

# Low energy, but lots of loot in UK forecast

Energy needs in the UK in the year 2000 will be at most 3% more than in 1976, and may even be 6% less, according to a report published by the International Institute for the Environment and Development last week. The report emphasises the savings that can be made by introducing proven conservation technologies, and allows for a trebling of Britain's gross domestic product (GDP). In contrast, the present official forecast of the Department of Energy (DOE) projects an energy growth of some 35% to 70% by 2000 after allowing for a 20% saving through conservation measures.

The IIED forecast may nevertheless not be extreme. The DOE admitted last week that their 20% conservation figure was a rough one, and said that they had been waiting for nearly a year for a response to it. Their figure was based on consumer research by the Electricity Council and the Gas Boards, advice from the Department of the Environment on the progress of insulation of buildings, "and many other sources", but was open to revision. The IIED report would have its impact on the forthcoming Green Paper on energy futures, said a spokesman, although there was too little time to take it fully into account.

Mr Gerald Leach, the author of the

*A low energy strategy for the UK* (Science Reviews Ltd and IIED) £7.50. Obtainable from IIED, 10 Percy Street, London W1.



report, said last week that far from having an energy gap the UK had "a great deal of room to manoeuvre on supply options, without extreme measures". Much of the necessary conservation technology — such as heat pumps for domestic space heating and efficient internal combustion engines — will become available in the 1980s, he argued, when the devices will begin to replace existing equipment. Cost savings in running the technology will lead to its adoption by the consumer with little or no encouragement from the government, he argues. "We have found that it is astonishingly easy to save energy" said Mr Leach. "We began this work as energy pessimists, but now we are optimists".

Many of the measures are emerging as a result of the 1973 oil crisis, says the report, when it became fashionable as well as expedient to consider ways of saving energy. The effect of this work is mostly yet to come. The Royal Institute of British Architects, for example, has enthusiastically adopted conservation, an attitude which has

already resulted in buildings using half as much energy as before for only a 2 to 3% cost penalty, but building stock is replaced only slowly. In the home, lights, cookers, and heaters will soon enjoy "very substantial increases in efficiency". Small-scale heat pumps, such as the one being designed by the Gas Boards, are "at an advanced stage" and will make a dramatic impact. The motor industry is designing cars with a 50% reduction in fuel consumption. Industry uses 40% of primary energy, "but a large proportion of that is in heating poorly insulated buildings, where strict regulation is on the way" says Gerald Foley, one of the team that produced the report. Indeed the government has already adopted measures which will improve industrial conservation. "The result is that all across the board there is slack" said Mr Leach. "For example, we predict a need for only 26-30 GW by 2000, whereas the DOE assumes 83 GW. Quite clearly there is no need for nuclear; we have assumed 4½ to 6½ GW to keep the industry in business. The breeder reactor could be postponed indefinitely." Even renewable sources were not strictly necessary: the report assumes 4-6 million tonnes of coal equivalent produced in 2000 from alternative sources, compared with 10 in the DOE projection.

The report may, however, have assumed unrealistic substitution rates. The most uncertain element may be the cost of the new technology, and of

## Britain's energy optimist

Gerald Leach, author of *A low energy strategy for the UK* (see above), may see himself as an energy optimist—but the *Financial Times* last week saw it differently. Thinking no doubt of the markets lost to the energy supply industry, the sub-editor had headlined the story about Leach's report "Bleak forecast for UK energy". But Gerald Leach's interests do not lie with big business.

Gerald Leach is 44, and left science writing and broadcasting (for the BBC and the *Observer*) in 1972. At the *Observer* he had become interested in the works of Commoner and Ehrlich, and had accumulated "shelves of fascinating books with no time to read them. As a journalist I felt I was skating over an ocean." Then he met a representative of the Ford Foundation at the Stockholm environment conference, cheque book



in hand, and his new career began.

He produced a series of reports for various bodies on energy matters, including *Energy and Food Production* (for IIED), *Fuel conservation: options for aviation* (for OECD), *Nuclear energy balances in a world with ceilings* (for IIED), and gave evidence on energy futures to the Windscale inquiry on reprocessing. He defended "Limits to growth" at the Royal Society, did "a big splash" in the *Observer*; but "I began to feel uncomfortable. Early on he realised the importance of "saturation" effects—such as a ceiling on the

number of cars, or the temperature of a house, or conservation. Growth might limit itself.

"Early in 1976 I'd finished a project and I went down to Her Majesty's Stationery Office to read all the government reports on energy. There turned out to be only 4 pages on futures." But the US was much further ahead. "My first task was to convince the Ford Foundation that we were so far behind". Then he got the grant, and the study was under way under the wing of the International Institute for the Environment and Development. "The original proposal to Ford was on alternative sources with a bit of conservation" said Leach. "Then we began to feel strongly about disaggregation", calculating energy futures by adding up all possible uses rather than using macroeconomic trends. It also emerged that previous reports were unduly moderate on conservation. The result was the low energy prediction just published. □

fuels which will affect substitution. "We will be attacked by economists" admits Leach. The report has adopted apparatus replacement rates of some 5% per year after the new technology becomes available. Thus heat pumps have a 15-20% penetration of the market by 2000. But in housing the report allows until 2010 before all houses have 4 inches of loft insulation, and cavity walls are filled.

So far, the Department of Energy response has been friendly, and mildly defensive. "My feeling is that there is a lot of work to do yet in conservation in our methodology" said a spokesman. "We are only scratching the surface . . . But has Gerald Leach only taken the most favourable answers from all his inquiries? In our last green paper we took advice from the department of transport, the oil companies, and car manufacturers among others. Most thought that 20% conservation was ambitious. Mr Leach is applying current best practice across the board, and concludes that one can increase that 2 or 3 times. That may be wishful thinking."

The team responsible for the IED report consisted of Gerald Leach, Christopher Lewis, Frederick Romig, Ariane van Buren, and Gerald Foley.  
**Robert Walgate**

## ... and the view from across the Atlantic

### Forecasts of US primary energy demand in 2000 AD (in quads = 10<sup>15</sup> BTU) (1975 consumption 75 q)

Year of forecast	Source of forecast			
	beyond the pale	heresy	conventional wisdom	superstition
1972	125 <i>Lovins</i>	140 <i>Sierra Club</i>	160 <i>AEC</i>	190 <i>Fed Power Comm'n</i>
1974	100 <i>FF (Zero growth)</i>	124 <i>FF (Tech. fix)</i>	140 <i>ERDA</i>	160 <i>Edison Electric Inst.</i>
1976	75 <i>Lovins</i>	89-95 <i>vH and W—Lovins</i>	124 <i>ERDA</i>	140 <i>Edison Electric Inst.</i>
1978	33 <i>Steinhart (for 2050)</i>	63-77 <i>CONAES panel (for 2010)</i>	95-100 <i>CONAES, DOE-IEA</i>	123-124 <i>RDE—Ralph Lapp</i>

Energy forecasts have been falling in many countries, not only the UK. Amory Lovins has communicated this table of US forecasts for the year 2000, produced by various bodies over the last six years. "Read diagonally, the matrix has considerable predictive power" says Lovins. The September 1978 Department of Energy forecasts were not known when the table was first prepared. However, there is considerable subjective judgement involved in the choice of columns and of forecasts to fit them. Read literally, the matrix predicts that the conventional 1980 US forecast for the year 2000 will be some 70 quads, less than 1975

consumption.

Abbreviations used: AEC, Atomic Energy Commission; FF, Ford Foundation; ERDA, Energy Research and Development Administration; vH and W, von Hippel and Williams; CONAES, the Committee on Nuclear and Alternative Energy Systems of the US National Research Council; and DOE, Department of Energy. In 1976 Lovins' two forecasts were private (75q) and public (95q, published in *Foreign Affairs*). In 1978 the CONAES panel used three scenarios, as did the DOE (varying with projected oil price). □

## Black year for Soviet refusniks

1978 was, in general, a black year for Soviet refusnik scientists, marked by increasing harassment and the imprisonment or exile of a number of the best-known of them. However, the year ended on a note of partial triumph—in the last week of December the "Sunday seminar" for refusniks achieved its long-standing aim of an international meeting with the participation of scientists from USA, France and the UK.

Inevitably a number of the intending foreign visitors failed to receive the necessary visas. Five of the eight would-be participants from the US had their visas revoked—evoking a statement of censure from the Committee of Concerned Scientists saying that it "found it unconscionable for the USSR to seek to prevent American scientists from engaging in scientific discussions with Soviet colleagues". The conference, it claimed, was "an excellent example of the kind of unofficial, non-governmental exchanges provided for by the Helsinki Final Act."

"Non-governmental" exchanges do not fit easily into the Soviet concept of science, and previous attempts of the seminar group to hold an international meeting were less successful. In 1974, no foreign visas were issued and the leading Soviet participants were arrested. Nevertheless, the proceedings

of the "Conference that never was" were published in the regular manner, and limited foreign participation was permitted in the April 1977 meeting to commemorate the fifth anniversary of the founding of the seminar.

The apparent acquiescence of the Soviet authorities with regard to last month's meeting seem due rather to international pressure than to any change of heart. Continuing routine surveillance of the venue—the flat of Viktor Brailovskii—during the seminar, and a thorough police search with confiscation of his recent scientific material and his Lenin library ticket made this clear. A number of other intending participants suffered like harassments.

Nevertheless, the meeting itself took place. The main purpose of last month's gathering was to bring the refusniks abreast of recent Western developments.

The chosen title "collective phenomena" allowed a wide range of subjects. The US participants presented work in statistical physics and vortex motion in superfluid <sup>4</sup>He, while the French contributions ranged over crystal physics, axiomatic quantum field theory, one-dimensional conductors, and what one participant described as a "very pretty" result in percolation

theory. Since this last contribution required no specialist background, it was of particular value to the refusniks, many of whom have inevitably fallen irrevocably behind in their original field, and who therefore wish to extend their acquaintance with other subjects.

Local contributions were, understandably, somewhat hampered by the extremely restrictive nature of refusnik life—lack of access to experimental facilities and to new results in particular. Nevertheless, a wide range of subjects was attempted, including solitons, plasma physics, and quantum field theory. Yurii Orlov, one of the few non-Jewish members of the original seminar group, could not be present in person—he is at present serving a 12-year sentence for "anti-Soviet agitation and propaganda". A paper of his on "Wave logic", an alternative to conventional two-valued logic, more appropriate to quantum mechanics was presented in absentia.

Another gentile who has always taken a keen interest in the Seminar, is academician Andrei Sakharov. To the delight of all participants, Sakharov attended the first session. Other notable Soviet participants included Aleksandr Lerner, Grigorii Rozenshtein, Yurii Fishman, Yurii Gol'fand and Yakov Al'pert.  
**Vera Rich**