

NAS on global warming: 'insurance' needed

■ Report urges improved energy efficiency

■ Seeks research for adapting to greenhouse

Washington

Two-and-a-half years after Congress requested it, the US National Academy of Sciences (NAS) has finished its report on the *Policy Implications of Global Warming*. The Evans report (named for Daniel J. Evans, former senator from Washington State and chairman of the NAS panel) calls for a limited set of actions as 'insurance' against the possibility that an increasing amount of greenhouse gases in the atmosphere will raise the Earth's average temperature in coming decades.

The measures recommended by the NAS panel stick to the middle ground in the current greenhouse debate. The panel acknowledges the uncertainties in predicting the effects of man-made greenhouse gases such as carbon dioxide, methane and chlorofluorocarbons (CFCs), but nonetheless argues that it makes sense to begin certain inexpensive measures that will reduce the production of these gases — advice that runs counter to the current White House line of doing nothing that cannot be justified on grounds other than amelioration of the greenhouse effect.

On the other hand, the NAS panel stopped short of the environmentalist position that the possibility of global warming

demands a vigorous response now, and it takes two positions likely to irritate environmentalists. It calls for a series of measures to help mankind adapt to an increased greenhouse effect — such as research into farming under conditions of less water and more carbon dioxide — and even suggests that people in the United States could adapt to potential greenhouse changes with no more difficulty than experienced in adapting to the 'dust bowl' days of the 1930s. (One panel member, Jessica Matthews, vice-president of the environmentalist group World Resources Institute, wrote a sharp dissent from this view.)

And second, the NAS group advised research into 'geoengineering' techniques that could lessen the greenhouse effect, such as ways to increase cloud cover and thus reflect more sunlight back into space. Although the report emphasizes that it is calling only for research, not active measures, and that any such geoengineering would have to be done with extreme caution in light of potential unexpected consequences, the very idea of more meddling with the Earth's natural environment is anathema to many environmental organizations.

The report, which was released yesterday

(10 April), bases its conclusions on what it terms "conservative assumptions" on the possible global warming over the next 40 to 50 years — it posits a rise of 1–5 °C in average global temperature. The predictions of most global climate models fall somewhere in this range, assuming greenhouse gases increase to the point where there is effectively twice as much carbon dioxide in the atmosphere as in pre-industrial times.

Working from these assumptions, the Evans report states that "even given the considerable uncertainties in our knowledge of the relevant phenomena, greenhouse warming poses a potential threat sufficient to merit prompt responses." Fortunately, it continues, "the panel believes that substantial mitigation can be accomplished at modest cost. In other words, insurance is cheap."

The recommended insurance policy includes the following clauses:

- Reduce or offset emission of greenhouse gases by: continuing the phaseout of CFCs and developing substitutes that minimize or eliminate greenhouse gas emissions; studying the concept of 'full social-cost pricing' of energy, where the costs of various types of energy include such factors as their environmental effects, with the eventual goal of instituting such a system; increasing energy conservation and efficiency by such means as nationwide building codes and improved automobile gas mileage; planning future energy supplies with an eye towards greenhouse warming, so that natural gas and a new generation of nuclear reactors would provide a larger fraction of the nation's energy needs; and reducing global deforestation.

- Enhance adaptation to greenhouse warming by: doing agricultural research aimed at farming in an enhanced greenhouse world; making the nation's water supply more robust; building structures such as bridges, dams and levees with a margin of error that allows for the possibility of higher water levels in the future; and acting to prevent losses of biodiversity.

- Improve knowledge for future decisions by: continuing to collect the climatological data that is necessary for building and testing climate models; strengthening our understanding of which mechanisms have important roles in the climatic response to greenhouse gases, so that global climate models can be improved; improving weather forecasts in order to make it easier to adapt to possibly more severe weather conditions; conducting research on how different species of plants and animals would react to global warming; and studying the social and economic aspects of global climate change.

- Evaluate geoengineering options to understand the advantages and disadvantages of various methods of artificially decreasing the greenhouse effect.

- Participate in international programmes to slow population growth and take part in other programmes aimed at climate change response to global climate change.

Robert Pool

Contrary agenda for greenhouse research

Washington

EVERYONE agrees that more research is needed to understand just how the increasing amount of greenhouse gases in the atmosphere will affect the Earth's climate, but is some potentially valuable research being ignored for political reasons? A group of climate researchers suggests that it is, and has offered a set of research proposals aimed at correcting some of the supposed omissions.

"There is significant research both going on and being proposed by people who are not convinced that there is a looming cataclysm," says meteorologist Richard Lindzen. But, he adds, researchers who do not accept the hypothesis that global warming is threatening to cause catastrophic climate changes find it much more difficult to get their proposals funded. So Lindzen and 27 other scientists met last October at Arizona State University to suggest global change research not predicated on that assumption.

The product of that meeting, *Global Climate Change: A New Vision for the 1990s*, was released last month, and seems to have presaged many of the rec-

ommendations of the new NAS global climate change report (see above).

Several researchers, for instance, suggest studies to get more accurate data on past and present climate changes, such as a proposal by David Aubrey of Woods Hole Oceanographic Institution to measure sea-level rise with new, very accurate technology. Others want to take a close look at how increased concentrations of carbon dioxide will affect plants and ecosystems. Still others wish to look at ways to lessen greenhouse warming, such as a proposal by George Kukla at Lamont-Doherty Geological Observatory and three others to examine how industrially produced aerosols may help to cool the climate.

The group of proposals offers a research agenda that is "complementary" to the current line, says Patrick Michaels at the University of Virginia, a well known greenhouse sceptic. Although the package, which was sent to the White House, has yet to receive any official response, Michaels predicts that it will have a better chance of getting attention than individual complementary proposals.

R.P.