

DINNER/DISCUSSION SUMMARY

CLIMATE CHANGE: TECHNOLOGY FOR MITIGATION AND ADAPTATION

Held at The Royal Society on Tuesday, 22nd November, 2005

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Council for the Combined Laboratories of the Research Councils (CCLRC)
Engineering and Physical Sciences Research Council (EPSRC)
Natural Environment Research Council (NERC) and
Particle Physics and Astronomy Research Council (PPARC)

Chair: **The Earl of Selborne KBE FRS**
Vice President, The Foundation for Science and Technology

Speakers: **Sir David King KB ScD FRS**
Chief Scientific Adviser to the UK Government and Head, Office of Science and Technology, DTI
Hon. James L Connaughton
Chairman, Council on Environmental Quality, The White House, Washington D.C.

SIR DAVID KING outlined the information already known to scientists about rising CO₂ levels in the atmosphere, and the forecast rise in sea levels, rise in flood events, hotter summers, increased droughts, more destructive hurricanes and retreat of glaciers. As with the December tsunami event, the facts and their likely consequences are known. Governments could choose to ignore them, but would then have to live with the consequences. CO₂ concentration had risen from a historical 200 ppm to, currently, 381 ppm, and could rise to 550 ppm in 2050. Present problems arose from the delayed impact of CO₂ increases from the past, and these were irreversible. Furthermore, levels would continue to rise from past emissions until 2030. The crucial task is to prevent them from rising to such a level that they threatened the melting of the Greenland ice sheet (which would cause sea levels to rise 6m) or, even more catastrophic, the melting of the Antarctic ice sheet. But, even if this were successful, there is a serious problem of transition in changing policies and practices, to get to that point. It is a question of both adaptation and mitigation in industrial processes and domestic habits. There is no one global solution: it is essential to look country by country at what needs to be done – what the US could and might do, is different from the UK. But change needs to start happening now, with an urgent need to move to low carbon emission sources of energy, and to start addressing the threats from rising sea levels and other consequences of the existing change in climate. This was already starting to happen – the UK has increased expenditure on flood protection from £200m p.a. to £500m, and there were significant moves globally in the private sector – such as BP's carbon emissions trading using more scheme and Wal-Mart's policy on renewable energy. But much more is needed.

MR. CONNAUGHTON said that US policy stemmed from the belief that climate change or other environ-

mental concerns should not be looked at in isolation. It was essential to maintain sustained economic growth, because only that way could the investments in new technology and practice to meet environmental concerns be afforded. But this did not mean that the US was not well aware of the problems and had not been taking vigorous actions to meet them – greenhouse gas emissions were down by 0.8% since 2000, in spite of increased population and economic activity; power plant pollution was down by 70% and diesel engine pollution by 90%. Tax law changes had promoted investment in energy efficient equipment. Key elements of US climate change policy were slowing the growth of emissions (reducing GHG (greenhouse gas) intensity by 18% in 10 years); promoting international co-operation, and investing in science and technology in order to lay the groundwork for current and future action. \$2bn p.a. was earmarked for scientific research and \$3bn for technology programmes. These would consider both short and long-term options, ranging from transportation to nuclear fusion. The hydrogen fuel initiative, and carbon sequestration technology were important elements in the strategy. The US would need to use its coal resources, and the priority was to develop clean coal technology; nuclear energy was now being seen as a vital component of fuel policy. In short, the need was to implement policies, which looked at the whole development agenda, promoted economic growth, enhanced security, reduced pollution and mitigated greenhouse gas emissions.

The ensuing discussion took place against a general acceptance of the catastrophic consequences of uncontrolled GHG emissions. There was no dispute about the realism of the graphic scenario presented by Sir David. The problems were of leadership, to ensure that politicians and the public understood the seriousness of the problem; of establishing the priorities for the appropriate scientific and technical means of miti-

gation, and of managing the short term costs of transition against the long term benefits of avoiding the consequences of future GHG emissions. Some questioned the assumption that leadership would become effective only if it were seen to be part of a long term policy of economic growth: would that be seen as realistic by low lying countries desperately concerned about the consequences of rising sea levels; by developing countries, such as China, which put economic growth ahead of other goals, or by comfortable rich countries, who valued regulation which hindered innovation, and had adopted planning processes which hindered new development? On the other hand there was a good deal of evidence that China and India were well aware of climate change problems, and were investing large sums in hydroelectric and other non carbon sources to mitigate GHG emissions. But the short-term costs were inevitable. It would always cost more to build a conventional power station than a CO₂ free station, unless either regulation stood in the way, or the price of emitting GHGs grew substantially. There was much to be said for carbon pricing at a level which provided strong financial signals to reduce emissions. But, inevitably, there would need to be global agreement, to keep competition between countries on a level playing field. And the short-term problem remained. If, for example, the price of carbon went up, fuel prices would go up, until generators had changed their processes to emit less carbon. What politician would welcome advice, which told him to agree to gas or petrol prices rising now, with the prospect of reductions in the future?

Further themes in the discussion were whether the possible contribution of renewables had been sufficiently recognised; whether sufficient account had been taken of possible major scientific or technical advances, and how to reduce demand. There was no doubt that renewables did have an important role to play, but it was not evident how important that would be. Many of the obstacles in the way, for example, of wind or wave power, or the use of biodiesel, stemmed from government regulations on safety, health and land use planning. Governments should seek to overcome these as well as offering incentives for renewables to play an increasing role in generation, but it should be for the market to decide which were the technologies in which investment would be profitable. The more money there was for investment in innovative technologies, the more likely it would be that technological advance would be swift. But at present, renewables were seen as supplementary to other power sources, rather than main stream. Scientific and technological breakthroughs would certainly be made, but the question was one of timing. Could, for example, a hydrogen economy be introduced within a time scale that meant we need not worry about other means of reducing GHGs?

Reducing demand was important – energy efficiency had been a key policy proposal in the UK Energy White Paper in 2003; we needed to know how successful it had been. But demand reduction was not a simple process: for example, reducing aviation fuel consumption depended on global agreements and local regulations; compulsory purchase of energy effi-

cient domestic equipment or cars affected household budgets and restricted individual choice

Speakers also suggested that there would be advantage in creating, or acknowledging, a liability for the damage caused by climate change. Indeed, such a proposal had already been made by small islands, which might disappear with rising sea levels. But it was doubtful if this would be practicable as a global policy. Indeed, it could have the significant disadvantage of removing, or diluting, the political responsibility of governments for dealing with what were essentially issues requiring statesmanlike leadership, and the ability to make harsh decisions. Not that specific financial consequences for failing to take account of climate change were unacceptable – note the effect of increased insurance premiums on flood-prone areas in the UK.

Sir Geoffrey Chipperfield KCB

The presentations from the speakers are available on our web site - www.foundation.org.uk .

Background information:

**Department for Environment, Food and Rural Affairs;
Climate Change:**
www.defra.gov.uk/environment/climatechange

Intergovernmental Panel on Climate Change:
www.ipcc.ch

Kyoto Protocol:
unfccc.int/resource/docs/convkp/kpeng.html

Sir David King's Zuckerman Lecture 2002:
www.foundation.org.uk/801/311002_2.pdf

Office of Science and Technology:
www.ost.gov.uk/about_ost/csa.htm

Hon. James L. Connaughton:
www.whitehouse.gov/ceq/connaughton-bro.html

House of Lords debate on climate change:
www.publications.parliament.uk/pa/ld199900/ldhansrd/pdvn/lds05/tx/51110-04.htm#51110-04_head3