

THE RACE IS ON

Energy analyst David Hunter posits that all roads lead to an energy gap, with only one solution worth considering

The global scramble for energy has begun. The recession may have bought us a year or two by restraining worldwide demand, but the UK must be prepared now to fight for its share of finite energy resources in the future – and the battle will be intense. The developing world's thirst for fuel will dominate the global agenda, with wide-ranging implications for Britain.

It is no wonder that set against this backdrop, the 'nuclear option' has moved strongly back into vogue. In their hearts,

nobody wants atomic power stations in an ideal world. In reality, however, the lack of reliable low-carbon alternatives is pushing nuclear energy, for a long time the awkward, guilty secret of the power industry, firmly into centre stage.

For the last 30 years, the UK has been relatively insulated from the global market and concerns over energy security. We turned on the North Sea 'taps' and transformed our economic fortunes; from the 1970s the UK Continental Shelf

provided plentiful supplies of oil and gas for both domestic consumption and export. Taken together with our long history as a coal producer, this meant the country was awash with fossil fuel energy, not only to heat our homes, but to burn cheaply in power stations to light them too.

Unfortunately, this energy utopia couldn't last. A number of factors have conspired to place UK energy policy in crisis – some unforeseen, others entirely avoidable. The authorities were complacent – North Sea

production peaked in 2001, and by the middle of the decade we became a net gas importer as supplies dwindled. The energy infrastructure, most notably gas storage, hasn't been planned to cope with this new reality. Added to this, we 'sweated the assets' by letting our power stations age and degrade, all the while providing us with cheap electricity that couldn't last.

In January, the latest symptom of this lack of planning manifested as the UK's energy network operator issued four gas system

balancing alerts in a matter of days, cut off supply to almost 100 industrial users, called for emergency imports and asked power companies to turn off gas power stations in favour of coal. While this showed that the system worked, prior to 2010 only one such alert had ever been issued.

In fairness, we experienced a severe cold snap with record gas demand as a result. However, if we think this is a problem now, we ain't seen nothing yet.

Gas has left coal and nuclear far behind

as our main source of power generation – from less than 40% of supply a few years ago, to between 50% and 60% now. In the next decade this will rise further, perhaps to 75% or more.

The system coped this year because we could switch on coal-fired plant – but by 2015 many of these will have to close as a result of the EU's Large Combustion Plant Directive (LCPD), which aims to cut power station emissions. In the meantime, they have to run on restricted hours.

Furthermore, our nuclear reactors are ageing and unreliable. Their share of generation has dropped from more than a quarter to around 15%, and will continue to fall over the decade. Renewables will play an increasingly important role, with exceptionally ambitious government targets for new wind power, in addition to commitments to huge cuts in carbon emissions. Neither nuclear, nor wind, will fill the energy gap that is looming by 2015.

All roads lead to a yawning energy gap. Coal is the dirty outcast – until clean coal technology is proven on a large scale – and that is at least a decade away. So, what is cheap to build and run, clean(er) and able to fill the gap by 2015? Gas. Lots of it. Power companies are falling over themselves to build new gas stations, often on the sites of old coal plants on their last legs: Cockerzie and Tilbury to name but two.

The problems are obvious. As global gas demand mushrooms, we will be hugely reliant on one imported fuel source for our energy needs. It will come by pipeline from Russia and the former Soviet Bloc via Europe – and we are at the end of the line. If Ukraine doesn't pay for Russian gas, will we be cut off as a result? We also increasingly rely on liquefied natural gas (LNG) imports by ship from the Middle East, but that is a global market – the UK will have to pay top dollar to attract these cargoes. Norway is a safer source of supply, but also sends its gas to the continent.

Nor is gas clean enough to meet our emissions objectives. The dilemma of future energy supply in the UK is a menu of imperfect options. Gas is cheap and easy, but on the other hand the supply sources are far from guaranteed, it burns off CO₂, and we are in great danger of becoming completely reliant on one fuel. Unabated coal is an emissions 'car crash' that is being regulated out of the picture – clean coal is a nascent technology and years away from economic production on the scale needed. Renewables, primarily wind, are being developed at a furious rate with generous subsidies. Yet reliability is a major issue – the intermittency of supply inevitably means that flexible back-up (fossil fuel) will be exceptionally expensive.

Step forward nuclear. With the UK signing up to low carbon legislation both here and at European/global levels, atomic power is virtually impossible to ignore. Ironic then, that until 2005 that is exactly what government policy did. Emboldened by cheap and plentiful fossil fuel-sourced power from ageing power stations, policy froze out nuclear as an ongoing option. The key energy White Paper in 2003 noted



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that there was a lack of replacement nuclear on the slate, but argued that "its current economics make it an unattractive option for new, carbon-free generating capacity". Firm statements like this over time led to the erosion of the nuclear skills base – why go to university to learn about atomic power stations that your country has written off?

The tide started to turn in late 2005. First, the government's Chief Scientific Adviser Sir David King – and then the Prime Minister – spoke in favour of a reappraisal of nuclear. In 2006, the resulting White Paper confirmed that a new generation of 'nukes' was on the agenda as part of a future mix of energy supplies – but the private sector would have to cover the cost of investment, decommissioning and waste storage. Greenpeace was furious, and won a court action ruling that the subsequent consultation process was lacking. The government consulted again, and came to the same conclusion.

At the end of May 2008, a series of coincidental power station outages – including at Sizewell B, the newest atomic reactor – caused 'brownouts' (managed power cuts) to hundreds of thousands of people. This brought into sharp relief the problems caused by the lack of investment in infrastructure over the preceding 20 years, and did little to dampen the government's new-found ardour for the atom – plans were announced for a new generation of eight plants in July of the same year. Then, in September, the State sold its controlling stake in British Energy (operator of most of the UK's existing nuclear build) to EDF, the French State-owned utility, for £12.4bn. The government expects EDF and Areva, its French industrial partner, to deliver four of the 10 (now) planned stations.

In 2010, it is clear that nuclear is right at the heart of the UK energy agenda, and we are moving mountains in order to clear the path for new build. The National Policy Statement of 2009, for example, incorporates radical legislation to reduce the planning lead time to as short as one year – the government appreciates that it simply does not have the luxury of time. Sites for the new planned stations have been identified, and energy companies have been falling over themselves to buy up land.

There are two questions – should we build nuclear, and can we do so in time? The answers are linked, and complicated. Nuclear ticks many boxes: it is low carbon, provides reliable baseload power, and boasts stable sources of supply. Carbon targets and energy independence means that a future built mainly around conventional fossil fuels is untenable. In many

commentators' minds, cleaner fossil fuels would provide the 'sandwich filling' between worthy but unpredictable renewables, and controversial yet reliable atomic power. Of course, nuclear's detractors would argue that the emissions and social cost of atomic energy is measured in hundreds of thousands of years, and the lack of a permanent solution for waste storage is undeniably the biggest argument against a new generation of reactors. The other aspect is cost – nuclear has never been built on time, on budget – and never without public subsidy. In this last respect, atomic and renewable energy have more in common than one might expect.

The global community wants cleaner energy and a halt to global warming. Yet no government can afford to let the lights go out, and that is what may be at stake. That is why, while there are around 450 nuclear power stations currently operating globally, plans now exist for a doubling of this total. China alone plans 130 reactors to add to the 11 currently generating; South Africa has two but plans a further 30. And as recently as February, President Obama announced his support for new build in the United States, with the prospect of Federal Loan Guarantees.

Nuclear is coming, so can it be delivered in time to fill the UK's impending energy gap? With the first shortages predicted by 2015, it is already inevitable that this demand must be filled by a 'dash for gas', as touched upon earlier. The first new nuclear plant is slated for commissioning by the end of 2017, according to EDF Energy. This seven-year timescale from the drawing board to active service is highly ambitious, and unrealistic according to experts such as Dieter Helm, Professor of Energy Policy at Oxford University, who believes that we will be lucky to see new plants by 2020. Deloitte estimate that 50GW of new or refurbished generation will be required by then – roughly two-thirds of current capacity; the decisions that the government is making now to fast-track nuclear power should have been made a decade ago.

The example of Finland is instructive. The Olkiluoto project could be described as the rebirth of new European nuclear power – if so the labour is proving to be exceptionally painful. Originally due to start supplying power

in 2009, the latest estimate for completion is 2012 – a full 13 years from conception of the plans. Amid a series of production halts due to regulatory concerns over safety and build quality, the costs have doubled from €3bn to €6bn.

What's more, the reactor design (by Areva) is the one favoured by EDF to build their UK reactors. Optimists argue that someone had to be first, and that all subsequent projects will learn from the painful mistakes in Finland.

With Olkiluoto weighing heavily in the minds of investors already reeling from the credit crunch and recession, the issue of investment is a key concern. OFGEM, the UK regulator, estimates that £200bn is needed over the next decade to prepare Britain's energy infrastructure for future demands. It is clear that this cannot come from a state wrestling with record budget deficits, and so the private sector must deliver.

To do so, it will demand clear pricing signals and a stable investment climate. The bill, inevitably, must be borne by the customer. Renewable projects benefit from generous state subsidies in the form of the Renewable Obligation (RO) and other environmental levies. Gas-fired power benefits from a low carbon price that currently places an insufficient cost on emissions from fossil fuel plants. Nuclear supporters argue with justification that to create a level playing field will require that the public subsidies available to green power are open to nuclear also, and that the carbon markets reflect the true costs of emissions to balance those charged to atomic power (in the form of decommissioning provisions).

A policy package should comprise a Low Carbon Obligation to replace the RO, a minimum 'floor' price for the carbon market, and an exemption from the Climate Change Levy for atomic power. In addition, the liberalised wholesale markets must be reformed, at least to include a capacity payments scheme whereby power producers are paid by the consumer for having plants available. OFGEM has gone as far as to raise the possibility of a central buying agency for power – but this is surely a step too far that would indicate total policy failure. The market can deliver with a few 'tweaks' here and there,

together with the right messages over investment.

Last but not least, if we are to build nuclear stations in time, we must address the skills gap, and resource the Nuclear Installations Inspectorate and Health & Safety Executive sufficiently that all the cogs of the planning wheel keep turning safely – this is no easy task given the extent to which nuclear skillsets have withered on the vine.

In conclusion, nuclear has a central role to play as a 'necessary evil' within a low carbon future energy mix. We should plan for a third generation of nuclear fission reactors, but make them our last. The government however needs to do a lot – and fast. The policy impetus in the last two or three years has been impressive, but we are making up for a lost decade or more.

Above all, even if all the obstacles can be overcome, the consumer will have to accept a price premium for keeping the lights on – but with anger that, with greater foresight, the bill could have been substantially lower. **ep**

About the author

David Hunter is international business manager – electricity at energy consultancy McKinnon & Clarke. He graduated from University of Edinburgh with MA Hons in Politics and Economic History. He joined McKinnon & Clarke in 1995 as an energy analyst for a diverse client base. He now manages a team of analysts in the UK, and is responsible for developing market intelligence and client services throughout Europe and the Far East – he also chairs the company's international Innovation Group. With an in-depth understanding of the global market, David regularly appears in both national print and broadcast media

