration of the cumulative effects of a shale gas project may lead to a local community rejecting it. Another lesson would be to avoid what might be called the factory approach of mass drilling of wells in the US, which is the result of relatively lax regulation and, as already noted, of the pattern of individuals owning the gas as well as the land. A more selective approach, which took more time to identify the best targets, would obviously be better suited to a more densely populated region such as Europe.



The sum of production and net imports represents total demand.

Chart 2:
The EU's gas balance if it follows the IEA's golden rules for exploitation

Source: IEA, 2012.

In general, policy-makers and regulators should judiciously weigh up the risks and rewards. As the IEA puts it, "in designing an appropriate regulatory framework, policy-makers need to set the highest reasonable social and environmental standards, assessing the cost of any residual risk against the cost of still higher standards (which could include the abandonment of resource exploitation)".[7]

Development of shale gas could moderate the increase in Europe's dependence on imported gas, as shown in the IEA projection on the previous page.

However, this rising share of unconventional gas in European gas production (which would approach 50 per cent by 2035) assumes that every EU member state with shale gas potential exploits it. This would mean countries with shale gas potential, such as France and Bulgaria, reversing their bans on fracking – and that would entail designing a European model for shale gas development that was attractive enough to encourage Paris and Sofia to do so.

Europe's indigenous shale gas could well undercut the price of Russia's oil-indexed gas shipments to Europe, and it might even match the cost of LNG coming to Europe from places like Qatar and Nigeria. But it seems unlikely that European shale gas will be cheap enough to match the price of US gas. It is unlikely, therefore, to replicate the effect it has had in the US, of squeezing coal's share in power generation and so reducing emissions – unless shale gas was given specific policy support. Some countries might do this; the UK government, for example, has promised tax benefits for shale developers. But European opinion on shale gas is too divided for such support to be repeated at EU level. So even with the best will and rules in the world, shale gas does not look like a game-changer for Europe in terms of either security of supply or emissions reduction.

"It seems unlikely that European shale gas will be cheap enough to match the price of US gas."

Conclusion

There is no reason why EU countries should not try to exploit shale gas, if they choose to do so, provided they are clear-eyed about its limitations and difficulties. The US experience appears to be that the pollution risks are avoidable, but that some environmental disruption and disturbance is unavoidable. Whether that is tolerable should be for member-states and their local communities to decide. Poland appears so keen to go ahead that, in a recent EU-wide consultation conducted by the Commission about shale gas, half of the 22,000 replies came from that one country, almost all of them favourable to shale exploitation. Frustrating this desire would not be in the interest of Poland's partners, if shale gas were to help diversify Poland away from coal and thereby soften Warsaw's opposition to a higher carbon price in a reformed ETS.

However, there is one big caveat. Shale gas exploitation must not be sold to the European public on a bogus prospectus that it will be cheap or easy or an alternative to renewable energy. To set shale gas in a false antithesis to renewable energy would undermine Europe's transition to a low carbon economy.

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7: IEA, 'Golden rules for a golden age of gas', 2012.