

Energy: A foot on the gas

By Carola Hoyos and Ed Crooks

Published: March 11 2010 23:26 | Last updated: March 12 2010 08:23



Andrew Austin is bringing an American revolution to Britain. On a patch of farmland east of Liverpool, his company [Igas](#) has drilled one of Europe's first wells for "unconventional" gas, extracted from source rocks traditionally rejected by the industry as uneconomic.

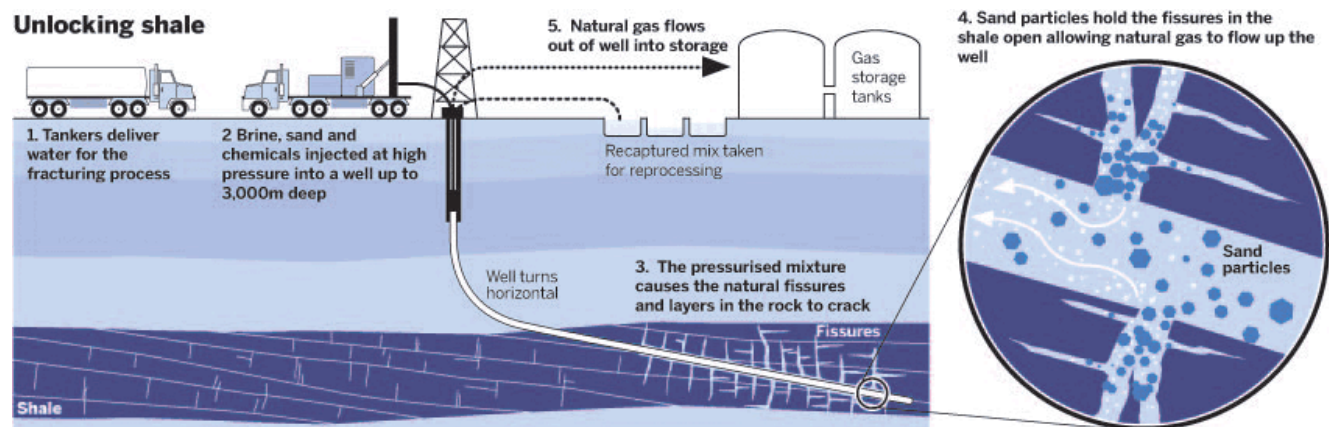
The former investment banker hopes in the next couple of years to exploit the source that has transformed the outlook for energy in the US: shale rocks.

Igas has taken leases on 300,000 acres of shale, a sedimentary rock, across north Wales and north-west England, joining the rush of companies large and small in countries such as Poland and Germany seeking to replicate a boom in the US that has captured the industry's imagination.

"Even a year ago, if I had said I was taking licences in big slabs of shale rock, everybody would have thought I was barking mad," Mr Austin says. "Now I get invited to five conferences a week."

The rush of [European interest in shale](#) underscores wider awareness of a [change in the outlook for gas supplies](#). A surge in US production has meant that within three years the world has gone from running out of natural gas to being drowned in it.

The implications are profound. Policymakers have faced a trilemma: how to make energy supplies secure, affordable and clean. Now an abundance of gas appears to provide the answer to all three problems at once. In the words of Tony Hayward, chief executive of [BP](#), it is a “game changer” – certainly for America, and quite possibly for the world.



If western politicians get it right, they could transform their uneasy relationships with suppliers in potentially troubling countries such as Russia and Nigeria, while meeting carbon reduction targets without relying on nuclear and wind power, which can deliver electricity only at vastly inflated expense. The consequences will be greatest if Europe can emulate the upsurge in US production. If it does not, the effects will still be profound.

However, there are two problems that could prevent gas from being the “long-term energy solution” proclaimed this week by Jim Mulva, chief executive of [ConocoPhillips](#), a US oil and gas group.

One is political resistance; the other is the danger of pollution that one analyst warns could pose a “[Toyota](#)-sized” reputational risk.

Scepticism about the gas revolution is understandable because change has come so fast. Until five years ago, US policymakers and energy executives were fretting about securing enough gas to make up for the decline in the country’s own, sizable production. This year, the US has overtaken Russia to become the world’s biggest gas producer for the first time in nearly a decade. Technical breakthroughs that allow companies to tap gas trapped in its vast shale reserves, until recently considered impervious, have allowed it to shut its doors to imports from distant countries. The industry now thinks it can produce from those reserves for 100 years.

Furthermore, with technical developments that make it easier to export liquefied natural gas, changes in the US market can have effects thousands of miles away. As America loses its appetite for imports, LNG tankers from countries such as Qatar are re-routed to Asia and Europe.

For the latter, the prospect of increased imports of LNG and the potential for its own unconventional gas production offer reprieve from dependence on [Gazprom](#), the Russian gas export monopoly. A recent report by the Wood Mackenzie consultancy concluded that Russia's share of the European gas market was likely to fall from 29 per cent to 24 per cent this decade because of the competition from gas originating in countries such as Qatar, Nigeria and Algeria.

The increased supply of gas, and the more cautious views of the outlook for demand growth after the recession, have also taken the urgency out of projects such as the Nabucco pipeline, the European Union-backed project to bring up to 31bn cubic metres of gas a year from the Caspian region to central Europe. Because Russia has the world's largest reserves of gas, Europe will still find it difficult to extricate itself from the relationship with its biggest supplier. But exploiting its own unconventional gas reserves could make a big difference to the EU, its eastern members in particular.

The especially appealing feature of the new supplies of gas is that they could reinforce energy security at a much lower cost than other home-grown energy sources such as nuclear power or offshore wind.

In America, the benchmark price of gas is below \$5 per million British thermal units; in Britain, it is about 30p per therm. Those prices are equivalent to about \$30 per barrel of oil: less than half today's crude price of about \$80. Prices are so low that it is cheaper to use gas to generate electricity than coal. As the world economy recovers, prices are expected to pick up again. But rising US production is likely to put a ceiling on how far they can rise.

Gas is also the preferred fuel for power companies planning to build plants, because gas-fired designs are cheapest and quickest to construct. Combined cycle gas turbines, the most modern and efficient plants, are a proved technology that can be built for less than \$1m per megawatt of capacity, compared to perhaps \$4m per megawatt for a new nuclear plant and \$5m per megawatt for a wind turbine located out at sea. "Gas is a very competitive option," says Fabien Roques of the IHS CERA consultancy. "Gas-fired plants are very flexible; they can back up renewables; they are very straightforward, and they are very low risk for investors."

When the political commitment to curb greenhouse gas emissions is taken into account, the appeal of gas is even stronger.

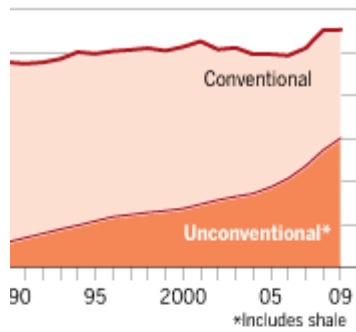
Gas creates about half the carbon dioxide of coal when burned to generate electricity. Indeed, one of the cheapest ways to cut emissions is to shut coal plants and replace them with gas.

Lambert Energy, the advisory firm, estimates that shutting down the EU's coal-fired power stations and replacing them with CCGT plants would cut emissions by about 20 per cent of 1990 levels, meeting the target set by European governments for 2020.

In the US, the same shift would cut emissions by 22 per cent from 2005 levels, exceeding the 17 per cent reduction proposed by President Barack Obama at the Copenhagen climate summit last December.

natural gas productive capacity

1 cubic feet per day

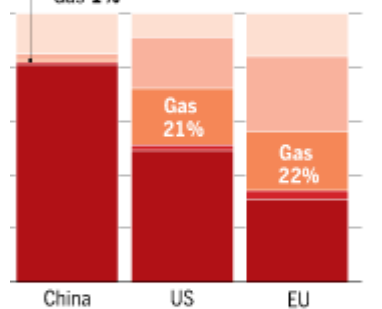


If it switched entirely out of coal-fired power and into gas, the EU would need about 40 per cent more gas, but higher LNG imports and some domestic shale gas production could make it possible to meet that increased demand.

The vision of a gas-based energy system, cheap, clean and secure, is a seductive one. It will not be easy, however, to turn it into reality.

Electricity generation

by source (%) 2007

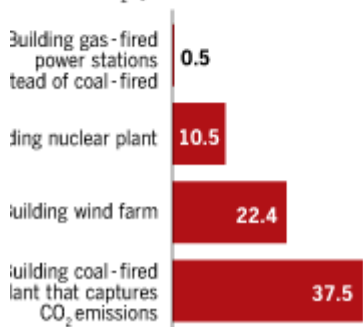


The primary problem is politics, according to Philip Lambert of Lambert Energy. "There is only one thing that can stand between natural gas being the affordable, quick and material answer to the environmental challenge posed by the globalisation of energy use – and that is political unwillingness to accept gas as the fuel of choice."

In part because of concerns about excessive reliance on Russia, EU governments have committed themselves to renewables such as wind power, promising to derive 20 per cent of Europe's energy from those sources by 2020. As a result, the industry is being pushed away from the lowest-cost options for emissions reduction to higher-cost technologies such as offshore wind.

Cost of saving carbon emissions

per tonne of CO₂ by 2030



Source: IHS CERA; IEA; McKinsey; Pathway to a Carbon Economy 2009

In the US, opposition to an increased use of natural gas comes not only from the politically powerful coal lobby resisting any erosion of its position but also from policymakers and Congress, largely focused on supporting renewables and nuclear power.

Policymakers on both sides of the Atlantic have been slow to accept that the outlook for gas supplies has been transformed.

At the CERA Week industry conference in Houston on Tuesday, Steven Chu, the US energy secretary, spoke positively about shale deposits but highlighted the role of gas as merely "a key enabler of renewable energy".

Günther Oettinger, the new European commissioner for energy, also stresses the value of renewable energy. Welcoming forecasts on Thursday that the EU was on course to meet its renewable goal for 2020, he said: "Our task will be to help all member states not only to reach the 20 per cent target but to go beyond."

That political pressure damages confidence in future demand for gas and risks choking off the investment needed to guarantee supplies. It may also weigh against the construction of new gas-fired power stations because investors will worry about whether the plants will run only when other forms of power, such as wind, are unavailable. "Investors need to work out how gas plants will remain profitable post-2020," says Mr Roques.

The other problem is the potential environmental impact of shale gas production. Water, sand and chemicals are pumped into the ground under pressure, to crack the shale and create gaps so the gas can flow out.

In the US, this process of fracturing, or “[fracking](#)”, has already caused [concern among environmental campaigners](#) and some politicians worried about possible contamination of ground water.

Michael Zenker of Barclays Capital, warns: “If fracturing was halted, there would be a serious dent in the supply outlook for North America.”

He does not expect environmental concerns to slow the growth of the US industry, although he acknowledges they could be a “reputational” risk.

In more densely populated and often environmentally sensitive European countries, however, those worries could be much more of a problem.

Wolfgang Ruttenstorfer, chief executive of Austria’s [OMV](#), one of the companies exploring the potential of shale gas in Europe, says: “I don’t want to create these kind of hopes and fantasies that lack final results, so I’m extremely cautious whether [shale gas] will be an option at all.”

Alexander Medvedev – the head of Gazprom’s international business, who is watching the effect of shale gas nervously – is counting on environmental concerns to derail ambitions to bring shale gas technology to Europe. If things go his way, then there is a risk that Russia’s grip on European energy could tighten, not ease.

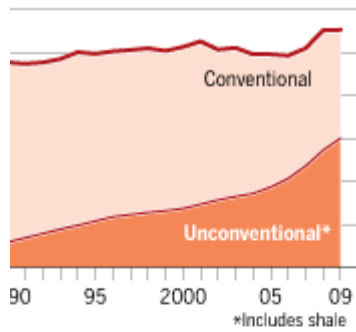
While shale gas may fail to take off in Europe, however, the most important revolution could come in China, which relies on coal for 81 per cent of its rapidly growing electricity needs and on gas for only 1 per cent.

Beijing is keen to change that balance to reduce carbon and sulphur emissions, which are suffocating its big cities, and also wants to secure more of its fuel supplies at home. Last year the government signed an agreement under which the US government will help China assess its shale gas potential.

In the long run, China and the US agreeing that natural gas is the fuel of the future may well prove to be more important than their failure to come up with binding emissions targets at [Copenhagen](#) last year.

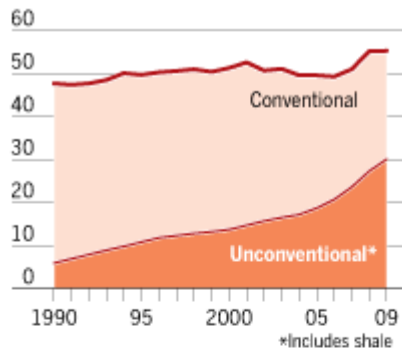
Natural gas productive capacity

1 cubic feet per day



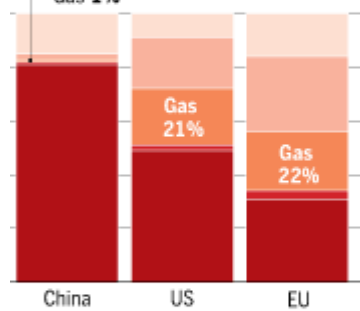
US natural gas productive capacity

Billion cubic feet per day



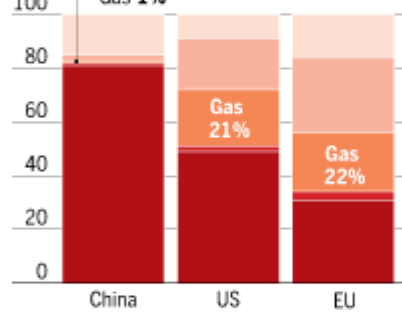
Electricity generation

Share by source (%) 2007



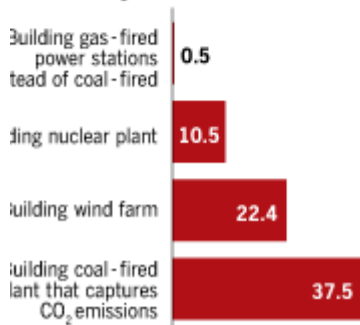
Electricity generation

Share by source (%) 2007



Cost of saving carbon emissions

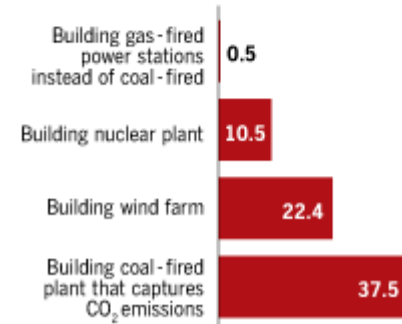
€ per tonne of CO₂ by 2030



Sources: IHS CERA; IEA; McKinsey: Pathway to a Low-Carbon Economy 2009

Cost of saving carbon emissions

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