US debate heats up over energy conservation strategies

Higher energy prices may encourage more efficient use — but will the poor have to bear an unfair proportion of the costs? **David Dickson** reports

THE recent take-over of the US Embassy in Teheran has focused Washington's attention even more sharply on the need to reduce dependence on imported oil. And this in turn has emphasised the gains to be made through measures to increase energy conservation.

Yet the appropriate strategy to achieve energy savings has become a major source of political controversy. At stake is the basic trade-off between energy efficiency and energy equity: if the price of energy is raised to encourage conservation, can this be done without imposing an unfair burden on those who would be proportionately most affected by the higher costs, namely the urban and rural poor for whom energy costs take up to 30 to 40% of the weekly income?

This conflict has been most visible in early sparring between the two main contenders for next year's Democratic presidential nomination. President Carter has made oil price de-control central to his energy strategy, arguing that the price of domestic oil should be allowed to rise to that set by the OPEC countries — and that there should be a 'windfall' profits tax on the oil companies from which the worst effects of the price increase can be mitigated.

In contrast, Senator Edward Kennedy has in recent weeks been arguing strongly against decontrol, suggesting that in current circumstances 'it would seriously exacerbate our inflation and produce 'conservation' only as a by-product of a massive recession'. Higher prices may in the long run be desirable to encourage economic competition — but in the present economic climate they would be unjust.

Not that the Carter administration has been idle on conservation. Last week, for example, the Department of Energy published proposed building regulations estimated to add 3 to 5% to the costs of new residential and commercial buildings — but to result in energy savings of 20 to 50% through setting overall consumption rates needed to qualify for federal loan guarantees and other benefits.

But after setbacks in other parts of its proposed policy, the administration has recently switched its main focus to energy supply matters, such as the proposed massive programme to develop synthetic fuels. And the conservation ball has been

The American poor have little money left for heat or light

passed back to Congress, where the Senate's Labour and Human Resources Committee is supporting a bill that would provide \$2.2 billion within three years to help poor people insulate their homes.

This see-sawing between the administration and Congress reflects the difficulties that surround attempts to devise a strategy for conservation, where the unpredictable effects of policy measures — as well as the complexity of putting them into practice — are even greater than for energy supply decisions.

Indeed it is only relatively recently that the full potential of conservation for reducing energy demand, not only for transportation but also for space heating and other domestic uses, has been accepted in policy circles. And there has been a tendency to lean heavily on the effects of 'price signals' — the expected response of individuals to increased energy costs.

Using such signals, for example, a study prepared two years ago for the National Academy of Sciences' Committee on Nuclear and Alternative Energy Systems (CONAES), produced estimates showing the wide range of energy-use forecasts resulting from different pricing strategies. It predicted, for example, that a four-fold increase in energy costs would lead to energy use remaining approximately constant between 1975 and 2010.

In practice, however, price signals have so far not provided a particularly good guide to the behaviour of car drivers, either in seeking energy-efficient vehicles or in cutting down consumption of petrol. "I am probably less optimistic now about how readily people take to economic signals", Dr John Gibbons, chairman of the NAS panel and now director of the Office of Technology Assessment, said last week.

"I am still convinced that people make rational economic decisions about future choices — but it seems that you still have a

lot of social inertia, perhaps because the path to high energy efficiency is complex".

Experience has therefore shown that the relationship between price and consumption is even more elastic than previously thought. This has led to greater consideration of non-price mechanisms, inevitably involving greater federal intervention. At the same time energy problems have become intertwined with broader attempts to cope with inflation.

Here the choice is whether, as Senator Kennedy argues, the government should tackle inflation head-on by trying to keep prices down until the economic situation improves — or to argue that eventually inflation can only be contained by realistic pricing strategies, and that the government's role should be to stimulate the operation of market principles.

"In the long run, it is going to hurt if prices stay down", says Dr Lee Shiffer of the Lawrence Berkeley Laboratory in California, a member of the panel which produced the conservation report for CONAES. "One thing that our study found was that for the majority of consumers, energy standards will only be accepted if . . . the savings are in the same ball-park as the costs."

The panel's calculations show that only when the cost of oil rises to about \$30 a barrel do major conservation programmes begin to look attractive. And this strategy is also supported by many environmentalists, who have argued that increased conservation will not only slow the growth of pollution-generating sources, but will also spur the search for more desirable sources of energy, such as solar power.

Such arguments, however, are meeting increasing opposition from community activists and others concerned more directly with social welfare issues. Gar Alperovitz, for example, of the Center for Economic Alternatives in Washington,

argues that whatever the theoretical principles involved, steps to offset the inflationary impact of increased energy prices are unlikely to prevent the poor from being required to shoulder a disproportionate amount of the burden.

The effects of recent price increases on such groups is illustrated by a survey prepared for the office of consumer affairs of the Department of Energy. This points out that between 1973 and 1977, the median income of poverty-level families increased 34.7%, while the costs of household fuels increased 78%, and has risen even more dramatically since then.

The survey found that for many poor

families, food was the first budget item to be cut in order to pay high utility bills. "Since few of them spend much money on anything except housing and food, there is nothing else to eliminate . . . many of them are without heat at all in the winter", the survey says.

If nothing else, current debates have raised a general awareness that energy politics have important equity implications, and cannot be resolved merely by technical arguments. But the tensions between environmentalists and community activists is symptomatic of the disagreement that remains over appropriate strategy.

Many are now demanding a stronger government role in regulating demand, through rationing, heavy energy taxes, and tough conservation standards. They point, for example, to the example of Portland, Oregon, which has recently introduced a statute which requires all home owners to introduce conservation measures if they want to sell or to rent their properties.

"We cannot realistically overcome the inequity of higher energy prices" says one community worker from New York. But with Congress in its current anti-regulatory mood, alternative strategies are unlikely to get very far, and protection for the poor will have to be sought by other routes. □

Canada boosts university research by 32%

THE Canadian government has announced that the budget of the Natural Sciences and Engineering Research Council (NSERC) will be increased by 32% in the financial year 1980-81, to a total of \$159.8 million.

The increase is the first of a number of measures expected to be made public in the next few weeks for stimulating Canadian research and development. This is in line with the government's pre-election commitment, reaffirmed two weeks ago by the newly-appointed Minister for Science and Technology, Mr Heward Grafftey, to raise Canadian R & D expenditure from 1% to 2.5% of the gross national product.

The extra money has been provided to the research council, which is responsible for supporting research in Canadian universities, in response to a five-year plan which the council submitted to the government earlier this year.

"We are currently operating with a budget which is 14% lower in real terms than it was ten years ago. This is obviously a very significant increase, although still less than we had asked for", Dr George Macnabb, President of NSERC, told *Nature* last week.

In response to current and projected manpower shortages, the council is planning to introduce a research associate scheme, under which it will provide salary costs and additional research support over a five-year period to post-doctoral scientists at universities prepared to commit 90% of their time to research. About 100 such awards will be made annually.

Another plan is to provide summer support for undergraduates in their second or third year who want to gain research experience. The council is currently working out details on how the extra money for equipment should be distributed. "We are trying to undo the damage of the last decade, and hopefully we can do it in a planned way", says Dr Macnabb.

As for research grants, the precise distribution of awards will not be announced until February, but it is planned that although the major part of the increase will go to basic research, there will be propor-

tionately a larger increase in support for targeted research.

The NSERC'S budget increase has been generally welcomed by Canadian scientists, who in recent months have been lobbying for an end to the decline in federal support for research through groups such as the Canadian Federation of Biological Societies and the Canadian Association of Physicists (CAP).

"The federal commitment to improve support for fundamental research in the universities and to ensure the creation of a healthy and vital university research community is long overdue", Dr Robert Willes of the CFBS commented last week.

Dr John Kucharczyk of CAP, however, warned that scientists still had some reservations. These included: doubts

whether the commitment to increased funding would continue for more than one year; doubts whether the provinces and private industry were prepared to provide the support on which the government's strategy depended for research; and concern over the constraints placed on the NSERC by the fact that less than half its requested budget increase had been accepted.

The Canadian government is expected to announce shortly increased funding for both the Medical Research Council and the Social Science Research Council. And the budget to be presented to Parliament in December is likely to include details of tax incentives offered to industry to invest in research and development.

David Dickson

US drops back in biology and maths

THE total number of US papers appearing in the world's leading scientific publications fell by 6% between 1973 and 1977, according to figures released in Washington last week by the National Science Board, the policy arm of the National Science Foundation.

US prominence dropped particularly in biology and mathematics. In biology, the net number of papers by US scientists in the Science Citation Index's two thousand most influential journals fell by 11%, representing a drop from 46 to 42% of the total biology papers. In mathematics, the proportion of US-authored papers fell from 48 to 41% over the four years.

This decline, which was mirrored but not quite so sharply in almost all scientific disciplines, was partly offset by an increase in the average frequency with which papers published were cited. In 1973 the rate of citation of US papers was 28% above what would have been expected on purely numerical grounds. By 1977 this had risen to 30%.

These figures, based on data gathered by Computer Horizons Inc. from the Institute for Scientific Information, are published in *Science Indicators 1978*, presented to Congress last week by President Carter as

the annual report of the National Science Board.

Despite frequent statements to the contrary, the report paints a relatively healthy picture of US research and development, suggesting that an apparent decline in international terms may be largely the result of countries such as Japan and West Germany catching up with the US's previously unchallenged position.

"Among the two major types of research activity — basic and applied — a period of modest growth has persisted for longer than any time since the late 1960s" the report says. Even in industry, it states, expenditure on basic research grew from \$719 million in 1975 to \$975 million in 1978, an increase in constant dollars of 14% over the years.

The report points out that the "phenomenal growth" which has taken place in energy research and development since 1974 — an occurrence which, contrary to expectations, it says did not take place in other industrialised countries — has slowed down, although perhaps only temporarily. But a shift from military to civilian R & D within the federal budget seem to have been reversed in the last two years. □