At Long Last CONAES: Energy for the '90s

Five years in preparation, the long-awaited report by the Committee on Nuclear and Alternative Energy Systems is finally out. Attempting nothing less than to detail all aspects of the nation's energy situation, which are likely to affect policy decisions over the coming transitionary period — 1985 to 2010 — it's little wonder that the National Academy of Sciences' more than 800-page opus took several more years and a lot more money than had been initially projected. What results is an ambitious, if not exhaustive, picture of some major energy options facing this country.

But don't look for a laundry list of succinct recommendations that will bail out confused policymakers in Washington on how to plan for the decades ahead. What the report has to offer are technical and economic observations that require interpretation by those in touch with the pulse of the nation's political and economic climate. Conceding that energy policy involves very large social and political components that are less well understood than any of its technical factors, the authors tender that "there will remain an irreducible element of conflicting values and political interests that cannot be resolved except in the political arena."

Among those sociopolitical factors is a definition of the energy crisis. "It is important to keep in mind," the authors say, "that the energy problem does not arise from an overall physical scarcity of resources. There are several plausible options for an indefinitely sustainable energy supply. ... The problem is in effecting a socially acceptable and smooth transition from gradually depleting resources of oil and natural gas to new technologies whose potentials are not now fully developed or assessed and whose costs are generally unpredictable."

The authors don't hesitate to contend, however, that:

- reducing the growth of energy demand should be the highest priority of the United States' national energy policy,
- beginning in the 1980s, liquid fuels will be the most critical near-term energy-supply problem for the United States,
- coal and nuclear power will offer the only large-scale, intermediate-term options for generating electrical power,
- the breeder-reactor option must be kept open in case energy demand cannot be reduced without radically changing lifestyles,
- the risk of nuclear-weapons proliferation is probably the most serious catastrophic problem associated with nuclear power — one for which the authors see no "technical fix," and
- the public will not cooperate fully with government goals to reduce energy demand unless the importance of conserving energy is hammered home repeatedly and reinforced with strategies for using energy efficiently.

Acknowledging that no one committee, such as CONAES, could cover all the necessary technologies and policy areas knowledgably, four major panels and 22 support groups — totaling some 300 individuals — merged their collective expertise. This diversity of opinions and backgrounds ensures that the report has given voice to "a reasonably representative microcosm of the conflicting relevant interests and viewpoints" in the energy community, said Philip Handler, NAS president.

Some effort was even made to include dissenting views by some of the CONAES authors. For instance, John P. Holdren, a CONAES member and University of California-Berkeley professor, took issue with the report's stance that obstacles to renewable energy sources over the transition period covered "are more fundamental and less tractable than obstacles standing in the way of expanded use of coal and nuclear fission." Obstacles for the renewables are technical and economic, he says, whereas those facing coal and nuclear are environmental and sociopolitical. So, as he sees it, "The choices are increased flirtation with [carbon dioxide] induced climatic change, other potentially excruciating environmental costs of coal, and nuclear debacles ... on the one hand, and the probability of considerably higher energy prices (for renewables), on the other. The notion that society should prefer the former to the latter may be the majority view of this committee, but that position should be recognized as a value judgment that does not deserve to be paraded as the 'only' possible outcome."

Energy in Transition should be available in local bookstores by March. □

Gravity's lens: Squinting at a galaxy

In astronomy things may seem quite simple at first but they often turn out on further inspection to be quite complex. Such is the case of the double quasar that has been interpreted by a number of astronomers to be an example of the gravitational lens effect, the quasar called 0957+561 A and B. To paraphrase Alice in Wonderland, it is getting complicateder and complicateder. The complications come in large part from radio and infrared studies reported at the meeting of the American Astronomical Society in San Francisco this week.

The history is that astronomers Dennis Walsh, Robert F. Carswell and Ray J. Weymann reported this example of two quasars lying close together in the sky and seemingly identical in appearance in optical spectrum (SN: 6/16/79, p. 389; 11/10/79, p. 324). They suggested that 0957+561 A and B might be an example of gravitational lens effect.

But the first radio observations done by Bernard F. Burke, P. E. Greenfield and D. H. Roberts of Massachusetts Institute of Technology and an English group and infrared observations by Eric E. Vecklin of the Univerity of Hawaii and several others from the University of Hawaii and California Institute of Technology very nearly shot that down by showing inequalities in the images.

Gravitational lens effect concerns the light from a distant object being refracted by the gravitational field of a heavy dense body between it and the earth. The standard idea is that the refracting body bends the light from the distant object so that there are two images — a primary and a secondary image — of identical appearance that appear to be along lines of sight equidistant from the line of sight to the gravitating body so that on the sky the two images formed by the gravitational lens appear equidistant on either side of the gravitating body. Light bending of this kind is one of the more arcane effects of Einstein's general relativity and it is something that astronomers have been fascinated by for several reasons.

Burke and collaborators have now done further radio studies with the Very Large Array radio telescopes near Socorro, N.M. The radio maps done with the VLA show 0957+561 A and B. But the two images do not appear to be equal. The maps also show extended sources called C, D and E. Furthermore, A and B show jets of radio-emitting material, jets that seem not identical and therefore unlikely to be images of each other.

The infrared studies done on Mauna Kea and on Palomar Mountain showed discrepancies in the brightness ratio between A and B. So it seemed that the gravitational lens hypothesis might have to be abandoned.

The game was saved by another Caltech team, Peter Young, James E. Gunn, Jerome Kristian, J. Beverlyoke and James A. Westphal. They found a bright galaxy surrounded by a cluster of fainter ones and the bright galaxy is slightly off center between the two images A and B of the quasar. They suggested that this bright galaxy might be the gravitational