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Dear Allan,

## **FORESIGHT ENERGY FUTURES TASK FORCE - SUBMISSION TO PIU ENERGY POLICY REVIEW**

### **BACKGROUND**

The Foresight Energy and Natural Environment Panel (ENE) set up the Energy Futures Task Force (EFTF) in January 2000 (see list of members in Annex). The EFTF produced a consultation document, 'Fuelling the Future' (November 2000), based on an analysis of the implications for the future of energy needs and supply of a set of scenarios developed for Foresight (Environmental Futures, March 1999). This was distributed widely and responses invited over a three month consultation period. In addition regional consultation events were held, at Middlesbrough (4 November 2000), Belfast (11 December 2000) and Stirling (15 February 2001). The final report of the EFTF is a synthesis of the knowledge, experience and research of the members and the views obtained during the consultation process. The report, 'Energy for Tomorrow – powering the 21<sup>st</sup> century' (August 2001) forms the submission of the EFTF to the PIU Energy Policy Review. The report accompanies this letter. Further copies may be obtained (free of charge) from the Foresight web site (<http://www.foresight.gov.uk>).

In addition the ENE Panel tasked a small sub-group to prepare a high-level report on an R&D strategy for electricity generation with near to zero emissions. This report will be submitted to the Energy Review separately.

**dti**

Department of Trade and Industry

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## SUMMARY

Looking ahead to 2040, this study focuses on what needs to be done to develop a mix of energy sources and an infrastructure that will ensure a competitive future for the UK.

In this time span, North Sea oil and gas will be in decline and most estimates are that global production of these fuels will have peaked. Failing determined action to reduce the need for energy, global demand will have continued to increase and may have doubled. Against this background there is concern that anthropogenic CO<sub>2</sub> is causing global warming. Either for this reason, or because oil and gas become scarce and expensive resources, the next forty years will see a shift in the mix of energy sources away from fossil fuels.

Because of the long lead times and long life of energy plant and infrastructure, decisions made in the next ten years will have effects stretching to 2040 and beyond. Highlighting research that therefore should be begun now to ensure that we are able to make the right choices in the future, the report does not try to pick technology 'winners'.

Analysing four scenarios with widely-ranging starting assumptions resulted in a short-list of key actions that should be addressed no matter what direction the future takes. These centre on the infrastructure, implementation, decommissioning, regulatory and education issues that will enable new technologies to be adopted and to achieve their potential as they are needed.

Among the key non-R&D issues, energy efficiency in end-use technologies and education were identified as being particularly significant. Energy efficiency measures can play a major role in moving towards sustainability by reducing energy demand. Implementation requires collective action, however, and so can only be achieved through widespread public co-operation.

The requirements in education include the continuing need to attract engineers and scientists to work in the energy sector, the encouragement of an energy conservation mentality, and the provision of accurate and unbiased energy information for decision makers. If the anticipated changes in the energy system are to take place, then public awareness of real energy issues must be increased. It is only in this way that planning decisions can be based on balanced arguments rather than first perceptions.

Three major R&D themes and recommendations emerge from the short-list:

### ***ELECTRICITY INFRASTRUCTURE MIGRATION***

Whatever the mix of energy sources it seems certain that more, smaller generation stations will be used in the future. These will be sited either at the point of supply, as for wind, wave and biomass power, or at the point of demand, as for combined heat and power (CHP) stations and embedded generation.

**Long-term R&D must begin now to determine how best the UK can move from an infrastructure based on relatively few, large plants to one with many, smaller generators that are geographically dispersed.**

If we neglect this we may fail to realise the full benefits of renewable energy, for instance by high project costs, by producing instabilities in the system, or by not being able to use the best sites (which are often remote from the point of demand).



### ***TRANSPORT FUEL MIGRATION***

It is not yet clear what energy sources will replace oil-derived fuels for transport, although vehicle (including water- and air-borne) manufacturers and energy companies are actively researching this. Whatever the energy source, changes to the supply infrastructure will be required, ultimately greater than those needed when the UK changed from town gas to natural gas in the 1970s.

**R&D must be started and co-ordinated to ensure that the UK is able to manage the change from oil-based transport fuels. This includes ensuring an appropriate regulatory environment and enabling the UK to take a full part in international decision-making.**

If insufficient attention is paid to this, UK business may be seriously disadvantaged by prolonged uncertainty and unpredictable costs.

### ***NUCLEAR POWER***

In the UK the last of our existing nuclear power stations is scheduled to close in 2035. As supplies of gas become more restricted and expensive it may be necessary to replace gas-powered generating capacity. If this CO<sub>2</sub>-emitting plant must be replaced by zero or close to zero emission generators, the problem becomes much greater - unless nuclear power is kept as part of the energy mix.

**A full re-examination must be undertaken of the nuclear power issue. If a nuclear power component is required over the long term, then the UK must maintain and develop its expertise, to keep the option of designing, building, running, and eventually decommissioning, new plant. Much of this activity will take place through international co-operation and will focus on cheaper, more efficient and easier to decommission power stations. The issues of planning, waste disposal and public confidence in safety must be addressed with further research.**

This is essential if the UK is, at a minimum, to be in a position to be an intelligent customer should it prove necessary to buy nuclear plant in the future.

Offering zero CO<sub>2</sub> emissions and small amounts of relatively short-lived waste, fusion power is an attractive option. Fusion research is an area where the UK is world class and participates in the major international programme. However, on present projections for the construction of commercial fusion power plant, it is beyond the report's forty-year horizon.

Yours sincerely

John McMullan  
Chair, Foresight Energy Futures Task Force



## Annex– List of Energy Futures Task Force and Energy and Natural Environment Panel Members

### ENERGY FUTURES TASK FORCE

Professor John McMullan (Chair)  
University of Ulster

Larry Atwood succeeded by <sup>1</sup>  
Dr Edward Clarke  
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and the Regions

Paul Hernaman  
The National Grid Company plc

Dr Alan Heyes  
Department of Trade and Industry

Arthur Hoare  
The Northern Energy Initiative

Dr Eoin Lees  
Energy Saving Trust

Peter Madden <sup>2</sup>  
Green Alliance

Professor Jim McDonald  
University of Strathclyde

Dr John McGuinness  
Health and Safety Executive

Andy Oliver  
Shell International BV

Nick Otter  
Alstom Power

David Porter  
Association of Electricity Producers

David Sigsworth  
Scottish and Southern Energy plc

Ian Vann  
BP

### PANEL

Hugh Williams OBE (Chair)  
ECOTEC Research and Consulting Ltd.

Dr Kevin Brown  
AEA Technology Environment

Dr Patrick Haren <sup>3</sup>  
Viridian Group

Dr Alan Heyes  
Department of Trade and Industry

Chris Newton  
Environment Agency

Andy Oliver  
Shell International BV

Nick Otter  
Alstom Power

Sara Parkin  
Forum for the Future

Professor Jane Plant CBE <sup>4</sup>  
British Geological Survey

Dr Peter Saunders succeeded by <sup>5</sup>  
Dr Alan Apling  
Department of Transport, Local Government  
and the Regions

Professor Jim Skea  
Policy Studies Institute

### SECRETARIAT

Dr John Cockaday, Assistant Director

Tom Ridge <sup>6</sup>

Neil Pitter

Jeremy Rogers <sup>7</sup>

Dr Mike Briers <sup>7</sup>

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<sup>1</sup> January 2001

<sup>2</sup> Until April 2000

<sup>3</sup> Until January 2000

<sup>4</sup> Until September 2000

<sup>5</sup> March 2001

<sup>6</sup> Until June 2001

<sup>7</sup> Until December 2000