

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

Science serves its readers as a forum for the presentation and discussion of important issues related to the advancement of science, including the presentation of minority or conflicting points of view, rather than by publishing only material on which a consensus has been reached. Accordingly, all articles published in *Science*—including editorials, news and comment, and book reviews—are signed and reflect the individual views of the authors and not official points of view adopted by the AAAS or the institutions with which the authors are affiliated.

Editorial Board

1977: WARD GOODENOUGH, CLIFFORD GROBSTEIN, H. S. GUTOWSKY, N. BRUCE HANNAY, DONALD KENNEDY, NEAL E. MILLER, RAYMOND H. THOMPSON
1978: RICHARD E. BALZHISER, JAMES F. CROW, HANS LANDSBERG, EDWARD NEY, FRANK W. PUTNAM, MAXINE SINGER, PAUL E. WAGGONER, F. KARL WILLENBROCK

Publisher

WILLIAM D. CAREY

Editor

PHILIP H. ABELSON

Editorial Staff

Managing Editor ROBERT V. ORMES
Assistant Managing Editor JOHN E. RINGLE
Business Manager HANS NUSSBAUM
Production Editor ELLEN E. MURPHY

News and Comment: JOHN WALSH, *Editor*; PHILIP M. BOFFEY, LUTHER J. CARTER, BARBARA J. CULLITON, CONSTANCE HOLDEN, DEBORAH SHAPLEY, NICHOLAS WADE, *Editorial Assistant*, SCHERRAINE MACK

Research News: ALLEN L. HAMMOND, *Editor*; GINA BARI KOLATA, JEAN L. MARX, THOMAS H. MAUGH II, WILLIAM D. METZ, ARTHUR L. ROBINSON, *Editorial Assistant*, FANNIE GROOM

Associate Editors: ELEANORE BUTZ, MARY DORFMAN, SYLVIA EBERHART, JUDITH GOTTLIEB

Assistant Editors: CAITILIN GORDON, RUTH KULSTAD, LOIS SCHMITT

Book Reviews: KATHERINE LIVINGSTON, *Editor*; LINDA HEISERMAN, JANET KEGG

Letters: CHRISTINE KARLIK

Copy Editors: ISABELLA BOULDIN, OLIVER HEATWOLE

Production: NANCY HARTNAGEL, JOHN BAKER; YALI SWIGART, ELEANOR WARNER; JEAN ROCKWOOD, LEAH RYAN, SHARON RYAN

Covers, Reprints, and Permissions: GRAYCE FINGER, *Editor*; CORRINE HARRIS, MARGARET LLOYD

Guide to Scientific Instruments: RICHARD SOMMER

Assistant to the Editors: RICHARD SEMIKLOSE

Membership Recruitment: GWENDOLYN HUDDLE

Member and Subscription Records: ANN RAGLAND

EDITORIAL CORRESPONDENCE: 1515 Massachusetts Ave., NW, Washington, D.C. 20005. Area code 202. General Editorial Office, 467-4350; Book Reviews, 467-4367; Guide to Scientific Instrument, 467-4480; News and Comment, 467-4430; Reprints and Permissions, 467-4483; Research News, 467-4321; Cable: *Advancesci*, Washington. For "Instructions for Contributors," write the editorial office or see page xi, *Science*, 26 March 1976.

BUSINESS CORRESPONDENCE: Area Code 202. Business Office, 467-4411; Circulation, 467-4417.

Advertising Representatives

Director: EARL J. SCHERAGO

Production Manager: MARGARET STERLING

Advertising Sales Manager: RICHARD L. CHARLES

Sales: NEW YORK, N.Y. 10036: Herbert L. Burklund, 11 W. 42 St. (212-PE-6-1858); SCOTCH PLAINS, N.J. 07076: C. Richard Callis, 12 Unami Lane (201-889-4873); CHICAGO, ILL. 60611: Jack Ryan, Room 2107, 919 N. Michigan Ave. (312-DE-7-4973); BEVERLY HILLS, CALIF. 90211: Winn Nance, 111 N. La Cienega Blvd. (213-657-2772); DORSET, VT. 05251: Fred W. Dieffenbach, Kent Hill Rd. (802-867-5581)

ADVERTISING CORRESPONDENCE: Room 1740, 11 W. 42 St., New York, N.Y. 10036. Phone: 212-PE-6-1858.

Energy Conservation Is Not Enough

President Carter's National Energy Plan* is fated to be modified. Mr. Carter made an important contribution by emphasizing the need for action, by giving top priority to conservation, by calling for substitution of coal for oil and gas, and by pushing for a strategic oil reserve. However, the legislation requested is complex and controversial. The public might have accepted a gas guzzler tax and a gasoline tax if proceeds were used to expand energy sources. But the coupling of energy and income redistribution has elicited a strong negative response. Some congressmen report that mail has been running as much as 9 to 1 against the gasoline tax.

Controversial proposals affecting automobiles have captured public attention while other features of the National Energy Plan have been neglected. A questionable feature of the Plan is its treatment of the problems of producing sufficient energy to meet national needs during the next decade. Mr. Carter projects an increase in the gross national product of 46 percent by 1985. At the same time the Plan calls for an increase in use of energy of 33 percent. Up to the present there has been a one-to-one correlation between energy use and GNP. Ultimately, through conservation, the two variables will be partially decoupled, but that can come only slowly. Also questionable are assumptions with respect to the supplies of energy that will be available. One prediction of the Plan is that generation of electricity by use of nuclear reactors will increase by a factor of 3.8 by 1985. Other sources believe that generation will at best triple.

The crucial energy sources will be oil and natural gas. We derive 75 percent of our energy from these sources, and the economy is tightly dependent on them. Reserves of both have been dropping at the rate of 6 percent per year. Last year oil reserves fell to 30.9 billion barrels; 2.8 billion barrels of domestic oil were consumed. This was offset by 1.1 billion barrels of additions, most of them discoveries in existing fields or mere bookkeeping adjustments. Only 0.068 billion barrels were found in new fields. At the same time, gas reserves fell to 216 trillion cubic feet while 19.5 trillion cubic feet were produced. An offsetting 7.6 trillion cubic feet were added, but of these only 1.4 trillion cubic feet were in new fields.†

Last year's attrition of oil and gas reserves is a continuation of long-term trends. In the face of this, the National Energy Plan predicts that in 1985 the total amount of energy available from domestic oil and gas will equal that available this year. Such optimism might be justified if the Plan provided substantially increased incentives for creation of new supplies.

However, on balance, the proposals of the National Energy Plan are mildly discouraging to the production of more coal, gas, or oil. For examples, major users of low-sulfur coal are to be required to employ costly and troublesome sulfur dioxide scrubbers. The price of intrastate natural gas is to be reduced. Environmental considerations are likely to delay further exploration of the outer continental shelves.

One of the especially meritorious proposals of the Plan is substitution of coal for oil and gas. However, there is little in the Plan except tax provisions that would be helpful in bringing about the substitution. The enormous practical problems of obtaining more supplies, adapting equipment to coal, and meeting environmental standards are not addressed. There is no provision for expediting major projects to obtain clean fuels from coal.

An important element that is missing from the Plan was pointed out by President Carter. The missing element is inspiration. There is no basis in the Plan for the public to hope that America's technological capabilities will be effectively marshaled to help solve a deepening energy deficit. Moreover, those abroad who have looked to the United States for technological leadership in this great crisis must turn elsewhere.—PHILIP H. ABELSON

*Executive Office of the President, Energy Policy and Planning, *The National Energy Plan* (Government Printing Office, Washington, D.C., 1977). †*Oil & Gas Journal*, 18 April 1977, p. 19.