

# **International Contexts for UK Energy Policy**

**Chris Lambert**

*Director - Energy Policy Unit, Adam Smith Institute*

Mr. Chairman, ladies & gentleman, thank you for inviting me to contribute to this afternoon's event.

Firstly I think it would be useful if I spend a couple of minutes briefly explaining how the Adam Smith Institute see itself contributing to the UK energy debate, and the role we are increasingly trying to fulfil. Then I'll concentrate on some of the key current and emerging issues and their international contexts that I see having an important bearing on UK energy policy now and in the future.

## ***The ASI role***

(SLIDE 2) There are a multitude of interested parties or 'stakeholders' in the UK energy scene, who come at the debate from very different perspectives and often with contrasting ideologies about what approach to policy analysis is best, or which form of generation offers the best long term opportunities for a secure, sustainable and economically viable energy system.

The regulator Ofgem has the tough task of protecting the interests of the consumer and helping to deliver government policy. Among the academics are the university departments like Imperial, Oxford & SPRU, and engineers chemical, electrical, mechanical and civil. Within an increasingly vertically integrated market interact the utilities, the grid operator and the City, while international policy requirements now determine the primary framework for our own domestic ambitions.

Public interest in energy is low – it's not an electoral issue – so the media responds to high profile environmental issues and security concerns, and rightly or wrongly the broad public opinion often follows close behind. What can upset this carefully balanced political applecart of course are the potential wild card events – the power blackout, the radiation leak, the oil spill.

The nature of debate during the Energy Review and following the publication of the White Paper illustrated the tensions involved in delivering a policy with so many contrasting stakeholder influences, and as a result of this the ASI Energy Policy Unit was set up a year ago in an attempt to provide an independent, inclusive forum specifically concerned with the debate and development of energy policy, both in the UK & internationally (SLIDE 3).

In brief, we take the view that of all policy initiatives security of supply is paramount, with environmental sustainability and economic affordability optimized within this context. We support the principle of a balanced, mixed energy policy to achieve this and are pragmatic about the need for all forms of generation to remain available to fulfil the various current and future policy objectives pertinent to the UK and the international community. In essence, we are trying to take an objective, risk-based approach, and I welcome the Royal Academy's recent drive to deal with costs of electricity generation in just this kind of transparent way.

The UK Energy Bill has recently passed through the Lords, and policy is now fixed, but just how stable is the policy landscape in which it must operate? (SLIDE 4).

### **A period of change?**

We are about to enter a period of flux, with a change of European Parliament & Commission in June of next year. In November the US elections take place, which raises questions about maintaining levels of support for their expensive, high-technology research programmes. In April 2005 the new electricity trading arrangements, BETTA, are due to go live across all of the UK, and of course our own general election may take place around about then too.

On a policy level the European Large Combustion Plant Directive & the Emissions Trading Scheme will impact on the market, and it is hard not to see further doubts about the efficacy of Kyoto arising. Russia has not secured agreement over European transit protocols and will not ratify, while China has ratified but just commissioned a raft of coal-fired power stations which are not fitted, or designed to be fitted, with clean coal systems.

By 2006-7 we should also have a nuclear waste disposal strategy, but also the start of the decline of the nuclear power plant fleet. The UK has now become a net importer of gas, and various concerns abound there, while by 2007 it should be clear how effective the government's renewables and energy efficiency strategies are being.

Underlying this period of flux are four major energy trends (SLIDE 5). Demand for energy is growing, environmental awareness and importance continues to rise, the EU market will expand post-accession, and technology continues both to offer new opportunities and pose new challenges.

The result? Energy policy needs to be viewed as a long term issue, to 2050. Over the coming two or three years the current government policy will be exposed to new political contexts both here and abroad that will produce changes in how we try to deliver the broad missions of UK energy strategy.

### **Renewables**

In terms of Renewables the UK has ambitious plans but given our starting position at the time of the Energy Review it was difficult not to be ambitious (SLIDE 6). We currently have among the lowest renewables contribution in Europe, and while the government's strategy is effectively to make us European leaders in this field by 2020

the current dependency on wind is – while understandable – not tenable in the longer term.

The Renewables Obligation Certificates give a boost to the expansion of the relatively mature wind power technology but they don't necessarily help emerging technologies, such as marine renewables, develop steadily towards commercialisation. Countries like Portugal, Germany and Japan instead used Feed In Tariffs for renewables development which guarantee the output price for the electricity, and these have helped investment in all technologies.

Feed In Tariffs were, however, perceived to be more a more costly alternative than ROCs, but in terms of the amount and diversity of actual renewables *deployed* it will be interesting to compare the effect of ROCs after five years with other countries' Feed In Tariffs.

Ultimately, all forms of generation will need to compete on a level playing field, with minimal or no subsidy, and that means internalizing all their costs. (SLIDE 7) If *emerging* renewable technologies are to compete in this manner in the long term, more powerful mechanisms to encourage their commercialization are likely to be needed. Let us remember that it is not just about curbing the UK's emissions that matters, it is the ability to disseminate as broad a package of low or zero carbon technologies as possible to the developing nations in order to accelerate their shift from *high polluting* consumers to *clean* consumers of energy.

(SLIDE 8) To suggest consumption will fall, or even be significantly curbed, is a fallacy, and as a highly advanced economy with world class engineering prowess we should really aim to incentivise the innovation and commercialization of these technologies with more expedience. Certainly diversifying the renewables base with other technologies like marine renewables is highly desirable for National Grid, and this also helps to overcome the intermittency and back up issues, but in terms of supply security how will other technologies fare in the future, and what are the international trends of these?

## **Oil & Gas**

Gas imports for the last quarter of 2003 were 80% higher than the same period in 2002, with exports down on the same period. Effectively this marks the beginning of UK dependency on gas imports as UKCS reserves begin to decline.

So where will the UK & the rest of Europe get our gas from? (SLIDE 9) Future gas trade flows will include Norway, the Netherlands, Russia, Iran et al, while the UKCS will still continue to produce. (SLIDE 10) We can see the effect and origin of gas imports, as well as the decline of coal and nuclear, on the UK's energy mix in this slide showing the sources for our future electricity generation.

If we become too dependent on gas from a single source then this clearly poses a high security risk, and it is an unlikely situation, but the risks of high dependence from some of the import States show how wise to the risks we need to be (SLIDE 11). This slide illustrates the insurance market's perceptions of political risk over the coming years from these suppliers, with the red bars representing the relative current risk

premium levels and the blue bars future risk. At present the UK has the most secure supply of the G8, but by 2024 will have the lowest because of its high import dependency, and what we have to decide is whether this higher risk level is acceptable and will continue to provide the security we need.

The current gas security concerns relate to a shortage of supply at the winter peak, and LNG storage facilities have the go ahead in the UK which in the medium term will address this problem. Assuming transit negotiations with Norway are concluded swiftly this will reassure the risk analysts. (SLIDE 12) Indeed, the recent UK Gas Market Report suggests that after the initial storage facilities are built, we could in fact have an oversupply for a short while. However, as UKCS supplies decline, and with a low swing towards imports, security of supply once again becomes a concern, with 10 days maximum gas storage available in 2010. In short, we are likely to need significantly more storage facilities for LNG operational from 2010 than have hitherto been planned.

Perhaps our concerns should also be focused on the broader global oil reserves and what will happen when production begins to decline. (SLIDE 13) Present annual oil consumption is 25bn barrels and not slowing, with consumption meeting maximum output possibly during the next two decades. This will result in a 'production crunch', with prices rocketing, and driving the demand for new technologies eg fuel substitutes from coal, and better energy efficiencies.

It is the potential for just such an energy shock which is behind the FutureGen research of the USA's clean coal technology programme that aims to develop a non-polluting hydrogen production process. Clearly, if successful, this would have major benefits for the climate, given transport's huge current and future demand for energy.

The big question is when the oil and gas production peak will occur. The IPCC say 2050, other research estimates 2010. The timing of this will also partly depend on how much oil can be recovered via Enhanced Oil Recovery utilizing carbon sequestration in the bedrock reservoirs. However, whenever the production peak does come one suspects that once again we will turn to coal, assuming we support clean coal technology development now. Whatever contribution renewables make in the future, and one hopes it is a significant one, they are not likely to fuel the transport sector, and coal substitute fuels and hydrogen fuel cells will be key.

Another question is whether this can be a relatively seamless transition, without massive price shocks. Energy prices will rise to a significantly new level, sometime between 2030 and 2050, and one might assume that the introduction of an international upstream carbon tax to finally value the environment appropriately within the energy market might be a useful method of delivering an acceptable transition.

## **Nuclear**

And what should the UK do about nuclear? The international trend in nuclear is startling (SLIDE 14).

31 nations now operate civil nuclear reactors, representing over 4bn of the world's population. Total operation now amounts to 11,000 reactor years, providing 16% of the world's electricity.

This contribution is set to rise. Thirty more reactors are currently under construction and many more are planned. By 2050 the US plans to expand its nuclear component by 50%, and China and India between them plan a total of 500 units - more than double the current world stock.

While much of the recent growth has been in industrializing countries, interesting developments are taking place in the West also. An 8-company consortium is preparing to apply to the US government in 2008 for a joint operating licence for the first new power plant to be built in the US since 1979 and the Three Mile Island incident. The US regulatory commission will make a decision in 2010, with power coming onstream in 2018. And given most objections to nuclear are economic rather than environmental now, how much will it cost? Nobody knows.

The European Economic & Social Committee has also recently adopted a report on nuclear energy, with the following statement by the Commissioner (SLIDE 15):

“there is a need for a more balanced debate on nuclear energy. At present renewable cannot replace the share of EU energy currently supplied by nuclear, and given the EU's high dependence on non-EU oil and gas supplies nuclear energy is needed to ensure security of supply whilst the development of alternative sources for the future is also pursued”.

A strong statement from a Commissioner, perhaps stimulated in part by the recent spat with the Russian Federation about gas transit protocols, and possibly also a parting shot before the Commission changes.

And, of course, there is the debate stimulated by Finland's new additional, not replacement, nuclear power plant Finn 5 at Olkiluoto (SLIDE 16), and the waste repository development that was a prerequisite to it (SLIDE 17)

Public opinion will clearly figure strongly in any consultation over replacement new build in the UK (SLIDE 18). One key finding in Finland in the run up to the new nuclear build decision was that as people became better informed about nuclear energy fewer actively *wanted* it, but overall they preferred having some new nuclear to the risk of power shortages that would likely arise without it. The key to all this was a transparent media debate.

My feeling is that the public aren't in fact risk averse, they risk are *naïve*. Consider one of the EC's Eurobarometer findings into public perceptions of energy choices (SLIDE 19). To the question, 'Does nuclear power contributes greatly to global warming', UK respondents answered: Yes 45%, No 37%, DK 28%.

It was the same across all of the EU with the exception of the Nordic countries who are 20% better informed, and shows that even with the Finnish debate a fifth of people are ignorant of the positive contribution that nuclear makes to the emissions challenge.

For those of us who believe that nuclear power will continue to play an important role in future of the UK's energy mix we must bear in mind not just the long lead times of planning, approval and construction but also of educating the public about its benefits. (SLIDE 20). The Finnish acceptance of new build has been a long road, as indeed it has for waste disposal (SLIDE 21). We should bear these lessons in mind.

### **The network**

I want to briefly mention the power Grid. Electricity is of course not just about the supply of primary energy sources to the generating stations, it's about getting it reliably to the consumer.

The three leading electricity companies in the world – Euroelectric, Edison Electric of the US, and the Japan Electricity Federation recently issued a joint statement stating that electric reliability should be the paramount element of electricity market policies, and that facilitating electrification of the developing world would lead to more effective reductions in greenhouse gas emissions.

The UK network will require extensive development in the coming years, not least to cope with growing demand but also the increasing distributed contribution from renewables. A failure to get this right would be unforgiveable given last year's experience in the UK, Italy & the US (SLIDE 22). The US blackouts show just how important security of supply is, politically, economically and socially.

This raises important questions about who is responsible for looking after and developing key infrastructure. At present, the funding is strongly dependent on political decisions, but given the lead times and construction periods of major energy projects the political horizon for planning and funding is often too short, limited by Parliamentary and electoral timescales.

One solution might be to make a non political, high level appointment of a technical specialist whose job it would be to advise the Government on the long term management of our national infrastructure, in the form of a Chief Engineering Adviser.

It would certainly give confidence to the public that the large sums of money which need to be invested in the infrastructure were being appropriately assessed first.

### **Carbon sequestration – a large scale solution?**

I've already mentioned the development of the US clean coal programme and the international collaboration with India, China and the EU with whom this is going ahead. Also central to this programme, and arguably more conventional than the FutureGen work, is the desire for carbon sequestration initiatives to become commercially viable on a wide scale to help radically reduce carbon dioxide emissions (SLIDE 23).

Carbon sequestration is based upon the Enhanced Oil Recovery techniques utilised to extend production in the oil and gas fields, which pumps CO<sub>2</sub> into the reservoirs.

Statoil in Norway has been storing CO<sub>2</sub> in the sea bed since 1996 following a national levy on CO<sub>2</sub> emissions, and annually stores 1% of global emissions.

For purely climatic benefits storage in plentiful deep saline aquifers on land could be utilized, but concerns abound about the likelihood of accidental releases of large amounts of dense CO<sub>2</sub> gas. Given that coal fuels the majority of the world's power generation, however, and will continue to do so until at least 2030 according to the IEA, sequestration may be the only immediate large scale solution to the large scale carbon problems we have.

### **Access to energy in the developing world**

So far I've focused on the UK in the context of the *developed* world, its energy policies and technologies. It is, after all, our immediate concern. I'd like to conclude, however, by placing this debate in the context of the *developing* world, the trends taking place there, and the implications if we don't help to ensure vital access to energy for the world's poor in the coming decades.

(SLIDE 24) Of today's 6 billion people, more than half live in dire conditions, and these expanding populations are lowering water tables so drastically that, within 25 years, half the world could be without reliable access to potable water – unless we can somehow achieve large-scale desalination of water from our oceans and seas.

In the next 50 years, as global population grows from 6 to 9 billion, human need will also multiply (SLIDE 25). As nations try to meet this need, the rate of world energy consumption will double or even triple, and – in just this narrow 50-year period alone – humanity will use more energy than in all previous history combined.

(SLIDE 26) Energy access is central to economic development but over the last 30 years there has been little improvements to access or reliability in the developing world.

Research by the World Energy Council states that global GDP is predicted to grow at less than 3% for the next 30 years. This is because of demographic trends, the potential for higher real energy prices, and the failure to address institutional barriers to energy access in the developing world. If global GDP growth proves lower than this expected level, investment in energy supply could be greater than the impact on demand, leading to higher prices.

Rising primary energy prices benefit energy efficiency & the environment but if they translate into higher energy service prices, eg the costs of electricity, this could negatively affect global GDP & make universal energy accessibility more difficult to obtain.

We rightly discuss at great length the ins and outs of UK energy policy, but similarly without clear policies and targeted temporary programmes it won't be possible to deliver sustainable commercial energy access for the world's poor to 2030 and beyond. Sustaining this access to supply will also be essential so that energy shocks don't hamper or derail such economic development.

Why should we be concerned? Well, as affluent consumers now preaching the mantras of clean energy there is a moral imperative for us to play our part. Improving access to better energy provision globally can only help to reduce emissions, and in economic terms will have a relatively small impact on global energy demand but could contribute to increased global GDP growth rates, prosperity and political stability.

### **Summary**

While the course of current UK energy policy has now been set it is important that emerging and external factors are monitored, debated and associated ideas developed in order to help inform the policy-making process. The Royal Academy of Engineering's work on the generating costs of electricity is an important example of introducing this kind of thinking into the debate.

For the Adam Smith Institute's young Energy Policy Unit the forthcoming year's work will examine some of the key issues I have mentioned today by collaborating with various stakeholder groups here and abroad. (SLIDE 27)

On May 27 we hold a seminar jointly with the British Energy Association – the UK Committee of the World Energy Council – to explore critical issues in financing the future of the UK energy sector. We will follow this up in September with a workshop held with the Renewable Power Association to examine mechanisms for supporting emerging technologies, like marine renewables, through innovation to commercialisation.

I made mention of the new fossil fuel technologies. In October we examine the potential of carbon sequestration and enhanced oil recovery, while in January we will hold a conference with the European Commission on emerging EU energy policies followed by a foresight workshop on the FutureGen clean coal technology, and the pathway to a future fuel cell economy.

In March of next year we plan to host a major international conference aimed at improving energy access in the developing world.

In terms of research, we will be developing a series of policy risk indices for the energy sector to help identify medium term scenarios that might inhibit our ability to develop the secure, sustainable and affordable energy system that we seek.

One of the policy choices in the future might depend on some replacement nuclear build, and given the lead times involved and the lack of genuine research into new build economics we feel that this would be an interesting and helpful research exercise. We will therefore be working with a variety of agencies, including I hope the Royal Academy of Engineering, to define the key elements of a UK new build pathway and the economic implications of this, both in terms of costs and financing structures. Such work is not intended to be a rallying cry for new build, simply a transparent piece of research which provides an exploratory template for debate and a possible future policy enquiry.

(SLIDE 28) That is what I mean by taking a risk-based approach. Security depends upon diversity and a balanced mixed energy policy. Taking an open mind to all forms of generation, and working openly with all stakeholder groups is key.

**And finally...**

The Finns are a pragmatic lot. When drawing up their energy policy the overarching belief was that whichever energy mix was chosen it should be for “the overall good of society”. (SLIDE 29) Indeed, unless power cuts and media interest catapult it to the top of the agenda for a few days, energy is a non-electoral issue, even with the concerns over climate change, so there is a big responsibility on government and others like us to help get the policy right, public scrutiny being generally absent from this area of national policy. I sense that today there is certainly a need for better objectivity in energy debate.

We have a proud history of leadership in science and engineering in the UK, and rather than the energy sector be characterized by conflict and opinion I hope that we can help to champion UK leadership in this field, and help to resolve some of these issues through better collaboration and transparency in debate.

Thank you.