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SUMMARY OF THE NATIONAL REPORT SUBMITTED BY THE UNITED KINGDOM
OF GREAT BRITAIN AND NORTHERN IRELAND*

* The designations employed, the presentation of material and the views expressed in this paper are those of the submitting Government and do not necessarily reflect the practices and views of the Secretariat of the United Nations in any of these respects.

SUMMARY OF UK NATIONAL PAPER

RENEWABLE ENERGY SOURCES IN THE UK

Energy is consumed in the UK mainly to provide heat, transport and electricity. Renewable sources, such as draught animals and fuel wood, originally supplied all our needs; shortage of land and the cheapness and versatility of coal, oil and gas, have however led to a substantial decline in the use of renewable sources.

RD AND D ON THE RENEWABLE SOURCES

With the rising cost of fossil fuels, universities, research institutes and industrial firms, in the UK, with the assistance of government departments and of consulting engineers, have studied the development of commercially viable techniques for the harnessing of new and renewable sources of energy, including those to meet small-scale local needs.

THE FUTURE OF RENEWABLE ENERGY SOURCES

The exploitation of many renewable sources is technically possible. The factors limiting the contribution which they can make to our future energy requirements are relative cost, reliability of new systems, and slow penetration of existing markets. The attached table classifies renewable sources in the UK by the form in which they can most readily provide energy, and by their degree of reliability or constancy.

HEAT SUPPLY

Solar energy is already in use in the UK, on a modest scale, for water heating. Research is being directed towards the development of space heating systems and the understanding of the likely cost and performance of such systems. No use is currently made of geothermal energy, although suitable hot aquifers are being investigated in the south of England. A small amount of biological waste is used in combustion, and research continues. In addition, work is being carried out on fuel wood and crops, by research workers with first-hand experience in developing countries.

TRANSPORT

Liquid fuels produced from biomass could provide a useful supplement to petroleum and electricity for transport. Since the UK is densely populated, only marginal or fallow land can be spared for specially grown fuel, but there is potential for the conversion of the waste products of existing activities.

ELECTRICITY

The renewables, apart from hydro, make no contribution at present to the UK's centralized electricity supply system. Wind generation, at least on the most

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windy sites, is almost economic, but suitable sites are limited. The potential wave and tidal power available along the UK coastline is considerable, although substantial further capital investment will be required to exploit this. Preliminary work in Cornwall indicates that geothermal hot rock could well provide steady power at reasonable costs, although developments are at a very early stage.

OBSTACLES TO THE RAPID DEPLOYMENT OF RENEWABLE ENERGY SOURCES IN THE UK

The chief physical constraints are the time necessary to develop new and economic technologies, and particularly hardware which can withstand the elements, and the variability of some sources, with the consequent need for either a conventional back-up supply or storage. As an industrialized country the UK must also take account of its existing huge investment in conventional energy sources and distribution systems - change is expensive.

There are other limitations, for example: biofuels may have to compete for land with food crops; large tidal barrages and hill-top aerogenerators have a major effect on the environment; customers familiar with fuel oil may be unwilling to convert to solar energy. To remove or to avoid these obstacles requires more than the development of improved technologies, and the research programme in the UK is addressed to such issues.

INTERNATIONAL CO-OPERATION

Although in developing new and renewable sources of energy each country faces difficulties specific to her own circumstances, many problems are common to all, and all can benefit from international collaboration. The Overseas Development Administration has funded many projects, ranging from major hydroelectric schemes to the development of more efficient wood-burning stoves. It is important to assess the way in which the new technologies will fit into the economy and society of each country, in order to minimize the wastage of resources by inappropriate or premature investment.

TABLE 1

Source	Form of supply most readily available	Constancy of supply	Judgement of contribution that may be in use in the UK early next century (MTCE)	State of development
Geothermal Aquifers	Low-temperature heat (<100°C)	Excellent	5	Resource assessment and early trials.
Geothermal Hot, dry rock	Medium-temperature heat (up to ~250°C) Electricity generation	Excellent	Small	Research phase.
Solar	Low-temperature heat (<100°C)	Poor. Daily, seasonal variation. Least available when most needed.	5	Commercially available for water heating. First space heating systems coming on to the market.
Biomass	Fuels (solids or gases) convertible to heat by combustion	Good	6	Already in commercial use for combustion of wastes; development required of both technology and infrastructure, for wider use for production of solids, gases and liquids.
Biomass	Fuels (liquid) for transport	Good	6	Research phase.
Wind	Electrical	Poor. Daily, seasonal and annual variations. Most available in winter.	5	Detailed designs of horizontal axis 3-4 MW machine now moving into construction phase. Early designs of vertical axis machines being made. Studies of offshore resource prospects in hand.
Wave	Electrical	Poor. Seasonal and annual variations. Most available in winter.	Probably small	The Programme now focuses on two designs, the Bristol cylinder and Lancaster bar. The central problem is whether costs can be brought below 5p/kWh.
Tidal	Electrical	Good. Daily and monthly variations but predictable.	10	A pre-feasibility study of the Severn Estuary suggests that a barrage might produce electricity at a cost not far above that of a coal-fired station.
Hydro	Electrical	Excellent/moderate depending on site.	3 (Already 2)	Well proven technology both at home and abroad.
