# U.K. ENERGY POLICY – A TIME OF CONSEQUENCES

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Over the years I have attended hundreds of conference sessions on financing clean energy. Every time, the main conclusion is that financiers need a stable policy environment. Contrary to what the general public might expect, most serious investors in renewable energy don't spend their time begging for bigger subsidies. Instead what they ask for is the assurance that policy-makers are not going to change the rules during the development of a project or, even worse, after it begins operating – as has happened in Spain, the Czech Republic and now Bulgaria.

Policy-makers attend many of the same conferences. Whenever they hear the demand for policy stability, they nod sagely, and take copious notes. Yet around the world, in country after country, they seem congenitally unable to respond. Stability doesn't mean deciding a level of subsidy or support and then keeping it unchanged for new projects into the distant future. Policy-makers legitimately want to be able to dismantle programs that outlive their usefulness, or that prove over-generous. It means being very clear about the long-term role of a sector in a country's energy mix; putting in place sensible regulatory structures that have a five- or 10-year life; modifying levels of support progressively over time, in an open, bipartisan process; and never changing the rules for a project once investors have committed capital.

## POLICY UNCERTAINTY

U.K. policy-makers have been among the most earnest nodders and note-takers, first during 13 years of Labour and now two-and-a-half years of the Coalition government. They have also been among the worst at actually providing policy stability. The U.K.'s extraordinary renewable energy resources, along with its strengths in science, engineering, energy and finance, should mean that it has some of the lowest-cost clean energy in the world. Instead you have seven of the world's leading engineering companies, employing 17,500 people in the U.K., writing to the Secretary of Energy and Climate Change threatening to curtail investment plans over yet another year of policy uncertainty. It is a shambles.

This is disappointing, given that the U.K. is one of the only countries in the world which has passed legislation enshrining a long-term intention to decarbonize its energy supply. And given that the Coalition has spent the last two-and-a-half years consulting on an energy bill intended to create the environment for energy investment through to 2030 and beyond.

What would you do if you wanted to create uncertainty and cause clean energy investors to put plans on hold? Shortly before the energy bill reaches the floor of Parliament you would fire the minister who has been leading work on it, building relationships with all the different energy sectors. You would bring in a new clutch of energy and environment ministers known to be skeptical about anything other than oil and gas, and put onto your main energy committee a back-bencher with links to a climate-change denying think tank.

In what world would this make sense? The answer is: in a world in which the government is dogged by a sluggish economy, having failed to produce a coherent narrative about how to jump-start growth. Where a powerful faction in government appears to have arrested its intellectual formation during a period in which the biggest problem was over-regulation, demonstrating difficulty in understanding emerging network technologies, including the energy system. Where the highest decibels in favor of clean energy come from a vocal, hard-left faction whose proposed solutions are almost exclusively statist and anti-enterprise. And where powerful lobbyists for oil and gas companies are given free rein to whisper siren words of a return to cheap indigenous energy into ministers' ears.

Do not get me wrong: I am excited about shale gas. Bloomberg New Energy Finance is already test marketing a Gas Insight Service – contact us if you want to know more. In the U.K., we should sort out regulatory frameworks and get started with all vim and vigor to explore the resources we might have here – as well as in other countries. Europe's ban on genetically modified organisms has significantly harmed the world's ability to feed itself in an era of rising population and increased weather volatility. A ban on fracking, as has been imposed in France, would be nonsensical. We should demand public disclosure of data on fracking fluids, and also about costs and yields – so there can be an informed debate about the role of shale gas in our energy mix. I want to see it done properly: addressing the issues of surface water disposal, of methane diffusing into drinking water, of earthquakes. Most importantly, I want to see the issue of fugitive emissions tackled properly: methane is a powerful greenhouse gas, and natural gas only beats coal if fugitive emissions are reduced to near-zero. Still, I think engineers are smart, and they will solve all of these problems.

## SHALE MIRACLE

We need to make sure we do not become so infatuated with shale gas that

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we risk driving our energy system into a cul-de-sac. We cannot afford to spend the next five years assuming that the U.K. will be awash with cheap gas. In fact, those siren voices, whispering of the new Age of Abundance, need to be challenged to explain why they expect long-term U.K. gas prices to go down, rather than up.

The U.K. sources some 40 percent of gas demand from its domestic continental shelf, another 28 percent or so from Norway, and the rest from further away sources such as Qatar and Nigeria. Production from conventional U.K. fields is declining. It is on track to fall to less than 20 percent of demand by 2030, according to projections shown by Royal Bank of Scotland at the Scottish Low Carbon Investment Conference earlier this month. Fiddling with the tax regime might slow the decline for a while, but cannot reverse it. At that point, shale gas or non-U.K., non-Norway imports would need to fill more than 50 percent of the U.K.'s gas demand.

Let's deal first with imports. The key point is that if the U.K. becomes more dependent on imports, it will be exposed to international gas prices. And these are going to stay high for the foreseeable future. The U.K.'s number one overseas supplier, Norway, will itself see declining output from around 2020.Yes, there are lots of new supplies coming on stream – Australia, East Africa and so on. And yes, by 2030 there should be other parts of the world that will be producing large amounts of shale gas. There are also huge new sources of demand.

In Europe, you have Germany, Italy and Switzerland shutting their nuclear plants and trying not to become dependent on Russia. In Asia, before Fukushima, Japan was planning to increase its dependence on nuclear electricity to 50 percent by 2040; now that figure may well be zero, and Japan is going to be a huge gas buyer forever. Then there are the insatiable sources of demand that are China and India, as well as other hyper-growth developing economies. With Indonesia making noises about restricting coal exports, gas supplies are going to be at a premium throughout Asia. If suppliers can sell their gas at $10-18 per million British thermal units into these markets, why would anyone sell cheap gas to the U.K.?

So what about shale gas? There is no reason to believe that it will push gas prices down in the U.K. in the same way as they have recently in the U.S. Shale gas has been an astonishing success story there, within a few years shifting the country from being a long-term gas importer to a potential exporter, and pushing prices down from $6-11 per mmBtu to as low as $1.73 in April. There are caveats. The U.S. gas price has rebounded by over 90 percent from its lows, and is now around $3.50 per mmBtu. Some wells can make money at very low prices, though most cannot. As Rex Tillerson, Exxon Mobil Corp.'s chief executive, recently said of the U.S. shale gas miracle: "We are all losing our shirts today. You know, we're making no money. It's all in the red."

The fact is that shale gas operators in the U.S. need a gas price of around $5 per mmBtu in order to justify continuing to drill, frack and build pipelines. All analysts expect the U.S. natural gas price to rise to $5 or $6 per mmBtu. Bloomberg New Energy Finance's own predictions are for a price of $5.50 by end-2015. And that is in the U.S., where conditions are ideal for shale gas: great geology, low population density, an existing pipeline network, a fragmented regulatory environment, landowners with sub-surface mineral rights and a liquid market for rigs and drilling services. Given conditions in the U.K., it is hard to see shale gas coming to market at much below $8 per mmBtu – around the same as the wholesale prices that have been driving up utility bills in recent years.

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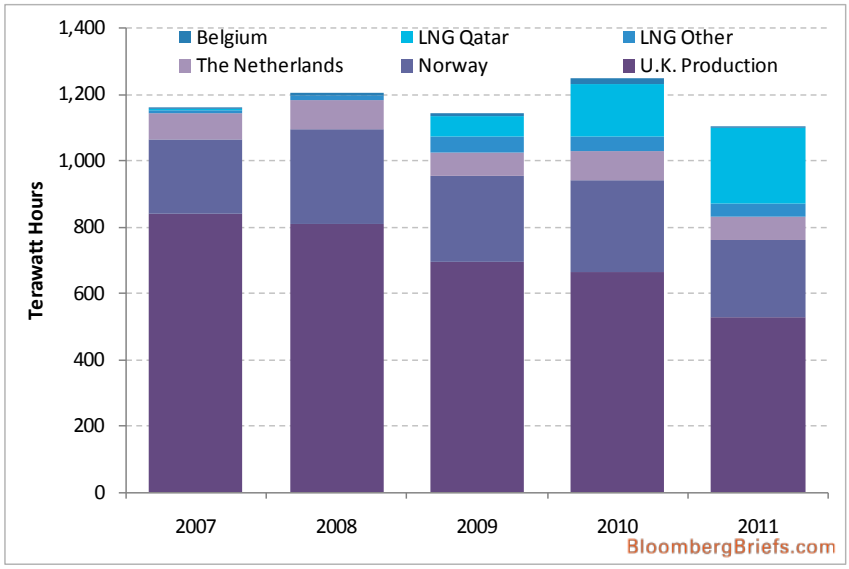
What about imports from the U.S.? Liquefying, transporting and gasifying liquefied natural gas adds $3-4 per mmBtu to its cost. So the potential for exports from the U.S. might put an upper bound on prices at around $8 per mmBtu, but there is no long-term prospect of large-scale trade driving lower prices than we are currently seeing for wholesale U.K. gas.

Let's also look at public acceptance. Sure, the British public does not like onshore wind-farms near their homes. But then they do not like roads either. Or chemical plants. Or nuclear power stations. Or sewage treatment farms. Or homeless hostels. They are going to love fracking operations.

In order to replace the decline of U.K. Continental Shelf gas production through 2030 – before starting to replace any coal or nuclear power – you would need 2,400 fracked wells. Assume 10 wells per pad, and that is 240 pads. Each one is an industrial development in the countryside, and this number would extend over an area the size of Lancashire. In terms of production per well, at its peak, one fracked well can produce enough gas to match the output

**U.K. Gas Production Fell in 2011, as Imports From Norway Dove 15%**




*Source: U.K. Department of Energy and Climate Change*

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of 50 onshore or 15 offshore wind turbines. However, the decline curve of a fracked well is so steep that within two years, each well could replace as few as four onshore or one offshore turbine (and yes, these figures are adjusted for the efficiency of gas generation and the intermittency of wind).

## UNCERTAIN ENVIRONMENT

The choice of fracking versus wind is a false dilemma, because the truth is we need both. The future of the U.K.'s energy system is not – despite all of the manufactured controversy – rocket science. We need dramatic improvements in energy efficiency. We need to shut old, polluting coal-fired power stations. We need to get a few carbon capture and storage projects up and running so we can learn the technology. We need to prolong the life of our existing nuclear capacity as far as we can, and try to build some new plants (though U.K. taxpayers should only subsidize nuclear if the technology benefits accrue domestically, not overseas). We need to exploit our extraordinary renewable resources in such a way as to drive down their costs and reduce their need for subsidies. And we need gas to meet peak demands and balance the electrical network, as well as for heating and industry – though we must do it in such a way that we are not locked into an expensive and polluting energy source for the long term.

These goals should not be seen as being in opposition to each other, they should be complimentary, pursued at the same time. This brings me to my final point. The reason that energy policy is hard is that modern energy systems have to meet a lot of different requirements. In the dim and distant past, it was enough to produce reliable, universal supply, and economic growth meant it was okay to over-invest in capacity. Then came the oil shocks, and concern over security. Then deregulation, and the requirement to push down prices while maintaining reliability. Then environmental concerns, first oxides of sulfur and nitrogen, then carbon emissions and fugitive methane. Where we are now is that energy is increasingly the key to industrial dynamism, drawing as it does on technologies like materials science, nanotechnology, bioengineering and software and communications. Energy is therefore the driver of future employment and economic health, though not, as some would have it, via the facile "green jobs" argument.

Energy policy not only has to optimize all these functions, it also has to do so dynamically in an uncertain environment. We can chart experience curves, which will drive down the cost of clean energy and shale gas fracking in a fairly predictable way. We cannot forecast breakthroughs. We can try to forecast future energy prices. We cannot forecast social movements like the Tea Party or the Arab Spring, and we cannot forecast geopolitical developments – when Iran's regime will fall, or whether unrest will envelop China if its economy slows. There are even huge areas of human behavior we do not really understand, such as people's responses to privacy issues, or requests to save energy.

What all of this volatility and uncertainty means is that options have extraordinary value. If you do not know whether gas is going to be cheap or expensive, do not build an energy system that is dependent on it. What you need to do is invest in technologies that increase your flexibility: energy efficiency, smart grid, demand management, power storage, international interconnects and electric vehicles. Sure, these may not seem cost effective on the face of it, particularly before they have reached scale, though they offer the opportunity to flex the system to respond to future conditions. It is the role of our leaders not to chase rainbows, but to insulate the country's future economy from risk.

To quote Winston Churchill: "Owing to past neglect, in the face of the plainest warnings, we have entered upon a period of danger. The era of procrastination, of half measures, of soothing and baffling expedience of delays, is coming to its close. In its place we are entering a period of consequences."

Within a few weeks the first major piece of energy legislation in the U.K. for 15 years will reach the floor of Parliament. Is it perfect? No. Is it good enough to provide a framework? Yes. Now policy-makers must create the policy certainty that investors in all parts of the energy system need, so they can get their heads down and build the flexible, robust, integrated system we are going to need for the coming decades.

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