

And secondly to maintain the direction of new initiatives introduced into the 1981 budget as a result of last year's domestic policy review of industrial innovation, even though at a reduced level.

In areas of project support, each field will be scaled downwards, although the emphasis will be maintained on shifting the balance of support back to physics and engineering from the life sciences. Thus the total for mathematical and physical sciences will be reduced by \$4.4 million (leaving a 14.5% increase over 1980), and for biological and behavioural sciences by (\$4.1 million, leaving a 6.8% increase).

The increase in funding for university-industry cooperative research projects will be reduced by \$5.1 million, from \$13 to \$7.9 million above this year's level of \$7 million. And support for small business innovation and industrial technology, initially scheduled to be raised from \$7.3 million to \$18.2 million, will now only increase to \$9.2 million.

Another new initiative to be cut back is the Ocean Margins Drilling Project. This is to be jointly funded with the oil industry, and had been scheduled to receive \$10 million in 1981, but the figure will be cut back to \$5 million.

More money has been saved by putting off detailed design studies of a 25-metre diameter millimeter wave telescope, which would have been scheduled for funding in 1982, as well as plans to purchase a new coastal research ship.

The NSF has also decided to defer a proposal to award \$14.3 million on a matching grant basis for improving university research facilities. There will also be a \$10 million cut in science education programmes.

Finally, the Foundation is cutting back on its joint scientific programmes with both the USSR and the China (the latter introduced for the first time in 1931). In particular, a programme with Soviet scientists on chemical catalysis, and a working group in scientific and technical information, will both be terminated, and these, together with cutbacks in exchanges through the National Academy of Science, will reduce the US/USSR budget from \$3.2 to \$1 million. Scientific cooperation with China will have its support reduced from a proposed \$2 million to \$1.5 million.

● **Defense Department:** the Department of Defense is the one agency to have escaped significant budget cuts. Precise figures have yet to be agreed, but it is expected that the department's original proposal will be cut back by between \$10 and \$20 million. This will still permit an increase in military support for basic research of about 15% — well above the expected rise in costs.

The big question now is how Congress will react. In general the cuts from its original budget proposals recommended by the administration are in line with those supported by Congressional budget committees, but there could be more surprises in store. □

# Energy choices: the cultural assumptions

THE debate surrounding the report of the National Academy of Sciences Committee on Nuclear and Alternative Energy Systems (CONAES) continues to reveal as much about different perspectives on the energy problem as it throws light on possible solutions.

Latest contribution to this debate is the report of a panel set up by the committee to study the "lifestyle" implications of different projected energy scenarios. Published by the Academy last week, the report carries the emphatic message that "energy is a social, not a technological issue".

A society's demand for energy must be seen as part of its general organisation of preferences. Yet in many discussions of the factual basis of energy problems, the cultural and social contexts tend to be left implicit; and research on social and cultural factors influencing energy decisions has consequently received "remarkably little attention".

"We know something about the technology of energy, but much less about the agents: the experts, the interest groups, the public," says the report, which recommends that more research is needed on the social organisation of energy experts.

"Do nuclear physicists and engineers, for example, dominate the latecoming biologists, health physicists and social scientists?" it asks. "What is the relationship between the experts who estimate the probabilities of harmful events and those who assess their consequences?"

The panel which produced the report was chaired by Dr Laura Nader Professor of Anthropology at the University of California, Berkeley. In publishing it, the Academy points out that it is intended as a "supporting paper" to the full CONAES report, and that it has not gone through the "normal critical review" for such reports — although adding that it has been "subjected to a thorough and expert peer review for accuracy, consistency and clarity."

The bulk of the report concentrates on some of the possible implications of two future energy scenarios that might be expected in the year 2010. The first assumes a level of energy consumption in the US of 71 quads, equal to estimates of consumption in 1975 when the study was started.

This level of energy demand, says the report, could be achieved without any significant changes in attitudes, and would still involve increases in amenities, with improvements "roughly consistent with those that have occurred in recent decades." □

The second scenario is based on the assumption that society agrees to cut its consumption to 53 quads — and is offered by the panel not as a prediction of what is likely to happen, but as a way of focusing on the relationship between energy demand and cultural values.

This scenario, says the panel, implies a significant shift in attitudes, including a decentralisation of work, and high value being placed on thrift and self-reliance. In what it characterises as a "high technology, low energy consumption" society, the aim would not be to turn back the clock, but to develop new technologies — such as advanced automobiles, or microprocessor building and process control techniques — aimed at improving the quality of life under the new energy constraint.

Pointing out that societies such as Sweden's already exist on much lower energy consumption than the US, the panel suggests that its scenario would be feasible, and would reflect the needs of a participatory democracy which might be challenged by increasingly centralised technological systems (such as those involved in the use of nuclear power).

"The trends toward tightly meshed technological systems characteristic of the 1970s are reversed in the 53 quad society, increasing the likelihood that most of the system can survive if a part of it is severely damaged," the report says.

In its conclusion, which stresses the need to integrate long-term energy planning with other kinds of social planning, the panel emphasises that there is nothing improper in the fact that political and social decisions about resource use extend beyond the market place and are influenced by subjective values and judgements.

"What is alarming is that experts often pretend to be able to perform objective analyses on energy systems or energy users because they are unwilling to acknowledge the values on which their decisions or analyses were made," it says.

Perhaps unsurprisingly, few of the more outspoken conclusions were included in the final report of the full CONAES committee. And this itself has provoked a reaction from Dr Nader, who says that her panel was told that its work "was not quantitative enough", and should include "more tables and less prose."

"The criticisms raised old disagreements about the use of qualitative and quantitative methods and illustrate how difficult it is in general for many scientists to incorporate findings from disciplines which could contribute to more intelligent discussions of unbounded problems" says Dr Nader. □