

# Energy policy - the impact of technical innovation

*(A joint meeting organised with the embassies of France and Germany)*

Held in the rooms of the Royal Society on 25 October 2000

Sponsored by: BP, Daimler Chrysler, The Embassy of France in the UK, EMTA - Scotland and Schlumberger

## *In the Chair:*

Sir William Stewart, President, The Royal Society of Edinburgh

## *Speakers:*

Dr Andrew Mackenzie Group Vice President  
Technology, BP

M. Claude Mandil President de l'Institute francais du  
petrole (IFP)

Herr Hans Michael Huber Deputy Director, Fuel Cell  
Project, Daimler-Chrysler

The opening speakers referred to a number of factors relevant to technical innovation in the energy sector. There was a clear concern on the part of the public and governments to reduce emissions - in particular to produce less carbon per unit of useful energy. Sustainability was also important against the background of the current energy supply situation. For example, taking a 21st century perspective, gas and coal were likely to be plentiful but oil supplies were limited. Finally, demand, particularly in the developing world, would create a continuing energy thirst. World-wide 2 billion people lacked an electricity supply and for them coal and oil sources offered the best prospects. Electricity and gas distribution required expensive infrastructure which developing countries would not be able to afford.

Technology could address some of these issues. Energy efficiency could be improved by technologies aimed at developing more efficient engines and vehicles and at reducing waste. Reduced carbon fuels, for example, liquid natural gas could be exploited, although the costs of transporting gas because of the infrastructure required were high - certainly higher than the costs of transporting oil. There were no serious alternatives to oil in the short term for many energy requirements and efforts to improve its performance in terms of efficiency and cleanliness were very important. Technological developments aimed at extending existing oil supplies were also needed. Efforts should be directed at increasing recovery rates, the development of new materials for use in the deep sea and the better exploitation of heavy oils and tar sands. A multi-disciplinary approach to such developments might be needed

involving increased computer power (for example to facilitate better seismic analysis) and, perhaps in the longer term, the life sciences.

It was argued that the control of emissions was a key area for further progress if government imposed targets were to be reached. There was considerable pressure on car manufacturers. Under existing technology further emission control measures led to expensive engines and in any case would not achieve government targets. Against that background Herr Huber described the work being done by Daimler-Chrysler on fuel cell electric vehicles using hydrogen as an energy source. Methanol was another possible energy source which could be converted to hydrogen on board the vehicle (CO<sub>2</sub> was produced but less than in existing engines). Hydrogen was both efficient and clean but there were storage and safety considerations which suggested that it might be most appropriate for fleet users. For the general public a methanol based technology might be more appropriate. Fuel cell vehicles had many operational advantages and there was the possibility of such vehicles being on the market by 2004. Daimler-Chrysler believed the issue was not whether such vehicles would come but when and how. Other speakers argued that the move to a wider hydrogen-based energy economy - though a promising line of development - was at least a decade away.

In discussion there was a recognition that efforts at improving energy efficiency in engines were important but two concerns were expressed. First it was emphasised that such efforts should not compromise safety. Secondly there was concern that they were of limited significance in the long term. In response it was argued that there were still important gains to be made through improving engine efficiency and that profits from improved efficiency were necessary to fund the research and development which would lead to more major developments. Safety would remain paramount. As regards the long term, there was general concern that there was no single solution to the energy issue. A balanced mix of sources would be needed - including nuclear energy.

In the context of technical innovation, some concern was also expressed about other environmental issues. Forms of possible pollution other than carbon - SO<sub>2</sub>, fluorocarbons, for instance - required attention. There was also the issue of the extent to which new developments in, for example, car manufacture might give rise to re-cycling problems. Fuel cells contained platinum.

There were references to other possible sources of energy. CO<sub>2</sub> and ammonia were mentioned but neither was seen as presenting credible ways forward.

The future of distributed power technology was also raised. There was however some uncertainty about how this might

develop beyond existing applications such as heat and power projects. Cost was a factor which might aid such developments because of the high infrastructure costs associated with transporting electricity but arguably smaller units gave rise to security and safety issues which pointed the other way.

In further discussion it was noted that the issues of nuclear energy and renewables had not been adequately addressed. One speaker argued that there were serious problems associated with the reliability of electricity supply produced from alternative sources of energy. These related, for example, to voltage and frequency control which were important in certain types of manufacturing where rotation speeds had to be accurately controlled for example - paper manufacture. A balanced mix of resources required a nuclear element to ensure reliability. Another speaker stressed the importance of nuclear energy production for Scotland and questioned whether coal, gas or renewables could adequately respond to energy demands in the 21st century.

It was also noted that if a new nuclear power station were proposed, the UK now probably lacked the ability to construct one. Skills needed would have to come from other countries and this led to a reinforcement in discussion of a general point that energy policy in this respect and others had to be seen as an international issue.

*Mr Gerry Wilson*

*The discussions were held under the rule that nobody contributing to them may be quoted by name after the event. None of the opinions stated are those of the Foundation for Science and Technology, since, by its constitution, the Foundation is unable to have an opinion.*

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