

## DINNER/DISCUSSION SUMMARY

Energy policy: selecting the right options for future electricity supply

Held at The Royal Society on 7<sup>th</sup> November, 2012

The Foundation is grateful for the support for this meeting from the Energy Industries Council, the Michael John Trust and the Nuclear Industry Association.

- Chair:** **The Earl of Selborne GBE FRS**  
Chairman, The Foundation for Science and Technology
- Speakers:** **John Hayes MP for South Holland and The Deepings**  
Minister of State for Energy, Department of Energy and Climate Change  
**Dr Andrew Spurr**  
Managing Director, Nuclear Generation, EDF Energy  
**Dr John Loughhead OBE FREng**  
Executive Director, UK Energy Research Centre
- Panellist:** **Dr Paul Golby CBE FREng**  
Former Chairman and Chief Executive, E.ON UK

MR HAYES outlined the objectives of the Government's energy policy which lay behind the draft Energy bill. They were to develop a new strategy so that the best energy mix would be delivered to meet demand. Substantial new generating capacity was essential as existing generation capacity was retired and demand grew, possibly doubling by 2060. The government must ensure that supply was adequate and secure by incentivizing investors to provide the capital; by keeping the costs of energy to industry and to householders as low as possible; and by delivering supply through a mix of means of generation which would meet the target of an 80% reduction in CO<sub>2</sub> by 2050 from 1990 levels – The Carbon Plan<sup>1</sup>. These aims could only be met through encouraging and employing diverse sources of generation. We must not avoid relying on only one technology; and the structure laid out in the Bill should provide a flexible structure for the support of a range of technologies.

The aim was to give certainty and clarity about policy and government support, so that investors would have confidence to invest. Long term contracts were necessary, with a full understanding of capacity restraints. The Energy Bill had been published in draft, and made subject to lengthy parliamentary and outside scrutiny in order to build a consensus about the best path forward, in the hope that future governments will not find the need to undertake major changes to the regime. On the various energy sectors, investment in renewables was high, but the costs of supply still remains too high. The costs

should fall as more capacity was created and technologies improved. The Bill's provisions aimed at stimulating investment in renewable technologies. Nuclear was crucial to future supplies - it now supplied 16% of demand - but most plants were nearing their end of life. New plants must be built, as nuclear was the cheapest non-carbon fuel generation option. He was glad that investors in new nuclear plant were coming forward, such as EDF, Centrica and bidders for Horizon.

Carbon capture and sequestration (CCS) is an area where the UK should be a world leader. It would provide new jobs and help the environment. The Government had launched a competition to select the most promising project and was providing £125m for research.

Gas was also an essential element of the mix. It provided the flexibility in supply between the fixed nuclear load and the variable loads from renewables. It was efficient, the least costly low carbon fuel and he saw it providing 30% to 40% of the mix by 2020. Shale gas could be an important element in the future but its exploitation in the UK depended on an effective regulatory structure that the public trusted. The government would soon publish a gas generation strategy.

Offshore supplies of both gas and oil needed to be further exploited, and the Bill made provision to encourage new developments.

DR SPURR agreed with the Minister on the vital need to increase generation capacity to meet increased

<sup>1</sup> [www.decc.gov.uk/en/content/cms/emissions/carbon\\_budgets/carbon\\_budgets.aspx](http://www.decc.gov.uk/en/content/cms/emissions/carbon_budgets/carbon_budgets.aspx)

demand, replace the existing generation stations when they were decommissioned, as well as to meet the 80% CO<sub>2</sub> reduction target.

While security of supply and price had long been policy concerns, environmental issues were now increasingly important. The recent New York experience showed how important secure electrical supplies were to the support of society. North Sea oil and gas fields were declining; he was doubtful that shale gas would be a silver bullet to replace offshore production.

40% of electricity generation needed to be replaced at a cost of £110bn. EDF already supplied 50% of non carbon emissions, and it would continue to invest to help meet the 2050 target. It was investing in off-shore wind and CCGT stations in Nottingham. But nuclear was the key; no new stations had been built since Sizewall B. EDF would like to build four new stations and work was well underway with investment for a new station at Hinkley Point, which would provide jobs and skill training and benefits to the local economy. However, certainty and clarity about future revenue streams must be in place for the project to go forward. Final investment decisions would need to be taken before the end of the year. Hence the importance of the Bill; he hoped it could pass through Parliament rapidly. We must get the regulatory structure right; if we don't, costs of meeting the targets will be much higher. But failing to meet them could incur even greater costs in the long run. Reducing demand also had a role to play and EDF was co-operating fully with government's initiatives to reduce household fuel use.

DR LOUGHHEAD showed many charts which outlined various scenarios for the future, set against the IEA base line of supplies in 2008 and world energy demand in 2035. These showed that without policy changes, supplies would still come largely from coal and hydrocarbons; but with changes in policy supplies from other sources could largely replace them. The same is true of the UK. Without a renewables obligation requirement, carbon floor price and no carbon reduction commitment, carbon emissions would continue to rise. With an incentive for generation from renewables and a carbon price they could start falling, but there would still be a gap between the target and achievement.

Nuclear would be the most important source of fuel to replace carbon fuels if the government wished to build in other factors, such as low gas price and not relying on more than 40% of fuel from any one source (resilience) it increased further the share of nuclear and renewables, if the carbon reduction target was to be met.

It was clear, however, that even with policy changes, world primary energy sources would still be dependent on hydrocarbons, including coal. The impact on the number of households in fuel poverty brought about by constraining the choice of energy sources must also be considered. Unless demand was reduced electricity and gas prices would risk and could become unacceptable to the public and politicians who supported substantial price rises could be unelectable.

A central feature of the following discussion was the implications of trying to meet the 80% carbon reduction target. Speakers agreed that the additional costs which would be imposed on consumers through constraining the use of cheaper energy sources would be intolerable, unless demand could be effectively reduced. While applauding attempts to get people to use smart meters, and insulate houses, these would not be sufficient. If one looked at consumer usage, it was clear that much energy demand was utilized in maintaining a modern life style. If we were serious about reducing global energy demand, we had to consider the impact on life styles. The 80% target applied to electricity generation, but the use of hydrocarbons for transport was also substantial. Perhaps electric cars could replace petrol driven transport in the long run but there were doubts that this would happen.

Carbon accounting was complex. Carbon consumption measures should take account of the carbon emitted in the manufacture of imported goods not just the carbon emitted in the UK.

The government needed to explain why only one use of hydrocarbons had been singled out. The public did not understand either the 80% carbon reduction target for the UK, or the global objectives for carbon reduction. The government had done little to prepare people for the inevitable costs of renewing the existing energy infrastructure and building new non-carbon sources in the UK, or for giving them an understanding of what changes in life style would be necessary to meet global issues. Household energy costs might well double in a comparatively short time. Unless there was an engagement with the public, governments would be forced (as they too often have been in the past) into short term and environmentally or economically damaging fixes. Engagement meant entering into a dialogue, not lecturing. It meant being open about whether we will meet the 80% target. If it is not possible to meet it without changes to lifestyle, demand and investment, then it is important to be frank.

Participants doubted whether the 80% target was achievable, and were sure that the public did not understand why it was important, (was it just an EU fad?) and what needed to be done to meet it.

The message of the Stern report, that the cost of doing nothing would eventually be greater than acting now, had been lost because the bigger cost fell on future generations, not present voters. Was it possible in a democratic society to overcome this hurdle? China was cited as an example of a country which was pouring vast sums into demand reduction, energy security and environmental improvement. But China was doing this because of a lack of past investment to meeting high growth in the economy and rises in local air pollution in some cities to unacceptable levels.

While speakers supported the aim of the Bill, to give flexible support to different technologies, and not rely too heavily on a single technology, they were concerned about the ability of Ministers to make sound decisions about costs and prices in long term contracts. Past attempts to forecast demand and the mixture of fuel sources had proved very unreliable, as international prices for oil, gas and coal had differed so markedly from the forecast trends. Would investors find any scenario painted by Ministers sufficiently credible to be prepared to invest? Would the contracts end, if technology costs fell, imposing demands on taxpayers, or giving entrepreneurs excess profits. Would it be possible to insert break clauses or cost sharing into the contracts? The problem with such arrangements was that they would reduce certainty for the investor.

Speakers also questioned some of the economic and technological assumptions that had been made. The costs for industry were likely to add to our problems of competition with other countries of energy intensive industries, and increase import costs. Had weight been given to the balance of payments? The capital resources any company must have to invest in building new nuclear stations were very large and companies expected a return on that capital commensurate with the risk. Few companies have the financial strength to make these sorts of investments. Participants warned about over optimism about competition or the government's negotiating powers. True, the Bill promised support for exploiting indigenous sources, and mention had been made of shale gas, but it was not clear that the UK resources would be competitive with outside sources (e.g. Australian coal or Norwegian gas) or that, because of environmental concerns, shale gas development might be delayed.

Two other technologies were mentioned - fusion and underground coal gasification. Fusion was a technology which was still seen to be a very long way off before it could be considered a realistic option. However, coal gasification could have real merit. It was, in effect, another version of CCS, which the

government did support. At present there was no incentive to invest in it, and unless the government made it a priority, it would remain a possibility, not a project. Concentrated solar power seemed a plausible option, but it was dependent on covering large areas of Africa with panels and relying on transmission lines to transport the power to the UK. Security would be an issue.

The issues facing policy choices for electricity supply were complex; there was a plethora of possible solutions. What stood out was that the low carbon future was possible, but only if a very different mix from today was established, and that people would accept a different life style and higher costs. The problems were not so much technical as funding and financial. The real danger is that policy seems to be being established with no real understanding of the costs. For a democracy, security of supply must come first: no government survives if the lights go out. Security of supply will not be delivered without huge investment; so it must be the government's aim to ensure that investment happens by incentivising the investors and for some options accepting the consequent carbon emissions.

Yet they cannot ignore the cost of electricity to industry and householders, or the need to reduce emissions. Properly guided, with sufficient incentives, such investment can be realised while at the same time keeping costs as low as possible, and working towards carbon reduction targets. The Bill provides a starting point, but its structure is complex and whether, and how, it will work unclear. But unless the public are engaged, accept the costs of security of supply and the need for carbon reduction, the Government risks missing its policy aims.

Sir Geoffrey Chipperfield KCB

Useful web links are:

BP  
[www.bp.com](http://www.bp.com)

Chatham House  
[www.chathamhouse.org](http://www.chathamhouse.org)

Centrica  
[www.centrica.com](http://www.centrica.com)

Department of Energy and Climate Change  
[www.decc.gov.uk](http://www.decc.gov.uk)

Dr Dieter Helm - Oxford University  
[www.dieterhelm.co.uk](http://www.dieterhelm.co.uk)

Energy Industries Council  
[www.the-eic.com](http://www.the-eic.com)

Energy Technologies Institute  
[www.eti.co.uk](http://www.eti.co.uk)

Energy UK  
[www.energy-uk.org.uk](http://www.energy-uk.org.uk)

Engineering and Physical Sciences Research Council  
[www.epsrc.ac.uk](http://www.epsrc.ac.uk)

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The Foundation for Science and Technology  
[www.foundation.org.uk](http://www.foundation.org.uk)

Hitachi  
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Horizon Nuclear Power  
[www.horizonnuclearpower.com](http://www.horizonnuclearpower.com)

Natural Environment Research Council  
[www.nerc.ac.uk](http://www.nerc.ac.uk)

Nuclear Industry Association  
[www.niauk.org](http://www.niauk.org)

Oxford Institute for Energy Studies  
[www.oxfordenergy.org](http://www.oxfordenergy.org)

RenewableUK  
[www.renewableuk.com](http://www.renewableuk.com)

Royal Academy of Engineering  
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