Britain Rises to Japan's Computer Challenge

In a departure from its free-market principles, the government will spend $300 million to subsidize research on information science

London. Britain's Conservative government has bent its free-market economic principles and committed itself to an ambitious 5-year, $300-million investment in collaborative research between university and industrial scientists in advanced information technology. Government ministers hope that the results will enable Britain to remain competitive with Japan and the United States in microelectronics over the next decade.

"This is the first time in our history that we shall be embarking on a collaborative research project on anything like this scale," industry minister Patrick Jenkin told the House of Commons on 28 April. "Industry, academic researchers, and the government will be coming together to achieve major advances in technology which none could achieve on their own."

The British government's decision to virtually double its current level of support for research in information technology follows a top-level study carried out last year by a team of civil servants and industrial research executives into the appropriate response to Japan's plans for a so-called fifth-generation computer program. The government has also been monitoring the U.S. Defense Department's research program into very high speed integrated circuits, as well as collaborative research ventures that are being supported by different consortia of U.S. computer companies.

The committee, chaired by John Alvey, senior director for technology of the publicly owned telephone service British Telecom, produced its findings at the end of last summer. It concluded that, "Compared with our competitors, our overall effort is badly fragmented. The interface between industry and the research community is nowhere near as productive as it is in the United States, for example. And our industry does not collaborate on basic research to the same extent as in Japan."

Claiming that there was a need for "urgent action" to generate a strong domestic capability in information technology, it recommended a national program covering a range of so-called "precompetitive activities" to include basic research, design tools, and "a communications infrastructure to link researchers." The Alvey committee suggested in particular that joint support from government and industry be concentrated on four fields:

- Software engineering, an activity in which, it claims, Britain is currently recognized as the leader in Europe and as second only to the United States worldwide.
- Man-machine communication.
- The study of systems embodying so-called artificial intelligence.
- The development of very large scale integration (VLSI) of circuits on silicon.

After 8 months of internal debate in Whitehall, the government has decided to accept virtually all of the Alvey committee's recommendations. In the case of artificial intelligence, for example, this is expected to include a program of R & D which will double the size of the research community within 5 years, and attempt to develop systems for computer-based planning and decision-making.

There was less consensus over the size of the investment proposed by the Alvey committee, or where it should come from. In the past, the Conservative government of Prime Minister Margaret Thatcher has set its face firmly against increased public subsidies for any activity—including research—where it felt the main responsibility should rest with the corporate sector.

When the Alvey recommendations were raised in the Cabinet at the beginning of April, they are said to have received a decidedly cold initial reaction from Thatcher. However, the case for substantial commitment to new research

The U.S. Studies Its Options

The Reagan Administration has not yet gone as far as the British Government in compromising its free-market principles to respond to Japan's supercomputer challenge, but it has at least decided to take a close look at its options. On 4 May, George A. Keyworth II, President Reagan's science adviser, asked the Departments of Energy and Defense to explore three potential federal initiatives. "Our national interests require that we maintain a dependable domestic capability to meet our needs. We can't permit foreign manufacturers, whose development costs may be heavily subsidized by their governments, to jeopardize that capability," Keyworth said in announcing the studies.

The Department of Energy (DOE) will set up a working group to examine ways in which the government's own requirements for supercomputers can be used to stimulate technological developments. One possibility will be to draw up a firm projection of the number of supercomputers government agencies will purchase in the next few years so that existing manufacturers—Cray Research, Inc. and Control Data Corporation—will have a more certain market on which to base their R & D expenditures.

A second working group in DOE will look into the perennial question of how supercomputers can be made more widely available to academic researchers whose institutions cannot afford the machines.

The third area under investigation is also a hoary problem: how can research into supercomputers supported by a variety of federal agencies be better coordinated to avoid duplication and unnecessary competition for scarce talent? A working group under the Defense Advanced Research Projects Agency will take that one on.

Keyworth has asked all three groups to report back to him this summer—in time to affect the fiscal year 1985 budget.—COLIN NORMAN

DOE's Mixed Forecast

The good news in the government's energy survey* released on 5 May is that Americans have continued to become more efficient users of energy and that oil imports have declined for the fifth year in a row. The bad news is that, unless something is done to prevent it, oil imports are likely to surge upward again in the next 2 years, perhaps growing from the present level of 4.2 million barrels a day to around 7.6 million in 1985.

The major importers in this new upsurge are likely to be electric utilities, according to J. Erich Evered, administrator of the Energy Information Administration (EIA). He told reporters that natural gas prices will be rising at mid-decade, driving power companies with the capacity for fuel switching toward the cheaper alternative of imported residual oil.

Gas prices will rise because the law now in effect (the Natural Gas Policy Act of 1978) calls for about half of U.S. natural gas production to be released from price controls by 1985. When this happens, gas prices are likely to be pegged to comparable crude oil prices. The EIA predicts that at this time many utilities will get out of the gas market, which will bring about a 1-million-barrel-a-day increase in oil imports. While the EIA would not speculate on this point, it seems that the Reagan Administration's plan to decontrol gas prices immediately would bring about a shift even sooner. Thus, an immediate decontrol of gas might halt the downward drift in the price of crude oil.

Evered saw a difference between the kind of conservation that occurred in 1980 and 1981, and the kind seen last year. In the earlier case, efficiency was driven by rapid price increases. In 1982, Evered said, the record reflected primarily a slowdown in business because of the recession and an unusually mild winter. The recession had a striking impact on electricity generation. It fell by 2.3 percent in 1982, the first decline since World War II. This was a sharp reversal of the pattern in 1972 to 1982, when electricity generation rose by 28 percent despite growing fuel costs.

Among other significant findings, the EIA reports the following:

- Per capita energy consumption in the United States last year fell to the lowest level since 1967, to 306 million Btu's. The highest level—353 million Btu's—was reached in 1973, just before the oil embargo.
- World petroleum consumption fell in 1982 for the first time since 1975, by 3.2 percent. OPEC production was at its lowest level since 1968.
- Saudi Arabia, the chief source of U.S. oil imports since 1976, took second rank in 1982 to Mexico, a non-OPEC nation.
- Crude oil production in the lower 48 states has been declining since 1972. But in 1982, the pattern reversed and oil production rose by half a million barrels a day.
- The use of energy continues to "decouple" from economic growth patterns. The EIA reports that the amount of energy needed to produce a given dollar of output in the GNP has declined sharply since the 1970's. It was once thought that the ratio of energy to GNP was fixed. But the EIA now predicts that the ratio will drop further, declining at least 22 percent between 1970 and 1990. This is a conservative figure. Data Resources Inc. predicts that it will drop 30 percent in the same period.
- In a series of forecasts, the EIA predicts that U.S. petroleum consumption will rise from 15.3 million barrels a day in 1982 to 18 million in 1985, then decline to 17 million by the end of the decade.
- The fastest rate of growth will be in electricity consumption, which the EIA predicts will grow at an average rate of 3.8 percent a year for the rest of the decade. Nuclear power will be the fastest growing sector within this category, providing 8 percent of gross energy in 1990 as compared with 4 percent in 1982.
- The international price of a barrel of crude oil, according to the EIA, will rise from the present level of $28 to something between $28 and $48 by 1990.—**ELIOT MARSHALL**

**1982 Annual Energy Review* and *1982 Annual Energy Outlook* (Department of Energy, Energy Information Administration, Washington, D.C.).

money has been strongly argued by Britain's Minister of Information Technology, Kenneth Baker, who pointed to a general consensus within British computer companies that only a broad-based collaborative research effort will be sufficient to meet the Japanese and U.S. challenges. Indeed the Alvey committee was itself set up at the request of industry.

There have been some concessions to Thatcher's political qualms. The Alvey committee, for example, suggested that some research carried out in industry should be 90 percent sponsored by the government, although the results were going to be made widely available to other companies. This proposal, however, has been dropped, so that government support for all industrial research projects will be limited to 50 percent of the cost. "Ninety percent government funding does not secure a sufficient industrial commitment and could lead to the program becoming divorced from industry's needs," according to Jenkin.

In virtually all other respects, however, the Alvey recommendations have been accepted. For example, the government has agreed that the subsidiaries of foreign multinationals will be able to take part in the research program in cases where, in Alvey's words, they can contribute "a particular asset vital to the program" but on condition that "it is guaranteed that valuable technical information will not leak from the United Kingdom."

The 5-year program will involve the activities of three government ministries. The Department of Education and Science, through its funding both of universities and of the Science and Engineering Research Council (SERC), will be primarily responsible for promoting advanced research in academic institutions and the training of the necessary manpower. The Ministry of Defense will—as in the United States—contribute its experience in the field of integrated circuits, and will fund any of the research felt to be of particular interest to the defense industry.

Principal responsibility for the program, however, will rest with a small directorate being established within the Department of Industry, which will also contribute most of the new research funds. The directorate will be headed by Brian Oakley, for the past 4 years secretary of the SERC and one of the main architects of the Alvey committee's proposals. It will itself report to a small supervising board of industrialists chaired by Sir Robert Telford, chairman of Marconi Avionics.—**DAVID DICKSON**