



British  
Geological  
Survey

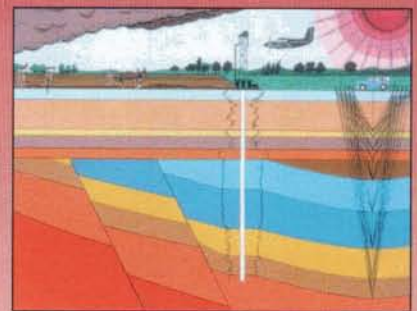
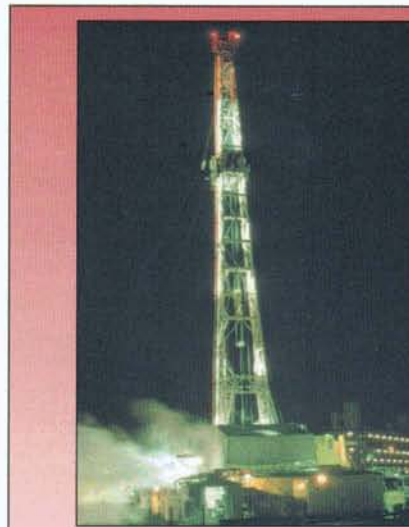
## The search for new and more sustainable resources

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Keyword

The present global economy is sustained by fossil fuels which are increasingly in short supply. Additionally, many scientists now consider that the unrestricted use of fossil fuels may be having a damaging effect on the global environment, contributing significantly to the greenhouse effect. The global community might have to choose between the continued year-on-year economic growth we have become accustomed to and adaptation to a different way of attaining growth.

Society is facing a period of potential energy shortage despite the fact that amounts of fuels available for use are theoretically quite large. Fuels range from non-renewable sources like nuclear materials (for example uranium and thorium) and fossil fuels such as coal, oil and gas, to the renewable energy sources, such as geothermal energy. Technological progress over the last one hundred years has meant that human muscle power has been replaced by high-energy-cost machines, and new high-energy-cost materials such as aluminium and plastics. Increased personal comfort, mobility and a high level of waste all contribute substantially to the large rise in energy consumption per head of population. This



Left Testing the geothermal resource at Southampton.

Above Subsurface data acquisition.

high level of energy usage is reliant upon limited stocks of non-renewable fossil fuels.

The BGS has long experience of many aspects of identification, assessment, exploration, mapping and development of fossil fuel resources both in the United Kingdom and internationally. Hydrocarbon prospectivity studies of the United Kingdom Continental Shelf by the BGS on behalf of the Department of Trade and Industry's Oil and Gas Division have been important Survey activities for the best part of three decades. The BGS also provides petroleum geological advice and related services to the Government of the Falkland Islands, a highly prospective area now witnessing the planning of offshore oil drilling activities and further seismic surveys. Similarly, the BGS operates (as principal contractor) a major hydrocarbons project in Papua New Guinea (PNG), funded by a loan from the World Bank to the Government of PNG.

The BGS also carries out specialised research into the behaviour of oil reservoirs during production of the oil or gas. For example, producibility from oil reservoirs is made more efficient and effective if sediment properties such as porosity, the movement of fluids within the pore spaces or fractures of sedimentary rocks, and the mechanisms of sealing the reservoir are better understood. This sort of research can also lead to improved control of methane gas, a contributor to the greenhouse effect.

It has been suggested that if present day man-made emissions of greenhouse gases, including carbon dioxide and methane, continue at the present rate there will be a doubling of the greenhouse effect by the year 2030. Amongst possible ways of reducing carbon dioxide emissions are 1) reducing energy use, 2) using emission-free power generation methods, and 3) disposing of carbon dioxide emissions. The BGS has led a major international project looking into the injection of waste carbon dioxide into depleted oil or gas fields. The methods are technically feasible but expensive, although given the right circumstances it may even be possible to utilise the carbon dioxide gas to improve oil recovery from mature fields.

There may however, come a time when fossil fuels will need to be preserved or deliberately allowed to decline in terms of production and it will be necessary to consider renewable resources. The BGS has for many years been active in the study of geothermal prospects in the United Kingdom and internationally. The extraction of heat from warm water in sedimentary basins (as presently carried out in Southampton) or even development of the hot dry rock resource from certain hot granites, may well come high on the agenda. At one time it was thought that serious development of such prospects would depend solely upon oil prices at any given time. In the future, it may be that energy economics are deemed less important than our burgeoning environmental problems.