massive cloud seeding effort now under discussion in Colorado and Utah, which would entail regular seeding of winter storm clouds to try to increase spring runoff to the Colorado River each year and boost water supplies to the arid southwest. A pilot-scale seeding effort was conducted by the Bureau of Reclamation in southwestern Colorado between 1970 and 1975 to measure the impact of cloud seeding on snowfall, and to evaluate potential long-term environmental consequences of a major effort covering most of the state. The results of that pilot effort were released last month, and they are adding to the debate.

The pilot project came up with two seemingly contradictory conclusions. First, it indicated that regular seeding may increase the snowpack by about 10%. And second, it seemed to show

that there was no statistical difference in the amount of snowfall on days when seeding took place compared with days of natural snowfall. Officials in the Bureau of Reclamation explain the contradiction by arguing that the seeding sometimes increased snowfall outside the target area, and residual silver iodide in the air often increased snowfall on days after seeding took place. Some seeding also took place on days when the conditions were not right for snowfall, which masked the overall effect, they claim. The ambiguous results are adding fuel to the debate about the advisability of sinking large sums into seeding this year, however.

The pilot project ended in May 1975, and discussions are now under way between officials in Utah and Colorado and representatives of the Bureau of Reclamation over the possibility of

expanding the effort into a large-scale demonstration programme. The Bureau has no money in its budget to begin such a project, however, and the earliest it could be started would be the winter of 1978-79. In the meantime environmentalists, who fear possible long-term effects on wildlife, increased damage from avalanches and potential effects on rainfall downwind from the target area, will continue to urge that water conservation be supported instead.

Whatever the outcome of that debate, it will not help alleviate the anticipated drought this spring. That would require at least twice the average snowfall between now and April, a prospect which weather forecasters deem extremely unlikely. As Colorado's Governor, Richard Lamm, stated when he signed the emergency cloud seeding legislation, "It's a roll of the dice". □

BRITAIN

Solar commitment

Britain moved another step in its efforts to implement a broad national energy policy with the announcement last week of a programme supporting the exploitation of solar power. Chris Sherwell reports

A POSITIVE but measured commitment to solar energy from the UK government; a positive but measured response from the country's solar energy lobby. That was the state of play at the end of last week after the Department of Energy (DEN) had unveiled its latest research and development programme, this time in the field of solar energy.

The announcement, neatly preceded a day earlier by a DEN junior minister's well-publicised visit to a solar heated house to reaffirm the commitment to explore alternative energies, was timed to coincide with the long-delayed publication of a report prepared for the DEN by its Energy Technology Support Unit (ETSU) based at Harwell*. In following earlier announcements in support of wave and geothermal power it marks another step towards comprehensive exploitation of renewable sources of energy. Reports on combined heat and power and on tidal energy are expected in the next couple of months.

The new commitment of resources to solar energy amounts to £3.6 million over four years, and is expected to bring total government expenditure in the area to about £6 million over the same period. The £3.6 million will be

concentrated on three principal activities: the use of solar energy for water and space heating (the ETSU report sees this as offering the best return), the collection of additional data on solar energy, and the biological conversion of solar energy.

DEN officials were reluctant to indicate precisely how it would be allocated. An important fraction will go to work on biological conversion, but the bulk of the money will be used to accelerate the development of suitable solar power appliances. The DEN's idea is to negotiate contracts with companies with satisfactory proposals, offering them up to 50% funding to reduce the risk involved and encourage the work.

Much of the support will also complement work done by the Department of the Environment, notably through the Building Research Establishment. DEN funds will not be used to finance R&D on photovoltaic devices, however. This is already being done under the aegis of the Department of Industry.

The International Solar Energy Society in Britain (UK-ISES), though welcoming the latest development as a "good starting point" and though in agreement with the balance struck by the DEN, points out that the UK commitment compares unfavourably both in amount and in time-scale with that in other countries.

The UK-ISES also points out that in its report released last year, *Solar Energy: a UK assessment*, it estimated that solar energy could make an energy contribution of 35 million tonnes coal equivalent (mtce) by the year 2020—about 10% of total energy needs. It

urged an immediate incremental budget devoted to solar energy, beginning at £2 million a year in 1976 and reaching £10 million by 1980.

Dr Walter Marshall, the DEN's Chief Scientific Adviser, citing the ETSU report, said solar energy could be making a contribution of "around 2% of our present requirements" within 25 years (some 7 mtce), an amount which could represent a "take-off point" and might be increased by a factor of about 10 over the ensuing 25 years or so. But it was hard to assess the real potential, he said, since the trends in fuel prices weren't known.

Dr Marshall paid tribute to the UK-ISES for the quality of its report. And in response to a question about the delay in the government's announcement of a programme and in publication of the ETSU report—research for it was completed 20 months ago, in July 1975—he acknowledged that he had made a mistake in not setting the wheels turning in the DEN in anticipation of a favourable verdict.

That seemed like a surprising admission. But in a country blessed with a surfeit of energy for the medium term from its oil, gas and coal resources and its existing nuclear programme, the error of judgment seems more understandable. Still, the UK-ISES emphasises the opportunities even to an energy exporter offered by solar energy investment—especially in the field of export.

The UK ISES's enthusiasm for solar energy is not based just on faith. In January alone it received five telephone calls a day and 253 written enquiries from non-members. The newly-won enthusiasm of the DEN cannot be so complete. There the real fight is between coal and nuclear power. □

*Solar energy: its potential contribution within the United Kingdom (London, HMSO, £3.00).