The original documents are located in Box 17, folder "12/31/74 S1283 Federal Nonnuclear Energy Research and Development Act of 1974 (2)" of the White House Records Office: Legislation Case Files at the Gerald R. Ford Presidential Library.

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ENERGY RESEARCH AND DEVELOPMENT

DECEMBER 1, 1973.—Ordered to be printed
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Mr. JACKSON, from the Committee on Interior and Insular Affairs, submitted the following

REPORT

[To accompany S. 1283]

The Committee on Interior and Insular Affairs, to which was referred the bill (S. 1283), to establish a national program for research, development, and demonstration in fuels and energy and for the coordination and financial supplementation of Federal energy research and development; to establish development corporations to demonstrate technologies for shale oil development, coal gasification development, advanced power cycle development, geothermal steam development, and coal liquefaction development; to authorize and direct the Secretary of the Interior to make mineral resources of the public lands available for said development corporations; and for other purposes, having considered the same, reports favorably thereon with amendments and recommends that the bill as amended do pass.

The amendments are as follows:

1. Strike out all after the enacting clause and insert the following language:

That this Act may be cited as the "National Energy Research and Development Policy Act of 1973".

TITLE I—COORDINATION AND AUGMENTATION OF FEDERAL SUPPORT FOR RESEARCH AND DEVELOPMENT OF FUELS AND ENERGY

STATEMENT OF FINDINGS

SEC. 101. The Congress hereby finds that—

(a) The United States is currently suffering a critical shortage of environmentally acceptable forms of energy.

(b) Compounding this energy shortage is our past and present failure to formulate a comprehensive and aggressive research and development strategy designed to make available to American consumers our large domestic energy

reserves including fossil fuels, nuclear fuels, geothermal resources, solar energy, and other unconventional forms of energy. This failure is partially a result of economic factors which have inhibited the timely development of new energy technologies.

(c) The responsibilities of the Federal Government for conducting and assisting energy research, development, and demonstration projects are fragmented among many agencies and departments and have not been planned and managed in a rational and coordinated manner.

(d) Present inadequate organizational arrangements and levels of funding for energy research, development, and demonstration have limited the Nation's current and future options for dealing with domestic energy shortages.

(e) The urgency of the Nation's critical energy problems will require a commitment similar to those undertaken in the Manhattan and Apollo projects; it will require that the Nation undertake, at a minimum, a ten-year $20,000,000,000 research, development, and demonstration program.

STATEMENT OF POLICY

SEC. 102. The Congress declares as the purpose of this Act the development within ten years of the option and the capability for the United States to become energy self-sufficient through the use of domestic energy resources by socially and environmentally acceptable means. In the achievement of this national goal, it is hereby declared to be the policy of the Congress to establish and maintain a national program of basic and applied research and development in the discovery, production, transportation, distribution, and conversion of energy resources and fuels adequate to meet the following objectives—

(a) encourage the conservation of limited energy resources and maximize the efficient development, production, conversion, and use of nonrenewable and limited primary energy resources;

(b) insure adequate, reliable, economical, and environmentally acceptable energy supply systems necessary to support the goals and essential needs of modern society including the established social objectives of Federal, State, and local government;

(c) to foster the expeditious transfer of the results of research on new energy technologies into the commercial application by the private sector through Federal assistance and participation in the demonstration and improvement of energy technologies to determine the engineering and economic feasibility, including the societal, economic, and environmental costs and benefits of said energy technologies;

(d) to develop an aggressive research strategy and priorities for solutions to the short-term (to the early 1980's) energy supply system and associated environmental problems;

(e) to develop an aggressive Federal research strategy and priorities including the information base, to support the development of the widest possible range of energy supply system options for the utilization of domestic nonnuclear energy resources to satisfy middle-term (the early 1980's to 2000) and long-term (twenty-first century) United States energy needs consistent with environmental policies; and

(f) establish within the Federal Government a central responsibility and institutional capability for maintaining continuing assessment and overview of the energy research, development, and conservation activities of the Federal Government, private industry, and nonprofit organizations pending the reorganization of the Federal energy agencies and activities to attain and support the objectives of this Act and a national energy policy.

ENERGY RESEARCH MANAGEMENT PROJECT

SEC. 103. (a) There is hereby established an Energy Research Management Project (hereinafter referred to as the "Management Project") which shall be composed of—

(1) one Assistant Secretary of the Interior who shall be designated by the Secretary of the Interior;

(2) one Commissioner of the Atomic Energy Commission who shall be designated by the Chairman of the Commission;

(3) one Commissioner of the Federal Power Commission who shall be designated by the Chairman of the Commission;

(4) the Director of the National Science Foundation;

(5) one Assistant Administrator of the Environmental Protection Agency who shall be designated by the Administrator of the Agency;

(6) one Assistant Administrator of the National Aeronautics and Space Administration who shall be designated by the Administrator;

(7) the Director of the National Bureau of Standards; and

(8) such appropriate representatives of other executive agencies which the President finds have a significant and continuing role in energy research and development.

(b) The Management Project shall have a Chairman who shall also serve as the Staff Director. The Chairman shall be appointed by the President to serve at his pleasure, by and with the advice and consent of the Senate. During his term of service, the Chairman shall not hold any other position as an officer or employee of the United States, except as a retired officer or retired civilian employee of the United States.

DUTIES

SEC. 104. The Management Project shall—

(a) review the full range of Federal activities in and financial support for fuels and energy research and development, giving consideration to research and development being conducted by industry and other non-Federal entities, to determine the capability of ongoing research efforts to carry out the policies established by this Act and other relevant Federal policies, particularly the National Environmental Policy Act of 1969 (83 Stat. 852);

(b) formulate a comprehensive energy research and development strategy for the Federal Government which will expeditiously advance the policies established by this Act, and insure that full consideration and adequate support is given to:

(1) improving the efficiency, conservation, and environmental effects of the conventional sources of energy including discovery, production, conversion, transportation, use, and disposal of waste products;

(2) advancing energy research, development, and demonstration of unconventional energy sources and technologies including but not limited to—solar energy, geothermal energy, magnetohydrodynamics, fuel cells, low head hydroelectric power, use of agricultural products and wastes as energy sources, tidal power, ocean current and thermal gradient power, wind power, automated mining methods, in situ conversion of energy resources, cryogenic transmission of electric power, electrical energy storage methods, alternatives to internal combustion engines, solvent refined coal, utilization of waste products for fuels, direct conversion methods, utilization of hydrogen for fuel; and

(3) improving management techniques and the effectiveness of management of existing energy systems through quality control; application of systems analysis, communications, and computer techniques; and public information to improve the reliability and efficiency of energy supplies and encourage the conservation of energy resources.

(c) utilize the funds authorized by section 120(b) of this Act to advance the energy research and development strategies pursuant to this Act by—

(1) supplementing by fund transfers the ongoing energy research and development programs of Federal agencies; and

(2) initiating and maintaining, by fund transfers, grants, or contracts, new energy research and development programs or activities utilizing the facilities, capabilities, expertise, and experience of Federal agencies, national laboratories, universities, nonprofit organizations, and industrial entities which are appropriate to each type of research and development.

(d) in the exercise of its duties and responsibilities under this Act, establish procedures for periodic consultation with representatives of science, industry, environmental organizations, and such other groups who have special expertise in the areas of energy research, development, and technology.

SEC. 105. The Chairman in consultation with the Management Project is authorized and directed to—

(a) identify opportunities to accelerate the commercial applications of new energy technologies by providing Federal assistance for or participa-

tion in pilot plants demonstrating technological advances and field demonstrations of new methods and procedures, and demonstrations of prototype commercial applications for the exploration, development, production, transportation, conversion, and utilization of energy resources; and

(b) conduct preliminary investigations and to explore potential cooperative agreements which may be entered into with non-Federal entities in order to develop recommendations for Federal participation or assistance in demonstrations of the technical feasibility and economic potential of energy technologies on a prototype or full-scale basis.

RESEARCH PRIORITIES

SEC. 106. Pursuant to the authority and directions of this Act, the Chairman shall transmit to the Congress—

(a) Within six months from the date of enactment of this Act, the Chairman's recommendations for an aggressive Federal research strategy and priorities designed to achieve solutions to immediate and short-term (to the early 1980's) energy supply system and associated environmental problems. Such recommendations shall include, but not be limited to specific anticipated actions and proposals pursuant to sections 105 and 107 for the most effective approach, through Federal assistance—

(1) to accelerate the commercial demonstration of technologies for producing a low-sulfur fuel suitable for boiler use;

(2) to accelerate the commercial demonstration of technologies for producing substitutes for natural gas, including coal gasification: *Provided*, That the Chairman shall invite proposals from potential participants based upon Federal assistance and participation in the form of a joint Federal-industry corporation, and recommendations pursuant to this clause shall be accompanied by a report on the viability of using this form of Federal assistance or participation;

(3) to accelerate the commercial demonstration of technologies for producing syncrude and liquid petroleum products from coal: *Provided*, That the Chairman shall invite proposals from potential participants based upon Federal assistance and participation through guaranteed prices or purchase of the products, and recommendations pursuant to this clause shall be accompanied by a report on the viability of using this form of Federal assistance or participation;

(4) to accelerate the commercial demonstration of advanced power cycles for the generation of electricity from coal, including technologies which employ the production of low British thermal unit gas from coal;

(5) in accordance with the program authorized by title II of this Act, to accelerate the commercial demonstration of geothermal energy technologies;

(6)(A) to accelerate the commercial demonstration of the production of syncrude from oil shale, and (B) to assist the research and development of in situ methodologies for the production of syncrude from oil shale;

(7) to demonstrate new and improved methods for the extraction of petroleum resources, including secondary and tertiary recovery of crude oil;

(8) to demonstrate new and improved methods for the extraction of coal resources: *Provided*, That the Chairman shall invite proposals from potential participants in joint Government-industry operated mines for the purpose of demonstrating new and improved mining technologies and methods and of training the associated personnel;

(9) to demonstrate the economics and commercial viability of solar energy for residential and commercial energy supply applications;

(10) to accelerate the commercial demonstration of environmental control systems including particulate and sulfur oxides emission control systems, necessary for the timely implementation of air pollution standards and water pollution standards established pursuant to Federal or State law; and

(11) to demonstrate new and innovative energy conservation technologies.

(b) Within one year from the date of enactment of this Act, the Chairman's recommendations for an aggressive Federal research strategy and priorities designed to achieve solutions to middle-term (the early 1980's to 2000) energy supply system and associated environmental problems. Such recommendations

shall include, but not be limited to, specific anticipated actions and proposals for the most effective approach—

(1) to improve the economics and cost-effectiveness of the technologies set forth in the research strategy recommended pursuant to subsection (a);

(2) to advance improvements in the methods and technologies for the transportation and storage of electric energy;

(3) to commercially demonstrate advanced power cycles for the generation of electricity which represent significant improvements in the efficiency of conversion of energy resources to electricity;

(4) to commercially demonstrate hot dry rock geothermal energy technologies;

(5) to commercially demonstrate advanced solar energy technologies;

(6) to determine the economics and commercial viability of the use of hydrogen as a primary energy source;

(7) to commercially demonstrate the use of fuel cells for central stations electric power generation; and

(8) to determine the economics and commercial viability for producing synthetic energy supplies from agricultural products and wastes.

(c) Within eighteen months from the date of enactment of this Act, the Chairman's recommendations for a Federal research strategy and priorities designed to achieve solutions to long-term (beyond 2000) energy supply systems and associated environmental problems. Such recommendations shall include, but not be limited to, specific anticipated actions and proposals—

(1) to further improve the economics and cost-effectiveness of the technologies set forth in the research strategy recommended pursuant to subsections (a) and (b);

(2) to commercially demonstrate nuclear fusion; and

(3) to commercially advance the use of hydrogen as a primary energy source.

FORMS OF FEDERAL ASSISTANCE

SEC. 107. (a) In developing proposals pursuant to section 105, the Chairman shall consider various forms of Federal assistance and participation which may include but are not limited to—

(1) joint Federal-industry corporations consistent with the provisions of section 108;

(2) contractual arrangements with non-Federal participants including corporations, consortia, universities, governmental entities, and nonprofit institutions;

(3) contracts for the construction and operation of federally owned facilities;

(4) Federal purchases or guaranteed price of the products of demonstration plants or activities consistent with the provisions of section 109; and

(5) Federal loans to non-Federal entities conducting demonstrations of new technologies.

(b)(1) A financial award under this Act may be made only in the amount of the Federal share of the estimated total design and construction costs, plus operation and maintenance costs; and

(2) For the purposes of this Act the non-Federal share may be in any form, including, but not limited to, lands or interests therein needed for the project or personal property or services, the value of which shall be determined by the Chairman.

(c) The Chairman shall, within ninety days of enactment of this Act, promulgate regulations establishing procedures for submission of proposals to the Management Project for the purposes of this Act. Such regulation shall establish a procedure for selection of proposals which—

(A) provides that projects will be carried out under such conditions and varying circumstances as will assist in solving energy extraction, transportation, conversion, and end-use problems of various areas and regions, under representative geological, geographic, and environmental conditions; and

(B) provides time schedules for submission of, and action on proposal requests for the purposes of implementing the goals and objectives of this Act.

Such regulations also shall specify the types and form of the information, data, and support documentation that are to be contained in proposals for each

form of Federal assistance or participation set forth in subsection (a): *Provided*, That such proposals to the extent possible shall include, but not be limited to—

(A) specification of technology;

(B) description of prior pilot plant operating experience with the technology;

(C) preliminary design of the demonstration plant;

(D) time tables containing proposed construction and operation plans;

(E) budget-type estimates of construction and operating costs,

(F) description and proof of title to land for proposed site, natural resources, electricity and water supply and logistical information related to access to raw materials to construct and operate plant and to dispose of saleable products produced from plant;

(G) analysis of environmental impact of the proposed plant and plans for disposal of wastes resulting from the operation of the plant;

(H) plans for commercial use of technology if demonstration is successful;

(I) plans for continued use of plant if demonstration is successful; and

(J) plans for dismantling of plant if demonstration is unsuccessful or otherwise abandoned.

(d) The Chairman shall from time to time review and, as appropriate, modify and repromulgate regulations issued pursuant to this section.

MODEL CORPORATION

SEC. 108. Joint Federal-industry corporations proposed pursuant to section 107 shall conform to the following guidelines:

(a) Each such corporation shall have the function to design, construct, operate, and maintain one or more full-scale, commercial-size facilities or other operations which will demonstrate the technical, environmental, and economic feasibility of a particular unconventional energy technology. In carrying out this function, the corporation shall be empowered, either directly or by contract, to utilize commercially available technologies, perform tests, or design, construct, and operate pilot plants as may be necessary for the design of the full-scale facility.

(b) Each corporation shall have—

(1) a Board of nine Directors consisting of individuals who are citizens of the United States, of whom one shall be elected annually by the Board to serve as Chairman. The Board shall be empowered to adopt and amend bylaws. Five members of the Board shall be appointed by the President of the United States, by and with the advice and consent of the Senate, and four members of the Board shall be appointed by the President on the basis of recommendations received by him from any non-Federal entity or entities entering into contractual arrangements to participate in the corporation;

(2) a President and such other officers and employees as may be named and appointed by the Board (the rates of compensation of all officers and employees shall be fixed by the Board); and

(3) the usual power conferred upon corporations by the District of Columbia Business Corporation Act.

(c) An appropriate time interval, not to exceed twelve years, shall be established for the term of Federal participation in the corporation at the expiration of which the Board of Directors shall take such action as may be necessary to dissolve the corporation or otherwise terminate Federal participation and financial interests. In carrying out such dissolution, the Board of Directors shall dispose of all physical facilities of the corporation in such manner and subject to such terms and conditions as the Board determines are in the public interest, and a share of the appraised value of the corporate assets proportional to the Federal participation in the corporation, including the proceeds from the disposition of such facilities, on the date of its dissolution, after satisfaction of all its legal obligations, shall be made available to the United States and deposited in the Treasury of the United States as miscellaneous receipts. All patent rights of the corporation shall, on such date of dissolution, be vested in the Administrator of General Services: *Provided*. That Federal participation may be terminated prior to the time established in the authorizing Act upon recommendation of the Board of Directors.

(d) Any commercially valuable product produced by demonstration facilities shall be disposed of in such manner and under such terms and conditions as the

corporation shall prescribe. All revenues received by the corporation from the sale of such products shall be available to the corporation for use by it in defraying expenses incurred in connection with carrying out its functions under this title.

(e) The estimated Federal share of the construction, operation, and maintenance cost over the life of each corporation shall be determined to facilitate the congressional authorization of the full amount at the time of establishment of the corporation.

(f) The Federal share of the cost of each such corporation shall reflect (1) the technical and economic risk of the venture, (2) the probability of any financial return to the non-Federal participants arising from the venture, (3) the financial capability of the potential non-Federal participants, and (4) such other factors as the Chairman may set forth in proposing the corporation: *Provided*, That in no instance shall the Federal share exceed 90 per centum of the cost.

SUPPORT THROUGH PRICE GUARANTEES

SEC. 109. Competitive systems of price supports proposed pursuant to section 107 shall conform to the following guidelines:

(a) The Chairman shall determine the types and capacities of the desired full scale, commercial size facility or other operation which would demonstrate the technical, environmental, and economic feasibility of a particular energy technology.

(b) The Chairman, may award planning grants for the purpose of financing a study of the full cycle economic and environmental costs associated with the demonstration facility selected pursuant to subsection (a) of this section. Such planning grants may be awarded to industrial entities, Federal agencies, national laboratories, universities, or nonprofit organizations. Such planning grants shall also be used by the grantee to prepare a detailed and comprehensive bid to construct the demonstration facility.

(c) Following the completion of the studies pursuant to the planning grants awarded under subsection (b) of this section, the Chairman shall invite bids from all interested parties to determine the minimum amount of Federal price support needed to construct the demonstration facility. The Chairman may designate one or more competing entities each to construct one commercial demonstration facility. Such designation shall be made on the basis of those entities' (1) commitment to construct the demonstration facility at the minimum level of Federal price supports, (2) detailed plan of environmental protection, and (3) proposed design and operation of the demonstration facility.

(d) The construction plans and actual construction of the demonstration facility, together with all related facilities, shall be monitored by the Administrator of the Environmental Protection Agency. The Administrator of the Environmental Protection Agency is authorized and directed to require the application of the best available pollution control technologies as determined pursuant to the Clean Air Act, as amended (42 U.S.C. 1857 et seq.), and the Federal Water Pollution Control Act, as amended (33 U.S.C. 1151 et seq.) on all demonstration facilities constructed pursuant to this section. If such additional environmental requirements are imposed after the designation of the successful bidders and if such additional environmental requirements result in additional costs, the Chairman is authorized to renegotiate the support price to cover such added costs.

(e) The estimated amount of the Federal price supports of the demonstration facilities' product over the life of such facilities shall be determined by the Chairman to facilitate the congressional authorization of the full amount of such support amounts at the time of the designation of the successful bidders.

(f) There shall be established in the Treasury of the United States a Competitive Research and Development Price Support Fund which shall be available to the Chairman for carrying out the price-support program authorized by this Act, including the payment of administrative expenses incurred in connection therewith.

CONGRESSIONAL APPROVAL

SEC. 110. (a) For each proposal which is considered pursuant to section 105, and in which the potential Federal investment is estimated to exceed $10,000,000 the Chairman shall prepare and transmit to the Congress a report setting forth the following:

(1) the anticipated, research, development, and application objectives to be achieved by the activities or facilities proposed;

(2) the economic, environmental, and societal significance which a successful demonstration may have for the national fuels and energy system;

(3) the relationship of the proposal to the criteria of priority set forth in section 111;

(4) the availability of non-Federal participants to construct and operate the facilities or perform the activities associated with the proposal and to contribute to the financing of the proposal;

(5) the total estimated cost and the probable time schedule;

(6) the proposed participants and the proposed financial contributions of the Federal Government and of the non-Federal participants; and

(7) the proposed cooperative arrangement, agreements among the participants, and form of management of the activities.

(b) If the total estimated amount of the Federal contribution to the proposal does not exceed $50,000,000 the Chairman is authorized to proceed with the negotiation of agreements and implementation of the proposal as set forth in the report subject to the availability of funds under the authorization of appropriations granted in section 120(b) of this Act: *Provided*, That if said Federal contribution exceeds $10,000,000 no funds may be expended for any proposal under the authority granted by this subsection prior to sixty calendar days (which sixty days, however, shall include days on which either House of Congress is not in session because of an adjournment of more than three calendar days to a day certain) from the date on which the Chairman's report is received by the Congress.

(c) Proposals for which the total estimated amount of the Federal contribution exceeds $50,000,000 shall be implemented by the Chairman only if the implementation and the necessary appropriations are specifically authorized by the Congress in subsequent legislation: *Provided, however*, That such proposal shall recommend whether an authorization is being sought for the total estimated amount of the Federal contribution in block or on an annual basis.

DETERMINATION OF NEED FOR FEDERAL PARTICIPATION IN RESEARCH AND DEVELOPMENT

SEC. 111. In evaluating proposed opportunities for particular research and development undertakings pursuant to this Act, the Chairman shall assign priority to those undertakings in which—

(1) the urgency of public need for the potential results of the research, development, or demonstration effort is high, and it is unlikely that similar results would be achieved in a timely manner in the absence of Federal assistance;

(2) the potential opportunities for non-Federal interests to recapture the investment in the undertaking through the normal commercial exploitation of proprietary knowledge appear inadequate to encourage timely results;

(3) the extent of the problems treated and the objectives sought by the undertaking are national or widespread in their significance;

(4) there are limited opportunities for regulatory actions and incentives other than direct Federal financial assistance, including, but not limited to, end-use controls, tax and price incentives, and public education, to induce non-Federal support of the undertaking;

(5) the degree of risk of loss of investment inherent in the research is high, and the availability of risk capital to the non-Federal entities which might otherwise engage in the field of the research is inadequate for the timely development of the technology; or

(6) the magnitude of the investment appears to exceed the financial capabilities of potential non-Federal participants in the research to support effective efforts.

PATENT POLICY AND MANDATORY LICENSURE

SEC. 112. (a)(1) All research, development, or demonstration contracted for, sponsored, or cosponsored by the Government pursuant to this Act, shall require as a condition of Federal participation that all information resulting from federally assisted research shall be made available at the earliest practicable date to the general public, including nongovernmental United States interests capable of bringing about further development, utilization, and commercial applications of such results. The disposition of patent rights in inventions or discoveries

arising out of research under this Act shall be governed by the President's Statement of Government Patent Policy issued on August 23, 1971 (36 F.R. 16887, August 26, 1971) and amended in September 1973 (38 F.R. 23782, September 4, 1973).

(2) The Chairman in administering patents pursuant to this Act shall make a determination, on a case by case basis, as to whether a requested license shall be granted on a royalty-free basis or upon a basis of charges designed to recover part or all of the costs of the research.

(3)(A) Where a participant in an energy research and development project holds background patents, trade secrets, or proprietary information which will be employed in and are requisite to the proposed research and development project, the Chairman shall enter into an agreement which will provide equitable protection to the participant's rights: *Provided*, That any such agreement must provide that when the energy research and development project reaches the stage of commercial application any of the participant's previously developed background patents, trade secrets, or proprietary information necessary to commercial application of the energy process or system developed under this title, but not embodied in any commercially available equipment, devices, or apparatus useful in such commercial application will be made available to any qualified applicant on reasonable license terms including suitable confidentiality agreements, reasonable royalties and such other conditions as may be applicable, which shall take into account that the commercial viability of the total energy process or system was achieved with the assistance of public funds.

(B) As employed herein, the term "background patent" means a United States patent owned or pending by a contractor, grantee, participant, or other party conducting research or development work, or both, pursuant to this Act for or under the sponsorship or cosponsorship of the chairman of a corporation established pursuant to this Act which would be infringed by the practice of any new technology developed under the research or development work, or both, contracted for, sponsored or cosponsored pursuant to this Act, or any demonstration-type or commercial-size facility authorized by any corporation thereunder.

(b)(1) Any corporation established pursuant to this Act shall receive a royalty-free license to practice such inventions or discoveries in connection with any demonstration-type or commercial-size facility provided for hereinafter. Such license shall include the right to make, use, and sell, and shall be without territorial limitation. As used herein, the term "research" includes "development" within its scope.

(2) Any corporation established pursuant to this Act shall license to responsible parties at reasonable terms, including reasonable royalties, any patent obtained by the corporation with respect to any invention or discovery made in performance of any activity conducted pursuant to this title. Any net royalty income shall accrue to the corporation during its existence and shall be available for use by the corporation in the advancement of its purposes. On and after the dissolution of the corporation, the Administrator of General Services shall administer such patent and shall have the sole right to issue licenses thereunder: *Provided*, That participants in the corporation shall receive a royalty-free license during and after the life of the corporation: *And provided further*, That the Chairman may recommend variations from this policy which he believes to be in the public interest for the consideration of the Congress when specific corporations are proposed for authorization.

(c) Whenever the Attorney General determines, upon application of the Chairman—

(1) that—

(A) in the implementation of the requirements of this Act a right under any United States letters patent, which is being used or intended for public or commercial use and not otherwise reasonably available, is necessary to the development or demonstration of an energy system or technology pursuant to this Act, and

(B) there are no reasonable alternative methods, to accomplish such purpose, and

(2) that the unavailability of such right may result in a substantial lessening of competition or tendency to create a monopoly in any line of commerce in any section of the country,

the Attorney General may so certify to a district court of the United States, which may issue an order requiring the person who owns such patent to license it on such reasonable terms and conditions as the court, after hearing, may determine. Such certification may be made to the district court for the district court in which the person owning the patent resides, does business, or is found.

PRESIDENTIAL REVIEW

SEC. 113. (a) The President shall—

(1) in connection with any reorganization plan which he has proposed or may propose which has significant impacts upon the agencies represented on the Management Project, or

(2) immediately upon the authorization by the Congress of any reorganization which has significant impact upon the agencies represented upon the Management Project,

make his recommendations to the Congress concerning the appropriate agency and organizational arrangements to perform the functions authorized by this title.

(b) Not later than two years from the date of this Act, unless a permanent reorganization of the energy research and development functions of the Federal Government has been accomplished in the interim, the President shall report to the Congress on his evaluation of the progress of fuels and energy research and development and his recommendation for further management of the Federal research and development programs, including but not limited to—

(1) the necessity for continuing the Management Project,

(2) the appropriate membership of the Management Project if it is continued, and

(3) the appropriate agency to receive the duties, funding, and staff of the Management Project if it is to be terminated.

ADMINISTRATIVE PROVISIONS

SEC. 114. The Chairman shall be compensated at the rate provided for level II of the Executive Schedule Pay Rates (5 U.S.C. 5313).

POWERS

SEC. 115. (a) The Chairman may employ such officers and employees as may be necessary to carry out the functions of the Management Project under this title and may employ and fix the compensation of such experts and consultants as may be necessary, in accordance with section 3109 of title 5, United States Code (but without regard to the last sentence thereof);

(b) The Management Project may—

(1) acquire, furnish, and equip such office space as is necessary;

(2) use the United States mails in the same manner and upon the same conditions as other agencies of the United States;

(3) purchase, hire, operate, and maintain passenger motor vehicles;

(4) enter into contracts or agreements for studies and surveys with non-Federal public and private organizations and transfer funds to Federal agencies to carry out aspects of the Management Project's duties; and

(5) incur such necessary expenses and exercise such other powers as are consistent with and reasonably required to perform its functions under this title.

(c) The Chairman shall have the authority and be responsible for—

(1) the supervision of personnel;

(2) the assignment of duties and responsibilities among personnel; and

(3) the use and expenditure of funds.

COOPERATION OF FEDERAL AGENCIES

SEC. 116. Upon request of the Chairman, the head of any Federal department or agency is authorized—

(1) to furnish the Management Project within the limits of available funds, including funds transferred for that purpose pursuant to section 115(b) of this Act, such information as may be necessary for carrying out its functions, and

(2) to detail to temporary duty with the Management Project on a reimbursable basis such personnel as it may require for carrying out its functions pursuant to this Act, each such detail to be without loss of seniority, pay, or other employee status.

CONGRESSIONAL ACCESS TO INFORMATION

SEC. 117. The Chairman shall keep the Congress fully and currently informed of all the Management Project's activities and shall submit to the Congress an annual report.

ENVIRONMENTAL EVALUATION

SEC. 118. (a) The Council on Environmental Quality established under the provisions of the National Environmental Policy Act (83 Stat. 852) is authorized and directed to carry out a continuing analysis of the conduct of research and development of energy technologies to evaluate—

(1) the adequacy of attention to energy conservation methods,

(2) the adequacy of attention to the probable environmental effects of the application of technology, and

(3) the adequacy of attention to environmental protection in connection with energy processes.

(b) The Council on Environmental Quality, in carrying out the provisions of this section, may employ consultants or contractors and may by fund transfer employ the services of other Federal agencies for the conduct of studies and investigations.

(c) The Council on Environmental Quality shall hold annual public hearings on the conduct of energy research and development and the probable environmental consequences of trends in the application of energy technology, and the transcript of the hearings shall be published and made available to the public.

(d) The Council on Environmental Quality shall make such reports to the President, the Chairman, and the Congress as it deems appropriate concerning the conduct of energy research and development, and the President as a part of the annual Environmental Policy Report required by section 201 of the National Environmental Policy Act (83 Stat. 854) shall set forth the findings of the Council on Environmental Quality concerning the conduct of energy research and development and the probable environmental consequences of trends in the application of energy technology.

ACQUISITION OF ESSENTIAL MATERIALS

SEC. 119. To achieve the purposes of this Act, the President is authorized to take such action as may be necessary to obtain or allocate materials which are or may be in critical supply and which are essential to the expeditious progress of energy research and development efforts.

APPROPRIATIONS

SEC. 120. (a) There are authorized to be appropriated to the Chairman to remain available until expended, $2,000,000 for fiscal year 1974 and $10,000,000 annually for fiscal years 1975 and 1976 for the expenses of the Management Project in administering this Act including such amounts as may be expended for consulting services and including funds transferred to other Federal agencies in compensation for personal services in assisting the Management Project with the administration of this Act.

(b) There are authorized to be appropriated to the Chairman to remain available until expended not to exceed $800,000,000 for each of the fiscal years ending June 30, 1974 and 1975, and such amounts as may be authorized by annual authorization Acts in fiscal year 1976 to carry out the provisions of subsections 104(c), 105, 106, and 107 of this Act: *Provided*, That 1 per centum of such amounts as may be appropriated in each fiscal year under the authority of this subsection shall be made available by fund transfer to the Council on Environmental Quality for the purposes authorized and directed by section 118.

(c) The Chairman of the Management Project, in conjunction with his recommendations for annual appropriations pursuant to subsection (b) of this section, shall report to the Congress on the activities of the previous calendar year, the expenditure of funds, the new projects initiated, the projects which have been

terminated, and any new contractual arrangements entered into, and the progress which has been made during that year toward attaining the capability of domestic energy self-sufficiency for the United States within ten years of the date of enactment of this Act. In each instance where delays in scheduled accomplishments are reported, the reasons for the delays shall be set forth along with recommendations for actions, including specific estimates of additional funding, or requirements for new legislative authority which would assist in regaining the schedule.

TITLE II—GEOTHERMAL ENERGY

SEC. 201. This title may be cited as the "Geothermal Energy Act of 1973".

LOAN GUARANTEE PROGRAM

SEC. 202. (a) The Congress, in consideration of the Federal responsibility for the general welfare, to facilitate commerce, to encourage productive harmony between man and his environment, and to protect the public interest, finds that the advancement of technology by private industry for the production of useful forms of energy from geothermal resources is important to all of those areas of responsibility. It is the policy of the Congress, therefore, to encourage and assist in the commercial development of practicable means to produce useful energy from geothermal resources with environmentally acceptable processes. Accordingly, it is the policy of the Congress to facilitate such commercial development by authorizing the Secretary of the Interior to guarantee loans for such purposes.

(b) In order to encourage the commercial production of energy from geothermal resources, the Secretary of the Interior, hereinafter referred to as the Secretary, is authorized to guarantee, and to enter into commitments to guarantee, banks or other financial institutions against loss of principal or interest on loans made by such institutions to qualified borrowers for the purposes of acquiring rights in geothermal resources and performing exploration, development, and construction and operation of facilities for the commercial production of energy from geothermal resources.

(c) Any guaranty under this title shall apply only to so much of the principal amount of any loan as does not exceed 75 per centum of the aggregate cost of the project with respect to which the loan is made.

(d) Loan guaranties under this title shall be on such terms and conditions as the Secretary determines: *Provided, however,* That a guaranty shall be made under this title only if—

(1) the loan involved is at a rate of interest which does not exceed the prevailing interest rates for conventional construction loans;

(2) the terms of such loans require full repayment within thirty years after the date thereof;

(3) in the judgment of the Secretary, the amount of the loan (when combined with amounts available to the qualified borrower from other sources) will be sufficient to carry out the project; or

(4) in the judgment of the Secretary, there is reasonable assurance of repayment of the loan by the qualified borrower of the guaranteed indebtedness.

(e) The Secretary shall not guarantee any loan for any project the amount of which exceeds $25,000,000, nor guarantee any combination of loans for any single qualified borrower in an amount exceeding $50,000,000.

SEC. 203. (a) With respect to any loan guaranteed pursuant to this title, the Secretary is authorized to enter into a contract to pay, and to pay, the lender for and on behalf of the borrower the interest charges which become due and payable on the unpaid balance of any such loan if the Secretary finds:

(1) that the borrower is unable to meet interest charges, and that it is in the public interest to permit the borrower to continue to pursue the purposes of his project, and that the probable net cost to the Government in paying such interest will be less than that which would result in the event of a default, and

(2) the amount of such interest charges which the Secretary is authorized to pay shall be no greater than an amount equal to the average prime interest rate for the preceding fiscal year as determined by the Secretary of the Treasury, plus one-half of 1 per centum.

(b) In the event of any default by a qualified borrower on a guaranteed loan, the Secretary is authorized to make payment in accordance with the guaranty,

and the Attorney General shall take such action as may be appropriate to recover the amounts of such payments from such assets of the defaulting borrower as are associated with the project.

SEC. 204. No loan guaranties shall be made, or interest assistance contract entered into, pursuant to this title, after the expiration of the ten-calendar-year period following the date of enactment of this title.

SEC. 205. There is established in the Treasury of the United States a Geothermal Resources Development Fund (referred to in this title as the "fund"), which shall be available to the Secretary of the Interior for carrying out the loan guaranty and interest assistance program authorized by this title, including the payment of administrative expenses incurred in connection therewith. Moneys in the fund not needed for current operations shall be invested in bonds or other obligations of, or guaranteed by, the United States.

SEC. 206. There shall be paid into the fund the amounts appropriated pursuant to section 207 of this title and such amounts as may be returned to the United States pursuant to section 203(b) of this title, and the amounts in the fund shall remain available until expended: *Provided,* That after the expiration of the ten-year term established by section 204 of this title, such amounts in the fund which are not required to secure outstanding guaranty obligations shall be paid into the general fund of the Treasury.

SEC. 207. There are authorized to be appropriated (1) to the fund not to exceed $50,000,000 annually, and (2) such amounts as may be required for the administrative costs of carrying out the provisions of sections 201 through 206 of this title.

SEC. 208. Business-type financial reports covering the operations of the fund shall be submitted to the Congress by the Secretary annually upon the completion of an appropriate accounting period.

COORDINATION OF FEDERAL ACTIVITIES IN GEOTHERMAL ENERGY EXPLORATION, RESEARCH, AND DEVELOPMENT

SEC. 209. The Congress, in consideration of the Federal responsibility for the general welfare, to facilitate commerce, to encourage productive harmony between man and his environment, and to protect the public interest, finds that the advancement of technology with the cooperation of private industry for the production of useful forms of energy from geothermal resources is important to all of those areas of responsibility. It is the policy of the Congress, therefore, to encourage and assist private industry through Federal assistance for the development and demonstration of practicable means to produce useful energy from geothermal resources with environmentally acceptable processes. Such means shall accordingly include resource inventory, research, and financial and technical assistance in the construction of pilot plants and demonstration developments with the objective of reaching commercialization in the most timely and practicable manner.

SEC. 210. The Secretary, acting through the Geological Survey, is authorized and directed to:

(a) develop and carry out a general plan for the orderly inventorying of all forms of geothermal resources of the Federal lands and, where consistent with property rights and determined by the Secretary to be in the national interest, of non-Federal lands;

(b) conduct regional surveys, based upon such a general plan, using innovative geologic, geophysical, geochemical, and drilling techniques, which will lead to a national inventory of geothermal resources in the United States;

(c) publish and make available maps, reports, and other documents developed from such surveys to encourage and facilitate the commercial development of geothermal resources for beneficial use and consistent with the national interest;

(d) make such recommendations for legislation as may from time to time appear to be necessary to make Federal leasing policy for geothermal resources consistent with known inventories of various resources types, with the current state of technologies for geothermal energy development, and with current evaluations of the environmental impacts of such developments; and

(e) participate with the Atomic Energy Commission, the National Aeronautics and Space Administration, and the National Science Foundation in

research to develop, improve, and test technologies for the discovery and evaluation of all forms of geothermal resources, and conduct research into the principles controlling the location, occurrence, size, temperature, energy content, producibility, and economic lifetimes of geothermal reservoirs.

SEC. 211. The Secretary shall coordinate the development and implementation of the inventory authorized by section 210(a) and the applied research authorized by subsection 210(e) with the geothermal research and development program of the Atomic Energy Commission to insure that information is developed in a timely manner for the optimum progress of geothermal development.

SEC. 212. In preparing or implementing the resources inventory plan the Secretary is authorized to:

(a) employ contractors and consultants;

(b) acquire by fund transfers the services of employees and facilities of other Federal agencies; and

(c) cooperate and enter into contracts with State, regional, and local governmental agencies and educational and research institutions.

SEC. 213. The Administrator of the National Aeronautics and Space Administration, hereinafter referred to as NASA, is authorized and directed to prepare and transmit to the Secretary within six months from the date of enactment of this title a proposal for the employment of space technologies and the services and facilities of NASA for inventorying and mapping of geothermal resources.

SEC. 214. The Secretary is authorized and directed to transmit to the President and the Congress, not later than one year from the date of enactment of this title, the general plan including a schedule and objectives, for inventory of, and applied research on, geothermal resources required by section 210, and each year thereafter a report on the status of activities authorized to be performed by the Secretary under the provisions of this title.

SEC. 215. (a) The Atomic Energy Commission in cooperation with private industry is authorized and directed to:

(1) conduct, encourage, and promote basic and applied scientific research to develop effective, economical, and environmentally acceptable processes and equipment for the purpose of utilizing all forms of geothermal resources for the production of useful energy forms;

(2) Pursue the findings of research authorized by this title having potential applications in matters other than geothermal energy to the extent that such findings can be published in a form for utilization by others;

(3) conduct engineering and technical work including the design, construction, and testing of pilot plants to develop and improve geothermal energy processes and plant design concepts to the point of demonstration on a commercial scale;

(4) conduct laboratory and field experiments and tests of technologies necessary for the successful development of all forms of geothermal resources;

(5) study methods for the reduction and elimination of undesirable environmental impacts of geothermal development;

(6) study methods for the recovery and marketing of byproducts resulting from the production of energy from geothermal resources; and

(7) undertake engineering and economic studies to determine the potential for energy from geothermal resources to contribute to energy requirements on national and regional levels.

(b) The Commission shall coordinate the research and development activities authorized by this section with the activities of the Department of the Interior relating to geothermal resources research to insure the full utilization of expertise and information and to prevent duplication of efforts.

SEC. 216. (a) The Commission is authorized to investigate, negotiate, and enter into cooperative agreements with non-Federal utilities, industries, and governmental entities for the construction, operation, and maintenance of demonstration developments for the production of electric or heat energy, water supplies, or minerals from geothermal resources.

(b) No agreement shall be entered into under the authority granted by this section unless the Commission determines that:

(1) the nature of the resource, the geographical location, the scale and engineering design of the facilities, the techniques of production, or other significant factors of the proposal offer opportunities to make important contributions to the general knowledge of geothermal energy, the techniques of its development, or public confidence in the technology;

(2) the potential non-Federal cooperating entities are willing and capable to make contributions toward the capital cost of the development, to operate the facilities, and to provide a market for the energy produced;

(3) no benefits have been obtained through the loan guaranty provisions of this title and applied to development of any facility for which funding assistance pursuant to this section is proposed;

(4) the development or the practical benefits of the development as set forth in clause (1) of this subsection are unlikely to be accomplished without Federal assistance or through the assistance provided by this title; and

(5) the Federal investment in each such development project will not exceed $10,000,000.

(c) The Commission is authorized to investigate potential agreements for the cooperative development of major facilities to demonstrate the feasibility of the production of energy from geothermal resources and to submit engineering and financial proposals to the Congress for consideration of authorization to proceed with implementation of said proposals. The Commission may consider:

(1) cooperative agreements with non-Federal governmental entities and utilities for construction of facilities to produce energy for commercial disposal:

(2) cooperative agreements with other Federal agencies for the construction and operation of facilities to produce energy for direct Federal consumption.

(d) Before favorably considering proposals under subsection (c) of this section, the Commission must find that:

(1) the nature of the resource, the geographical location, the scale and engineering design of the facilities, the techniques of production, or other significant factor of the proposal offer opportunities to make important contributions to the general knowledge of geothermal energy, the techniques of its development, or public confidence in the technology;

(2) the development or the practical benefits as set forth in clause (1) of this subsection are unlikely to be accomplished without such cooperative development; and

(3) where non-Federal participants are involved, the proposal is not eligible for adequate Federal assistance under the loan guarantee provisions of this title.

SEC. 217 There are authorized to be appropriated to remain available until expended to carry out the purposes of sections 210 through 216:

(a) $10,000,000 for fiscal years 1974, 1975, and 1976 to the Secretary of the Interior;

(b) $35,000,000 for fiscal years 1974, 1975, and 1976 to the Atomic Energy Commission;

(c) such amounts as may be required in fiscal years 1974, 1975, and 1976 to NASA.

SEC. 218. As used in this title, the term—

(a) "geothermal resources" means (A) all products of geothermal processes, embracing indigenous steam, hot water, and brines; (B) steam and other gases, hot water, and hot brines resulting from water, gas, or other fluids artificially introduced into geothermal formations; and (C) any byproduct derived from them;

(b) "qualified borrower" means any public or private agency, institution, association, partnership, corporation, political subdivision, or other legal entity which the Secretary has determined has presented satisfactory evidence of a property interest in a geothermal resource identified, in a manner acceptable to the Secretary, as being of sufficient interest for research objectives or the development and production of energy, and which has the financial responsibility to establish and operate, utilizing such resource, a commercial facility;

(c) "pilot plant" means an experimental unit of small size used for early evaluation and development of new or improved processes and to obtain technical and engineering data; and

(d) "demonstration development" means a complete facility which produces electricity or heat energy for commercial disposal from geothermal resources and which will make a significant contribution to the knowledge of full-sized technology, plant operation, and process economics.

2. Amend the title to read as follows:

A bill to establish a national program for research, development, and demonstration in fuels and energy and for the coordination and financial supplementation of Federal energy research and development, and for other purposes.

I. PURPOSE OF THE MEASURE

The purpose of S. 1283, the "National Energy Research and Development Policy Act of 1973," is to provide a framework of authority and congressional policy for a national program of research, development, and demonstration of fuels and energy technologies. As reported by the Senate Interior Committee, the measure is designed to initiate a joint Government-industry program for energy R. & D. which will establish the urgency of purpose which has characterized successful national research efforts in the past, such as the space program and the Manhattan Project. The measure has the following major parts:

1. A statement of a clear and specific energy research and development strategy designed to (a) provide the United States, within 10 years, with the capability to choose domestic self-sufficiency in environmentally acceptable energy sources, and (b) initiate adequate programs for longer term research efforts designed to broaden the range of energy options in the future and to develop a range of now unconventional energy sources.

2. Interim organizational arrangements to coordinate existing energy research and development programs with new programs established under this measure pending the formal reorganization of Federal energy agencies

3. Authorization of appropriations in the amount of $800 million annually to supplement existing Federal support for energy research and development.

4. Authority and direction to prepare and submit to the Congress a comprehensive research and development strategy including specific proposals for joint Federal-industry ventures which will demonstrate the commercial feasibility of promising new energy technologies.

In its entirety, the measure will provide the congressional initiative and direction for a coordinated Federal effort in research, development, and demonstration of energy technologies. It will represent a commitment to a total Federal level of financial support which must be expected to average at least $2 billion annually over the next decade.

II. NEED FOR THE LEGISLATION

In May of 1971, the Senate authorized the Committee on Interior and Insular Affairs to undertake a comprehensive study of national fuels and energy policy. During the course of this study, the committee has conducted extensive hearings and studies into every aspect of fuels and energy policy and has published more than 80 documents—hearing records, staff, and consultant reports, committee prints, and other materials.

The committee is now in the process of concluding the information gathering and public hearings stage of the study and investigation,

and is preparing policy option papers dealing with specific recommendations for administrative action, for legislation, and for national energy policy in a number of different subject matter areas.

One of the most important conclusions which has emerged is that the Nation critically needs and must now establish a comprehensive, high-priority energy research and development program.

A major factor contributing to our present energy crisis is that the necessary research and development efforts which could have provided us with the technological options and capabilities we now need so desperately were not undertaken in the past. Fragmented management, overall inadequate funding, and uncoordinated apportionment of the funds which have been available have all contributed to the critical energy supply situation we face today.

In the United States we now have for the first time very serious absolute shortages of natural gas, fuel oil, and other forms of energy as well as shortages of environmentally acceptable forms of energy. In the months ahead many regions of the Nation will face critical shortages of heating fuel and gasoline.

These shortages are not caused by a lack of domestic energy resources. There are adequate domestic supplies of energy to meet all of our requirements for the foreseeable future. We have huge coal reserves in Appalachia and in the West. The oil shale deposits in the Western United States are an untapped energy resource of great potential. Geothermal power—the heat contained in the earth—could be a major source of energy. There are large volumes of oil and gas yet to be discovered on the Outer Continental Shelf and in the United States.

The shortages we are experiencing and the shortages that all knowledgeable commentators project in the months ahead are the direct result of the Nation's failure to anticipate energy problems and to develop policies to deal with them. This is especially true in the area of energy research and development. We have failed to move from the realm of theory into the time of commercial demonstration.

Today in the United States adequate supplies of fuels and other energy resources are available. The basic scientific theory and laboratory experimentation to convert the domestic fuels we have in abundance into usable forms of energy exist. But the technologies which would make these domestic energy sources commercially useful within acceptable environmental and economic limits have not been developed.

Until recently, neither industry nor Government has fully appreciated the magnitude of the emerging energy crisis. Even now that the crisis has been recognized, there continues to be a reluctance to undertake the aggressive research effort which is needed.

We have been faced with the national security hazards of burgeoning oil imports for many years, but neither Government nor industry has made serious efforts to improve the utility of our most abundant domestic fuels. Specifically, research on oil shale has been sporadic and unenthusiastic; in coal gasification we have only the technologies which were developed abroad more than a generation ago.

We have recognized the adverse physical and social consequence of underground coal mining since before the turn of the century, but

underground mining continues to remain a dangerous, labor-intensive process with little application of modern technologies.

Air pollution caused by electrical powerplants and the adverse impacts of strip-mining are self-evident, but far too little research has been done on methods to mitigate these impacts. Even now, efforts are totally inadequate in relation to the enormity of the problem.

This Nation depends upon electrical power for 25 percent of the life support energy of modern communities, but the electric utility industry has not developed have the flexibility to effectively deal with all of the new constraints which now exist in the management of its systems. Most generating equipment, for example, is incapable of switching from one fossil fuel to another. When one fuel runs short, the utility experiences a crisis even if alternative fuels are available.

Too little has been done to control the burgeoning energy demand. Yet, if we fail to meet a peak demand for electricity, entire cities are blacked out.

There still is no coordinated strategy by which Government and the private sector can bring the talent and resources of American technology to bear upon the complexities of energy problems. There is no appropriate organizational arrangement at the Federal level to coordinate the various programs which do exist, and there is insufficient congressional direction concerning national objectives in energy research and development.

Current Federal R. & D. programs in energy-related fields are scattered throughout a number of departments and agencies, and are largely oriented toward the specific mission of the individual agencies. The bulk of Federal energy-related research is concentrated in two agencies. Within the Department of the Interior, the Bureau of Mines and the Office of Coal Research maintain small but active energy R. & D. programs related to coal gasification, liquefaction, oil shale, geothermal energy, and petroleum extraction. The Atomic Energy Commission focuses largely on nuclear research, but has recently initiated programs for research in non-nuclear areas.

At present no centralized program exists within the Federal Government to coordinate the research efforts of the various agencies. There is no research strategy nor plan for directing R. & D. efforts over the next few decades, and very little impetus to translate research to commercial application through development projects. In addition, funding levels, particularly for nonnuclear research, have historically been extremely low relative to need, reflecting in part a lack of both focus and urgency in energy research (see table 1). For example, the total budget for fiscal year 1970 was set at a $385 million level; of this amount, $283 million was spent on nuclear fission programs and $38 million on nuclear fusion programs. The remaining $64 million was spread among all other energy forms. By fiscal year 1973, the total energy R. & D. budget had increased to $633 million. However, the nuclear fission programs had grown to $412 million, and the nuclear fusion programs to $66 million. This left the remaining total R. & D. commitment at $155 million, of which $38 million was devoted to stationary source pollution control technologies.

TABLE 1.—FEDERAL ENERGY R. & D. FUNDING PRIOR TO JUNE 30, 1973

[In millions of dollars]

Type of energy and agency [1]	Fiscal year— 1970	1971	1972	1973
Coal resources development	32.6	51.2	69.6	85.6
Production and utilization R. & D. including gasification, liquefaction, and MHD:				
DOI–OCR	13.5	18.8	30.3	43.5
DOI–BOM	7.1	8.9	9.2	13.7
Mining health and safety research: DOI–BOM				
Interior central fund (part): DOI	12.0	23.5	30.1	28.4
Petroleum and natural gas	8.8	11.5	12.9	12.8
Petroleum extraction technology: DOI–BOM	2.7	2.7	3.2	3.1
Nuclear gas stimulation: AEC	3.7	6.1	7.1	7.2
Oil shale: DOI–BOM	2.4	2.7	2.6	2.5
Nuclear fission	283.4	295.2	358.0	412.0
LMFBR:				
AEC	144.3	167.9	236.0	269.0
TVA			.2	3.0
Other civilian nuclear power: AEC	108.5	96.6	86.8	98.0
Nuclear materials process development: AEC	30.6	30.7	35.0	42.0
Nuclear fusion	37.5	42.2	52.8	65.5
Magnetic confinement: AEC	34.3	32.2	33.3	39.6
Laser: AEC	3.2	10.0	19.5	25.9
Solar energy: NSF			1.7	4.2
Geothermal energy	.2	0.2	1.4	3.4
NSF			.7	.7
DOI–GS	.2	.2	.7	2.5
DOI–BOM				.2
Electrical generation, transmission, and storage		1.3	2.2	4.9
NSF		.5	1.3	2.4
DOI		.8	.9	1.0
AEC				1.5
Control technology (stationary sources)	22.1	19.8	28.6	38.1
Air pollution control technology: EPA	19.8	17.4	24.5	29.5
SO_x removal: TVA			1.1	3.0
Thermal effects:				
EPA	.8	.6	.7	1.0
AEC	1.5	1.8	2.3	4.6
Miscellaneous			6.3	6.9
Systems and resource studies: NSF			4.4	5.3
Energetics research: NSF			1.9	1.6
Total research development	384.6	421.4	533.5	633.4

[1] DOI—Department of the Interior; OCR—Office of Coal Research; BOM—Bureau of Mines; AEC—Atomic Energy Commission; TVA—Tennessee Valley Administration; EPA—Environmental Protection Agency; NSF—National Science Science Foundation; GS—Geological Survey.

Note: Original table was prepared by Office of Management and Budget. Figures for future years are not strictly comparable because of redefinition of program areas and inclusion of areas not previously counted as Energy R. & D.

The President's budget for fiscal year 1974 reflected a growing concern for energy needs, and included certain increases in funding for energy R. & D. It initially included $886 million for work which was defined as energy R. & D., including some programs which had not previously been included in that category (table 2).

On June 29, 1973, the President proposed a 5-year, $10 billion energy R. & D. program which would be initiated with the fiscal year 1975

budget. In the interim, an increase was to be requested in the fiscal year 1974 budget.

Table 2 also indicates the derivation of the requested $115 million increase. Of that amount, $60.1 million is the total of congressional additions to the appropriations request. The remaining $55.1 million has been requested as a pending fiscal year 1974 supplemental appropriation.

TABLE 2.—ENERGY R. & D. PROGRAM MODIFICATIONS FOR FISCAL YEAR 1974

[Dollar obligations in millions]

Energy R. & D. program area	President's fiscal year 1974 budget	President's recommended fiscal year 1974 increment	Congressional writein	Total fiscal year 1974 level
1. Coal	117.4	+49.5	22.9	166.9
(a) Liquefaction	22.5	+19.0		41.5
(b) Low Btu gasification	13.1	+8.0		21.1
(c) Improved combustion	9.9	+6.0		15.9
(d) High-Btu gasification	27.4	+5.4		32.8
(e) Extraction technology (including reclamation, explosives, anthracite)	7.1	+5.0		12.1
(f) Supporting technology, systems studies and administration	7.5	+6.1		13.6
(g) Health and safety R. & D	28.3	0		28.3
2. Geothermal	4.1	+7.0	7.0	11.1
(a) Resource appraisal and exploration	3.2	+2.2		5.4
(b) Extraction and power generation technology	.7	+4.3		5.0
(c) Environmental and institutional effects	.2	+.5		.7
3. Environmental control	46.5	+12.0	10.0	58.5
(a) Near-term SO_x control (including TVA demo plant)	34.1	+5.7		39.8
(b) Advanced SO_x control	1.7	+2.3		4.0
(c) NO_x, particulates, trace elements from fossil fuels	3.5	+2.2		5.7
(d) Other control technology for fossil fuel treatment/conversion, etc	.2	+1.8		2.0
(e) Thermal pollution control	7.0	0		7.0
4. Energy conversion (including solar)	20.2	+5.0		25.2
(a) Topping cycles (including MHD)	7.0	+1.2		8.2
(b) Bottoming cycles	0	+.4		.4
(c) Improved material	1.0	+.4		1.4
(d) Advanced power systems	0	+1.0		1.0
(e) Studies	0	+1.0		1.0
(f) Solar	12.2	+1.0	1.0	13.2
5. Conservation	9.2	+6.3		15.5
(a) Residential/commercial	3.2	+3.0		6.2
(b) Industrial	.1	+.9		1.0
(c) Transportation (not including automotive power system)	3.3	+1.0		4.3
(d) General and policy studies	2.6	+1.4		4.0
6. Gas-cooled nuclear reactors	9.1	+7.1	7.1	16.2
(a) HTGR base program (including equipment)	5.3	+3.4		8.7
(b) Thorium utilization	2.0	+2.5		4.5
(c) Gas-cooled fast breeder	1.0	0		1.0
(d) Nuclear safety	.8	+1.2		2.0
7. Automotive energy R. & D	16.7	+6.0	2.0	22.7
(a) Management	3.0	+.5		3.5
(b) Basic and applied research	4.7	+1.5		6.2
(c) Exploratory development	1.3	+1.0		2.3
(d) Engine development	7.7	+3.0		10.7

See footnote at end of table.

TABLE 2.—ENERGY R. & D. PROGRAM MODIFICATIONS FOR FISCAL YEAR 1974—Continued

[Dollar obligations in millions]

Energy R. & D. program area	President's fiscal year 1974 budget	President's recommended fiscal year 1974 increment	Congressional writein	Total fiscal year 1974 level
8. Environmental effects	38.5	+5.4		43.9
(a) Health effects research (including new pollutant identification)	14.8	+4.3		19.1
(b) Ecological effects and transport research	18.0	+.9		18.9
(c) Measurement and monitoring technology development	5.7	+.2		5.9
9. Electric transmission, distribution, and energy storage	5.7	+3.2	2.1	8.9
(a) Transmission and distribution	3.0	+2.1		5.1
(b) Energy storage	2.7	+1.1		3.8
10. Nuclear fusion (magnetic confinement)	47.5	+7.3	7.3	54.8
(a) Magnetic confinement systems	30.1	+3.8		33.9
(b) Fusion technology and materials research	9.0	+1.8		10.8
(c) Magnet research	.5	+.6		1.1
(d) Other (plasma research and computer simulation	7.9	+1.1		9.0
11. Other program increases	23.0	+6.2		29.2
(a) Conversion of wastes	0	+1.0	1.0	1.0
(b) Oil and gas recovery	8.4	+1.8		10.2
(c) Resource assessment (not including geothermal)	7.3	+1.0		8.3
(d) Oil shale	2.0	+.3		2.3
(e) System studies	5.3	+1.5		6.8
(f) International programs	0	+.6		.6
12. Energy R. & D. programs not receiving further increases in fiscal year 1974:				
(a) Other nuclear fission R. & D. (including liquid metal fast breeder reactor) and nuclear materials process development	503.5	0		503.5
(b) Laser fusion	42.9	0		42.9
(c) Other	1.7	0		1.7
Total [1]	886.0	115.0		1,001.0

[1] The obligations now shown for the 1974 budget are higher than earlier reported in the 1974 budget. The increase is attributable primarily to the inclusion of categories for R. & D. not previously reported under energy (e.g., automotive R. & D., conservation, resource assessment, and research on environmental effects) and recalculation of program costs. Fiscal year 1974 figures are not strictly comparable to those in table 1.

While this increased level of funding is clearly preferable to historical commitments, it is insufficient in a number of ways. Perhaps most important, funding in and of itself does not necessarily provide orderly or centralized direction to an R. & D. effort. The Nation is still in need of a coordinated national energy R. & D. program focused on rapid and timely commercial application of new energy technologies.

Recognizing the importance of such an R. & D. strategy, the committee sponsored a study by Resources for the Future of energy R. & D. needs from now through the beginning of the next century, including alternative strategies for meeting those needs. The report describes research requirements in the following areas of greatest concern for the near term: Coal liquefaction, coal gasification, shale oil development, and development of advanced power cycles. For the longer term, emphasis is placed on fusion, geothermal and solar en-

ergy. In addition, a number of commercial and demonstration synthetic fuel plants are described which can be built now with known technologies. The report further discusses different levels of commitment that could be devoted to energy R. & D.: Continuation of present efforts; a prudent increase in research and development efforts; and a Manhattan Project style "crash" program for energy R. & D.

Annual funding to achieve the energy R. & D. goals set forth in this program, to provide a long-term capability for efficient energy self-sufficiency, is estimated to be $2 billion a year for the next decade.

In addition to the levels of funding for general R. & D. for existing programs and the supplemental funds in the amount of $800 million which would be authorized by S. 1283, large demonstration efforts in specific technologies will have to be approved by later legislation. This measure, S. 1283, as reported by the committee, provides that proposals for carrying out demonstrations of various energy technologies must be promptly submitted to the Congress for specific authorization. The committee recognized that these demonstrations will be costly, however, it believes that the urgency of national needs justifies such expenditures. As examples of the costs involved, a demonstration plant for producing high Btu gas from coal with a 250 million cubic feet per day capacity may cost over $300 million and a demonstration plant for producing oil from coal with a 50,000 barrels per day capacity may cost over $500 million.

Separate efforts for demonstration and for research efforts are warranted for several reasons. Experience in a variety of R. & D. programs has shown that there are crucial differences in approach, management, expertise, and attitude between classical (basic and applied) research activities on one hand, and the successful completion of prototype plants or commercial demonstrations on the other.

For example, there is a tendency for research people involved in new and unproven technologies to wait for further research advancements which might improve the performance, efficiency or economics of prototype applications. This tendency has retarded the timely, successful development of large-scale commercial plants consistent with national, as distinguished from corporate or technical needs and interests. The problems associated with the continuous operation of large-scale commercial developments (that is, construction contract administration, product storage and distribution, handling quantities of feedstock or raw materials, marketing problems, and general systems problems) are very different from those associated with bench-size experiments. Thus, there is a general tendency for research to emphasize refinement of scientific knowledge while the massive problems and costs of full-scale application remain relatively unproven and often unexplored.

S. 1283 as ordered reported by the committee reflects an effort to implement the kind of far-reaching and coordinated energy R. & D. strategy as outlined in the special report on research and development prepared by Harry Perry, under a contract between the Interior Committee and Resources for the Future. The bill provides not only for significant increases in funding, but also for coordination and focus of effort through the beginning of the next century.

Specifically, the bill provides for a comprehensive Federal energy research and development strategy and for individual major demonstration proposals to be submitted to the Congress for separate authorization and implementation.

The bill further provides for immediate Federal research activities on the development of the following energy technologies: Production of low sulfur boiler fuel; production of synthetic gas, as from coal gasification; production of syncrude and coal liquefaction, demonstration of advanced power cycles; demonstration of geothermal technologies; oil shale development; improved methods for extraction of petroleum and coal resources; demonstration of solar energy; improvements of environmental control systems; and demonstration of energy conservation technologies.

Mid-term research provided for in S. 1283 includes a continuation of these short-term undertakings, plus: Improved transportation and storage of electricity; demonstration of the viability of hydrogen as a primary energy supply; demonstration of power generation from fuel cells; and development of synthetic energy supplies from agricultural products and wastes.

Additional long-term research required by the bill includes demonstration of fusion power and commercial application of previously demonstrated technologies. Such a timely, well-funded and coordinated program is essential to achieving a goal of energy self-sufficiency.

III. COMMITTEE AMENDMENTS

The committee amended S. 1283 by striking everything after the enacting clause and substituting a new text. The principal changes in the new text are as follows:

1. The congressional findings have been supplemented to specifically state that at a minimum, a national commitment to a 10-year, $20 billion energy research, development, and demonstration program is warranted by the urgency of national energy problems.

2. The statement of congressional policy has been revised to emphasize further the goal of national self-sufficiency through the use of domestic energy resources.

3. The statement of research priorities has been expanded and made more specific to provide congressional guidance for the preparation of a detailed strategy for Federal support for energy research and development, to achieve solutions to (a) immediate and short-term (until the early 1980's) energy and related environmental problems, (b) middle-term (1980's to 2000) problems, and (c) long-term (beyond 2000) problems.

4. Emphasis upon energy conservation research has been strengthened throughout the bill.

5. The congressional policy regarding potential forms of Federal support for and participation with industry in demonstrations of new energy technologies has been expanded and made more specific.

6. The policies regarding patents arising out of research performed pursuant to the act have been made more flexible to reflect the diversity

of possible cooperative research arrangements which may be forthcoming.

7. A new section 118 has been added which provides for an independent program coordinated by the Council on Environmental Quality to carry out a continuing analysis of the adequacy of attention to energy conservation and environmental research under the provisions of this measure.

8. The specific authorizations of joint Federal-industry corporations for the commercial demonstration of several energy technologies which were contained in titles II through VI of the bill as introduced have been deleted. Instead, the Chairman of the Energy Management Project established by this measure would be authorized and directed to select the appropriate form of Federal support for demonstrations and make recommendations to the Congress on a case-by-case basis. The joint corporation form could be selected, and a model structure for such a potential corporation is set forth in section 108 of the bill.

9. A new title II has been added which sets forth a comprehensive program for Federal assistance in the development of geothermal energy. The text of the new title II is adopted from S. 2465, a bill which has been under consideration before the Subcommittee on Water and Power Resources.

IV. LEGISLATIVE ACTION IN THE SENATE RELATED TO ENERGY RESEARCH AND DEVELOPMENT

Senate concern for energy research and development dates to 1943 with the introduction by Senator O'Mahoney, Chairman of the Senate Interior Committee, of the Synthetic Liquid Fuels Act. A similar measure was introduced by then Representative Jennings Randolph of West Virginia in the House of Representatives. Subsequent enactment of this measure in 1944 initiated an eight-year program for the construction and operation of demonstration plants to produce synthetic liquid fuels from coal, oil shale, agricultural and forestry products, and other substances in order to conserve and increase the oil resources of the United States.

More recently, on March 2, 1961, Senator Randolph introduced Senate Resolution 105, providing for the creation of a Senate Special Committee on a National Fuels Study. The measure was passed Septemper 11, 1961, and in 1962 the study group was established in the Committee on Interior and Insular Affairs, with ex officio members, including Senator Randolph, from other committees.

The study group completed reports on various energy issues, including development of a domestic shale oil industry, the role of Government-sponsored energy research, and energy self-sufficiency.

Since then, a number of Senate resolutions and bills have been passed relating to specific and particular energy research needs. But no comprehensive energy R. & D. program resulted.

Subsequently, in 1971, the Senate initiated the National Fuels and Energy Policy Study. The events leading up to the initiation of this study are described in the "Legislative History of Senate Resolution 45," prepared by the Senate Committee on Interior and Insular Affairs:

> By the summer of 1970 it was becoming increasingly apparent that the abundant supply of low-cost energy that had characterized the American economy would no longer be available. During the previous year, hearings on the declining reserves of natural gas had been held by the Senate Interior Committee and there was general agreement among the witnesses that the gas reserve to production ratio would continue to decline. During the summer and fall of 1970 brownouts occurred in some parts of the country due to a lack of electric generating capacity.
>
> On July 16, 1970, Senator Randolph introduced S. 4092 to establish a Commission on Fuels and Energy. The bill was cosponsored by more than 50 other Senators. On introducing the bill Senator Randolph said:
>
> > This Commission would make a detailed investigation and study of the energy requirements and fuel resources and policies of the United States with respect to the different type of fuels and energy, and would report to the President of the United States and to the Congress . . .
>
> Hearings on S. 4092 were held by the Subcommittee on Minerals, Materials, and Fuels of the Committee on Interior and Insular Affairs on September 10 and 11, 1970. Statements were received from forty-four witnesses. . . .
>
> By the time of the hearings the bill had 61 cosponsors and several more were subsequently added.
>
> Both management and labor organizations of the coal industry strongly endorsed the bill.
>
> In general the coal industry witnesses were concerned over the imbalance in Federal research and development funds among the fuel sources. This concern was expressed by the National Coal Policy Conference witness as follows:
>
> > Will the Government correct its present imbalance in Federal funds for energy and fuels research and development? Important as nuclear power is, there are processes for making gas from coal, extracting oil from shale, and other synthetic fuel and energy generation developments which warrant substantial Federal attention in terms of money and men. Most of these processes would create little, if any, pollution and several of them, if successful, may well achieve significant cost reductions in the generation of electricity. Magneto-hydrodynamics and fluidized-bed combustion are examples.
>
> The major theme of all the witnesses was the need for a long-range, coordinated natural energy policy which would prevent the various agencies with energy responsibilities from following conflicting courses of action.
>
> Despite the unanimity of opinion among all the witnesses concerning the need for a national energy policy to prevent future shortages and to assure adequate supplies of secure energy at low costs, no further action on S. 4092 took place

in the 91st Congress. This inaction was the result of both the position taken by the administration with respect to the need for a commission and the termination of the 91st Congress. On December 11, in a letter to the Chairman of the Committee on Interior and Insular Affairs from G. A. Lincoln, Director of the Office of Emergency Preparedness, the administration repeated the position it had taken earlier in a letter to Senator Jackson dated November 5, 1970, from the Office of Management and Budget, Executive Office of the President:

> It would appear that the study proposed by S. 4092 would closely parallel and duplicate the study requested by the President which is now well underway. By contrast, enactment of S. 4092 and appropriation of funds to support the proposed Commission, appointment of Commission members, selection of Commission staff, and other necessary organizational steps would necessarily delay the commencement of the Commission's study.
>
> Consequently, to avoid duplicative studies and to avoid the delays that would result if the Commission study were substituted for the Council study, I recommend against the enactment of S. 4092.

On December 22, 1970, Senator Randolph summarized the actions that the Senate had taken with respect to S. 4092 and reported on the adverse view expressed by the Office of Management and Budget. He then suggested that:

> In view of the administration's reluctance to participate in a joint executive-congressional study along the lines proposed in S. 4092, Senator Jackson and I have reviewed alternatives. We are in agreement that the most feasible vehicle for an urgently needed congressional effort would be a resolution empowering the Senate Committee on Interior and Insular Affairs to make a detailed fuels and energy study and to report its recommendations during the 2-year life of the next Congress beginning in January 1971 and extending to January 1973. No other means is known that can activate this vital effort without further lengthy delay.

On introducing Senate Resolution 45 on February 4, 1971, which would authorize the Senate to make a study of national fuels and energy policy, Senator Randolph disagreed with the administration position concerning the need for a commission.

[However,] since the Commission was not acceptable to the administration, he suggested an alternative:

> The administration, nevertheless, has made its decision not to be a partner in a Fuels and Energy Commission with congressional and nongovernmental members. That is its prerogative. The exercise of that prerogative kills the commission concept. But killing the commission concept and placing reliance entirely on the proliferated activities in the executive branch does not necessarily solve the fuels and energy problems which many knowledgeable persons consider to be of crisis proportions over the long range, even though some shortrange solutins may have emanated from the several instrumentalities created by the President.
>
> Realism forces us to write off the Fuels and Energy Commission approach. Nevertheless, there is too much need for prompt and careful attention to the fuels and energy crisis within the legislative branch for that attention to be excessively delayed. Hence, with the cosponsorship of the junior Senator from Washington (Mr. Jackson), Chairman of the Committee on Interior and Insular Affairs, and other Senators, I am introducing today a Senate resolution to authorize a study of national fuels and energy policy by the Interior Committee, with the cooperation and assistance of the bipartisan leadership of the Committees on Commerce, Public Works, and Atomic Energy.

The objectives of Senate Resolution 45 and S. 4092 were nearly identical except for the vehicle to carry out the study. Under Senate Resolution 45, the Senate would proceed with its own study, using staff employed for this purpose, and would report recommendations to the Senate for a national energy policy.

As there had been for S. 4092, there was unanimous agreement about the need for the development of a national fuels and energy policy as contemplated by Senate Resolution 45. The reasons were stated by Senator Randolph when he said:

> My objective in introducing Senate Resolution 45 was to insure that crisis not repeat itself. The immediate goal of the President's Domestic Council is to formulate our energy goal for the 1970's. The charter of the study under Senate Resolution 45 is to define and provide a definitive national fuels and energy policy for the next 20 or 30 years, where none now exist.

On April 5, 1971, the Senate Interior Committee issued Report No. 92–53 to accompany Senate Resolution 45 favorably reporting on the resolution. The committee amended the original resolution to reflect its complementary nature with the Mining and Minerals Policy Act of 1970 and also adopted a technical amendment regarding funding. The report was sent to the Committee on Rules where after several clarifying and technical amendments the resolution was reported (No. 92–87) favorably on April 26, 1971. The resolution was agreed to by the Senate on May 3, 1971.

Pursuant to Senate Resolution 45, the Senate Committee on Interior and Insular Affairs has conducted numerous hearings relating directly to energy research development needs:

President's Energy Message, June 15, 1971.
Energy Policy and National Goals, October 20, 1971. (Part I)
Energy Policy and National Goals, October 20, 1971.(Part II)
Department of the Interior Oil Shale Leasing Program, November 15, 1971.
Development in Coal Gasification, November 18, 1971.

Problems of Electrical Power Production in the Southwest, Albuquerque, N. Mex., May 24, 1971. Las Vegas, Nev., May 25, 1971. Salt Lake City, Utah, May 26, 1971. Durango, Colo., May 27, 1971. Page, Ariz., May 28, 1971. Washington, D.C., November 10, 1971.

Problems of Electrical Power Production in the Southwest.

Proposed Energy and Mineral Resources Administration, S. 2410 to Establish a Department of Natural Resources, January 28, 1972.

Advanced Power Cycles, February 8, 1972.

Federal Energy Research Programs and Priorities, June 7, 1972.

Geothermal Energy Resources and Research, June 15 and 22, 1972.

Conservation of Energy, March 22 and 23, 1973.

Conservation of Energy and S. 2176, the National Fuels and Energy Conservation Act of 1973, August 1, 1973.

The President's Energy Message of 1973 and S. 1570, the Emergency Fuels and Energy Allocation Act of 1973, May 1, 1973.

Coal Policy Issues, June 6, 7, and 8, 1973. (Part I)

Coal Policy Issues, June 6, 7, and 8, 1973. (Part II)

Coal Policy Issues, June 6, 7, and 8, 1973. (Part III)

S. 1283, the National Research and Development Policy Act of 1973, June 21, 22 and July 11, 12, 1973.

A number of committee prints were also prepared relating to energy R. & D. issues:

Considerations in the Formulation of National Energy Policy.

Studies and Reports Relevant to National Energy Policy.

Goals and Objectives of Federal Agencies in Fuels and Energy.

Conservation of Energy.

Summary Report of the Cornell Workshop on Energy and the Environment, February 22–24, 1972.

Federal Resources (Funding and Personnel) in Energy Related Activities, fiscal years 1972 and 1973.

Federal Energy Organization.

Factors Affecting the Use of Coal in Present and Future Energy Markets.

Summary of the Energy Conservation and Development Recommendations Contained in the Final Report of the National Commission on Materials Policy, June 1973.

History of Federal Energy Organization.

In one of these prints, "History of Federal Energy Organization," the following assessment was made of Federal energy research and development efforts through 1973:

> Research and development in energy areas have evolved in much the same way as general national scientific policy. When public issues or projects have arisen that have necessitated scientific investigation the Federal agencies involved have carried out their own research with very little concern for cooperative effort among agencies. There have been minimal attempts to centralize research efforts in broad policy areas except to consider short-term problems.
>
> There are actually two threads to be traced concerning research and development history in the Federal Government

> in order to understand where the Government stands today with regard to energy research policy. First, there are certain agencies with energy-related activities which have undertaken research when it was required for the administration of their responsibilities. Second, intermittent efforts have been made since the Nation's inception to establish a scientific organization in the Government which would have authority to support and coordinate all important research and development necessary for the formation and implementation of public policy.

The difficulties inherent in such an ad hoc approach are illustrated by the following excerpts taken from Selected Readings on the Fuels and Energy Crisis (92–4):

> There's a vast difference between fuel resources on one hand and energy actually on tap for the consumer on the other, producers emphasize. The leadtime for bringing any one of these resources to market is estimated at 3 to 7 years.
>
> Reasons are legion why energy supplies are now running short:
>
> (*1*) *Government energy policy has been nonexistent. Regulation of various fuels policies has been determined by 48 governmental agencies and 14 congressional committees. The decisions of these disparate groups are often at cross purposes with one another—playing havoc with any overall fuels approach.*
>
> "We have the resources," stated Gen. George A. Lincoln, director of the President's Office of Emergency Preparedness (OEP), in an interview. "But we need to get moving with technology, exploration, and development in order to have then available."

In an effort to encourage the development of new energy resources, Senator Henry M. Jackson, on May 12, 1971, introduced S. 1846, a bill to establish a Coal Gasification Development Corporation. Although the bill had 15 cosponsors, it was strongly opposed by the administration. Hearings were held on July 27 and 28, 1971, but no further action was taken by the Senate. In his opening statement at those hearings, Senator Jackson reiterated the need for a massive R. & D. effort in the energy field:

> All we need now is to marshal our scientific and technological resources to do what we hope can be done. I am confident that if we give it the kind of priority that is needed here, we can in fact come up with some real answers as we face the energy crisis, not just in this decade but for the balance of this century.
>
> Over the years, I have watched a lot of R. & D. efforts get underway only to find that we have not been hard nosed enough about some of these problems. The result has been that we had delays, and delays can result in a lack of confidence and faith in the effort.

In the next Congress, Senator Jackson introduced S. 1283, a bill to establish a massive federally-sponsored national program for re-

search development and demonstration in fuels and energy. This bill was the first legislation to describe a comprehensive energy R. & D. program for a number of different technologies and fuels. Specifically addressed were coal liquefaction, coal gasification, oil shale development, geothermal steam, and solar power, directed from a centralized agency.

Hearings on the bill were held before the full committee on June 21 and 22, and on July 11 and 12, 1973.

Witnesses included:

June 21, 1973

O'Leary, John F., Director of Licensing, Atomic Energy Commission.
Starr, Dr. Chauncey, president, Electric Power Research Institute.
Swidler, Hon. Joseph C., chairman, New York State Public Service Commission.
Wiesner, Dr. Jerome B., president, Massachusetts Institute of Technology.

June 22, 1973

DiBona, Charles, Special Consultant to the President.
Nassikas, Hon. John N., Chairman, Federal Power Commission.
Ray, Dr. Dixy Lee, Chairman, Atomic Energy Commission.

July 11, 1973

Harris, Shearon, chairman and president, Carolina Power & Light; chairman, Edison Electric Institute Research Division, executive committee, accompanied by John Conway, Consolidated Edison Co., New York, and John J. Kearney, vice president, Edison Electric Institute.
Houthakker, Prof. Hendrik S., department of economics, Harvard University.
Mitchell, Prof. Edward J., Graduate School of Business, Cornell University.
Radin, Alex, general manager, American Public Power Association, Washington, D.C.
Udall, Hon. Morris K., U.S. Representative from the State of Arizona.

July 12, 1973

Bagge, Carl E., president, National Coal Association.
Clam, Herbert D., president, National Fuel Gas Co.
MacKenzie, Dr. James, joint scientific staff, Massachusetts and National Audubon Societies.
Moss, Laurence I., president, Sierra Club, Washington, D.C.
Partridge, John, chairman of the board and chief executive officer of Columbia Gas System, Inc., of Wilmington, Del.
Rodgers, William H., Jr., professor of law, Georgetown University, Washington, D.C.
Symington, Hon. Stuart, U.S. Senator from the State of Missouri.
Walske, Carl, president, Atomic Industrial Forum, Inc.
White, Dr. Philip C., on behalf of the American Petroleum Institute.

Full committee markup sessions were held on September 18, October 23, November 2, 13, 26, and 27.

The following Senators were co-sponsors of S. 1283 as of the date of this report: Mr. Jackson, Mr. Randolph, Mr. Magnuson, Mr. Mansfield, Mr. Pastore, Mr. Bible, Mr. Church, Mr. Eastland, Mr. McClellan, Mr. Robert C. Byrd, Mr. Humphrey, Mr. Cannon, Mr. Moss, Mr. Hatfield, Mr. McGee, Mr. Symington, Mr. Inouye, Mr. Stevens, Mr. Bayh, Mr. Williams, Mr. Haskell, Mr. Eagleton, Mr. Tunney, Mr. Johnston, Mr. Huddleston, Mr. Cook, Mr. McGovern, Mr. Bentsen, Mr. Abourezk, Mr. Bartlett, Mr. Beall, Mr. Brooke, Mr. Burdick, Mr. Case, Mr. Domenici, Mr. Fannin, Mr. Gravel, Mr. Gurney, Mr. Hansen, Mr. Javits, Mr. Mathias, Mr. McClure, Mr. Metcalf, Mr. Modale, Mr. Nelson, Mr. Pell, Mr. Ribicoff, Mr. Schweiker, and Mr. Taft.

Legislative History of Title II "The Geothermal Energy Act of 1973"

The Senate Committee on Interior and Insular Affairs has been concerned with geothermal resources for many years. Under the leadership of Senator Bible, the committee developed legislation which culminated in the Geothermal Steam Act of 1970 (30 U.S.C. 1001–1025).

In June of 1972, as a part of the committee's study of National Fuels and Energy Policy being conducted pursuant to Senate Resolution 45, 92d Congress, hearings were held on geothermal energy resources and research which provided an overview of the state of technology and the potential of the resource as a new energy source.

On June 13, 1973, the Subcommittee on Water and Power Resources began a detailed investigation of the potential for the production of power from geothermal resources with a hearing in Washington, D.C. At that hearing the following Federal agencies, which have programs related to geothermal energy, were requested to present testimony in response to specific questions posed by the subcommittee:

(1) The Department of the Interior.
(2) The Atomic Energy Commission.
(3) The National Science Foundation.
(4) The National Aeronautics and Space Administration (NASA).
(5) The Department of State.

Subsequent to that hearing, the subcommittee conducted field hearings and inspections of existing and potential geothermal developments. On August 8, an inspection was made of the Geysers Geothermal Power Development of the Pacific Gas & Electric Co. in California, which is the only operating geothermal electric facility in the United States.

On August 10, an inspection was made by helicopter of geothermal areas in southern Idaho, which are being considered for early development for power production. On that date, also, the subcommittee held a public hearing in Idaho Falls, Idaho, to take testimony from witnesses including public officials, authorities in geothermal energy, representatives of industrial concerns involved in energy and various citizens groups and individuals.

On August 11, a similar subcommittee hearing was held in Klamath Falls, Oreg. The hearing at Klamath Falls was conducted at the Oregon Technical Institute, in a modern academic building complex which is entirely heated from geothermal wells.

The results of the subcommittee's investigations have been compiled in a report to the Senate which will be available shortly.

S. 2465, a bill introduced on September 24, 1973, by Senators Bible, Fannin, Bartlett, Buckley, Church, Hansen, Haskell, Hatfield, Jackson, Johnston, McClure, and Metcalf, is to a considerable extent based upon the evidence of the investigation concerning the need for definition of the Federal role in geothermal energy.

The Subcommittee on Water and Power Resources held a hearing on S. 2465 on November 7, 1973. The text of S. 2465, with minor amendments, was adopted as a new title II of S. 1283 on November 27, 1973.

V. COMMITTEE RECOMMENDATION

The Committee on Interior and Insular Affairs, by unanimous vote of a quorum present at an open executive session on November 27, 1973, recommends that S. 1283, as amended, be enacted.

VI. SECTION-BY-SECTION ANALYSIS

Short Title

The short title of the act is "National Energy Research and Development Policy Act of 1973."

Title I—Coordination and Augmentation of Federal Support for Research and Development of Fuels and Energy

Section 101. Statement of findings

Section 101 enunciates a series of congressional findings regarding the need for a National Energy Research and Development Policy. A declaration is made that the United States is currently suffering from a critical shortage of environmentally acceptable forms of energy and that this energy supply shortage is compounded by a past and present failure to formulate a comprehensive and aggressive energy research and development strategy. The bill also attributes the shortage to economic factors which have inhibited the timely development of new energy technologies.

Such economic factors include the fact that historically low prices for conventional fuel have inhibited the development of unconventional fuels which are more expensive to produce.

Subsection 101(b) specifically notes that there presently is no comprehensive and aggressive Federal research and development strategy designed to make available to the American consumers our country's large domestic energy resources, including fossil fuels, nuclear fuels, geothermal resources, solar energy, and other unconventional sources of energy.

This situation is attributed to fragmentation among many agencies and departments of the Federal Government's responsibilities for conducting and assisting energy research, development, and demonstration projects. This fragmentation is found to result in an overall Federal program that has not been planned and managed in a rational and coordinated manner. As a consequence the bill finds that there now exist inadequate Federal organizational arrangements and levels of funding for energy research, development, and demonstration which have combined to limit the Nation's current and future options for dealing with existing domestic energy shortages.

Finally, subsection 101(c) finds that the urgency of the country's critical energy problems now will require a national commitment by Government, industry, and other affected societal institutions similar to those undertaken in the Manhattan Project and the Apollo and other space programs. It is the Committee's finding that a comparable level of national commitment to the emergency facing our country will require a ten-year research, development, and demonstration program with a minimum level of funding of $20 billion. Unlike the Manhattan and Apollo Projects, however, the "products" developed under a stepped-up national energy research and development program will be used primarily by consumers in the private sector and not exclusively by the Government itself. This important difference highlights the need to develop within the private sector the continued capability of private industry to meet the total energy needs of the American public.

Section 102. Statement of policy

Section 102 sets forth a national goal and states that the principal purpose of the act is to develop "within 10 years the option and the capability for the United States to become energy self-sufficient" through relying on domestic energy resources by means which are socially and environmentally acceptable.

In the achievement of this national goal the policy is enunciated by the Congress that there be established and maintained "a national program of basic and applied research and development" on all aspects of the energy supply system, including discovery, production, transportation, distribution, and conversion of energy resources and fuels. This program is to be adequate to meet six policy objectives.

The first policy objective (subsection 102(a)) is to encourage the conservation of energy resources. This is to be accomplished, in part, through more efficient development, production, conversion, and use of energy resources.

Noting that primary energy resources are both nonrenewable and limited by natural and geological factors, the objective is to optimize their long-term benefits for society through improvements in all aspects of the energy supply system from the standpoint of conservation and efficiency. The premise is that waste of energy resources as a result of this inefficient use must be viewed as contrary to the public interest from the standpoint of overall societal, economic, and environmental concerns.

The second objective (subsection 102(b)) is to fully support the goals and essential needs of modern society including the societal objectives established by Federal, State, and local government. Achievement of such a societal objective will require the insurance of an "adequate, reliable, economical, and environmentally acceptable energy supply system."

Thus, the bill recognizes the close interrelationship and dependence between national goals and energy policy. Moreover, this objective supports in principle the achievement of the goals and objects of other national policies through the establishment of a national energy research and development policy. The committee intends that such policy insure that sufficient energy supplies are available so as not to indirectly or inadvertently constrain or jeopardize the achievement of established goals and objectives of national policy, including a viable economy with low rates of unemployment.

The third objective (subsection 102(c)) is to foster the expeditious transfer of the results of research on new energy technologies into commerical application by the private sector. This is to be accomplished through Federal assistance and participation in the demonstration of new and improved energy technologies to determine their engineering and economic feasibility, including their societal, economic, and environmental costs and benefits.

The premise is that through such Federal assistance and participation the commercialization of new energy technologies can be accelerated through joint Government-industry sharing of the risks of such development particularly where such risks are sufficiently high that the private sector development of new energy technologies would be deferred. Federal participation is intended to facilitate concurrent pursuit of new energy technologies and systems where such development otherwise would occur in series.

The committee also intends that the Federal program support several possible systems for each new energy technology to determine their comparative engineering and economic feasibilities. It is recognized that the environmental problems and economic costs of each system will vary; consequently, for some technologies and individual systems, upon demonstration of the first full pilot plant or full-scale system, further commercial development may prove to be impractical.

Federal participation in the joint Government-industry demonstration of new energy technologies can therefore insure not only the timely commercialization of such technologies but that the most economical and environmentally acceptable system ultimately reach commercialization.

The Committee believes the public interest can best be protected by ensuring competition among energy sources. Thus, when alternative energy sources are developed, competition for energy markets will intensify and the consumer will be protected. The sooner such alternatives are developed, the sooner the burden of fuels allocation can be removed.

The fourth objective (subsection 102(d)) is to assure the development of an aggressive Federal research strategy and priorities to find solutions to the United States' energy supply problems between now and the early 1980's. This research strategy and its associated priorities reflect our immediate national problems which involve all aspects of the energy supply system and their associated environmental impacts. This research strategy is to make full use of the capabilities of the private sector as well as Government to foster the expeditious development and commercialization of new and improved energy technologies, consistent with environmental policies. When the United States develops its own capability for self-sufficiency in fuels, vulnerability to foreign manipulation of energy supplies and prices will be reduced and the capability of exercising a truly independent foreign policy will be enhanced.

The fifth objective set forth in subsection 102(e) is to develop similar Federal research strategy and priorities for technologies which offer the potential for satisfying the U.S. energy supply needs between the early 1980's and 2000 (middle term) and during the 21st Century (long term). The required Federal research strategy and priorities are to provide for the development of the widest possible range of energy supply system options for the utilization of domestic nonnuclear energy resources consistent with applicable environmental policies. The emphasis of the research strategy for the middle term and long term is on flexibility of choice among new energy technologies; while the emphasis of the short-term strategy is to find solutions to the immediate problems associated with the energy supply systems and their environmental impacts.

The sixth objective (subsection 102(f)) is to establish within the Federal Government a central focus where the responsibility and institutional capability can exist for maintaining a continuing assessment and overview of the total national energy research, development, and conservation activities, including research performed by Government, private industry, and nonprofit organizations. For this purpose authority is vested in the Energy Research Management Project established pursuant to section 103 and is to remain in effect until such time as there is a reorganization of Federal energy agencies and activities to attain and support the objective of both this Act and other aspects of national energy policy.

Section 103. Energy Research Management Project

Section 103 establishes an interagency Energy Research Management Project to administer the provisions of the act. The Management Project is provided in subsection 103(b) with an independent Chairman who is appointed by the President, with the advice and consent of the Senate. During his term of service the Chairman is specifically restricted from holding any other position as an officer or employee of the United States other than as a retired officer or retired civilian employee of such.

The Management Project, as an interagency body, also is to be composed of the following individuals:

(1) one Assistant Secretary of the Interior who shall be designated by the Secretary of the Interior;

(2) one Commissioner of the Atomic Energy Commission who shall be designated by the Chairman of the Commission;

(3) one Commissioner of the Federal Power Commission who shall be designated by the Chairman of the Commission;

(4) the Director of the National Science Foundation;

(5) one Assistant Administrator of the Environmental Protection Agency who shall be designated by the Administrator of the Agency;

(6) one Assistant Administrator of the National Aeronautics and Space Administration who shall be designated by the Administrator;

(7) the Director of the National Bureau of Standards; and

(8) such appropriate representatives of other executive agencies which the President finds have a significant and continuing role in energy research and development.

The committee envisions that the Management Project operate through an independent Chairman with a small technical and budget staff who are assisted by representatives of the existing Federal agencies which have responsibilities and programs in energy research, development, and demonstration. The duties of the management project are set forth in section 104.

The committee does not intend that the Management Project result, in any way, in a reorganization of any existing Federal energy functions and activities. Rather it is intended that the Management Project enable the Federal Government to now undertake an aggressive start on a comprehensive research strategy pending completion of presently proposed Government reorganization for energy which is complex and will be time-consuming. The establishment of the Management Project is not intended in any way to disrupt the progress of ongoing programs which are sorely needed at this time. At such time as a permanent lead agency is established by statute for the administration of Federal energy research and development, it is intended that the duties and budget of the Management Project be assigned to that new agency by statute.

Section 104. Duties

Section 104 sets forth the duties of the Management Project requiring that a review be conducted of the full range of Federal activities in and financial support for fuels and energy research and development. Consideration is to be given to similar energy research and development activities being conducted by industry and other non-Federal entities to determine the capabilities for a combined effort to carry out the policies established by this act and other relevant Federal policies, particularly the National Environmental Protection Act of 1969.

In carrying out the duties set forth in subsection 104(a), the Management Project is also to give particular attention to the development of the necessary technologies for the timely implementation of national air-pollution control and water-pollution control policies. The committee intends that the Management Project work closely in this regard with the Environmental Protection Agency toward the timely implementation of requirements stemming from the Clean Air Act, as amended, and the Federal Water Pollution Control Act, as amended.

Subsection 104(b) requires the Management Project to formulate a comprehensive energy research and development strategy for the Federal Government which reflects all aspects of the energy supply system and its attendant environmental implications. In the formulation of this comprehensive energy research and development strategy,

full consideration and adequate support is to be given to those technologies outlined in general in subsection 104(b). This strategy also is to reflect the specific research priorities established by statute in section 106.

The bill sets forth three general categories of research and development subjects to provide examples of the areas which ought to be given consideration in developing a research and development strategy and programs. The lists are not intended to exclude by intentional omission any area of interest, but are intended to suggest the most comprehensive attention to potential research subjects.

The first category (subsection 104(b)(1)) includes improvements in the efficiency, conservation, and environmental effects of conventional energy systems. Examples of research which might be included within this category would be improved methods of drilling for petroleum and tertiary recovery of petroleum.

The second category, subsection 104(b)(2) includes research into unconventional energy technologies. The items listed are intended to imply the broadest definitions. For example, the use of agricultural products for energy includes consideration of both direct uses of agricultural products, by products and wastes as fuels and the sophisticated production of fuels such as alcohol from surplus agricultural products.

The third category, subsection 104(b)(3), includes research into the improvement of management techniques which as an example might include the application of systems analysis and computer modeling to fuel distribution systems to determine methods of reallocating fuels during temporary conditions of shortages.

The Management Project is authorized to implement this strategy by the transfer of supplementary funds to ongoing Federal energy research and development programs and by utilizing the facilities, capabilities, expertise, and experience of Federal agencies; national laboratories, including national contract laboratories such as those of the Atomic Energy Commission; universities; nonprofit organizations; and industrial entities. The largest burden of such research, however, must properly fall upon the private sector.

In the exercise of its duties and responsibilities, the Management Project is required to establish procedures for periodic consultations with appropriate experts in the areas of energy research, development, and technologies. The committee intends that this authority be used by the Management Project to monitor both its overall research strategy as well as individual major demonstration projects.

Section 105

In carrying out the Management Project's duties pursuant to section 104, the Chairman, in consultations with the Management Project, is authorized and directed in section 105 to identify opportunities to accelerate the commercial applications of new energy technologies. This is to be accomplished through Federal assistance for pilot plants and demonstrations of such technologies by means of the various forms of Federal assistance set forth in section 107. The Chairman also is authorized to conduct such preliminary investigations and enter into such cooperative agreements that he deems necessary in order to develop recommendations for Federal participation or assistance.

Section 106. Research Priorities

When formulating the comprehensive energy research and development strategy pursuant to subsection 104(b), the Chairman is required to transmit to the Congress recommendations pursuant to the research priorities set forth by the Congress in section 106. In establishing these priorities the committee relied on the investigations performed in the course of the Senate's National Fuels and Energy Policy Study, particularly a report prepared under a contract with Resources for the Future. The Resources for the Future report, prepared by Harry Perry, was published by the National Fuels and Energy Policy as a committee print and is entitled, "Energy Research and Development—Problems and Projects."

This report is the basis for the committee's requirement that the Federal research strategy and priorities be structured and designed to achieve solutions to the U.S. energy supply system and related environmental problems in three time frames:

—for immediate and short term (to the early 1980's);
—for the middle term (early 1980's to 2000); and
—for the long term (beyond 2000).

For each time frame specific technologies are designated in the bill with a requirement for recommendations to be submitted by the chairman for an aggressive Federal research strategy and priorities for each technology. The intention of authorizing such diversified mechanisms for the pursuit of new energy technologies is to provide flexibility in place of predetermining a fixed approach.

In establishing the research priorities set forth in section 106 several technologies were highlighted by the committee with a requirement that a specific form of Federal assistance be given preferential consideration. In such instances the Chairman shall invite proposals for potential participation and recommend to the Congress the viability of using the preferred form of Federal assistance or participation.

For example, in the commercial demonstration of technologies for producing substitutes for natural gas, including coal gasification, consideration is to be given to Federal assistance and participation in the form of a joint Government-industry corporation. In the development of synthetic crude oil and liquid petroleum products from coal preference is to be given to Federal support through price guarantees or the purchase of products.

Section 106(a)(7), which applies to research related to the extraction of petroleum is intended to include such research as is being conducted by the Los Alamos laboratory in its hot-tip drilling project.

There also is a requirement that in the demonstration of new and improved methods for the extraction of coal that the chairman invite proposals on joint Government-industry operated mines for the purpose of demonstrating new and improved mining technologies and the training of associated personnel. The committee intends that the Management Project is initiating demonstration programs on new mining methods for the extraction of coal give appropriate consideration to mining methods for the extraction of antracite and lignite coal as well as bituminous coal.

The other research priorities set forth in section 106 are self-explanatory.

Section 107. Forms of Federal Assistance

Five potential forms of Federal assistance and participation are specifically set forth in section 107. These include:

—joint Federal-industry corporations which are structured consistent with the model corporations set forth in section 108;
—contractual arrangements with non-Federal participation;
—construction and operation of federally owned facilities; for example, in connection with military bases;
—Federal purchase or guaranteed prices pursuant to the guidelines set forth in section 109 for the purchase of products resulting from demonstration plants or activities; and
—Federal loans to non-Federal entities.

Subsection 107(b) provides that in calculating Federal and non-Federal shares consideration may be given to both design and construction costs as well as operation and maintenance costs. Provisions also is made for the non-Federal share to be in the form of lands or property interests, including natural resources interests, for the project, or personal property or services to be provided for the project. The value of such is to be determined by the Chairman.

Subsection 107(c) requires the Chairman to promulgate within 90 days of enactment, recommendations establishing procedures for submitting proposals and the content of such proposals.

Section 108. Model Corporation

This section sets forth general guidelines for the form of joint Federal-industry corporations which may be proposed pursuant to subsection 107(a)(1). Such proposals will be submitted to the Congress for approval on a case-by-case basis. The guidelines are for the purposes of providing congressional guidance to the Chairman of the Management Project in preparing such proposals. Variations from the guidelines could, of course, be provided for in the legislation authorizing establishment of a specific corporation if the facts indicated the desirability of such a variation.

Subsection 108(a) provides that each such corporation would have the function of carrying out a commercial scale demonstration of a particular energy technology such as combined power cycles, coal gasification, or the production of syncrude from shale. The corporation could explore several types of processes within a given energy technology in the course of developing a commercial-sized demonstration facility.

Pursuant to subsection 108(b) nine members of the board of directors shall be appointed by the President and may be removed by him. Five of the members shall be entirely selected by the Federal Government and appointed by and with the advice and consent of the Senate. The other four members shall be selected by the President, based upon recomendations of the non-Federal participants in the corporation.

Subsection 108(c) requires that at the time that such a corporation is proposed for congressional authorization, an appropriate time interval of not more than 12 years shall be established for the term of Federal participation. At the conclusion of such term, the Federal participation in the venture shall be terminated. The corporation may

then be dissolved or otherwise modified to conclude the Federal involvement.

The Federal share of the assets of the corporation of the appraised value of the net assets of the corporation in proportion to the Federal participation. In the disposition of valuable assets of the corporation the committee intends that preference shall be accorded to the non-Federal participants to acquire the assets of the corporation by payment to the Federal Government of the appraised value of the Federal share.

Patent rights arising from such corporate ventures shall be handled pursuant to the provisions of subsection 112(b) and shall be vested in the Administrator of the General Services Administration following termination of Federal participation in the corporation.

Subsection 108(d) is self-explanatory.

In proposing such joint-corporate ventures to the Congress, the Chairman is required, by subsection 108(e), to estimate the full amount of Federal costs of participation over the life of the venture. It is the intention of the committee that the Congress would consider authorizing and appropriating the full amount of the Federal share at the outset of the venture to reduce the uncertainties of future financing.

The committee intends that the block authorization and appropriation of funds in the amount of the full Federal share in proposed ventures be utilized by the Management Project as an incentive in the promotion of new energy technologies.

Subsection 108(f) sets forth the criteria which should be considered in arriving at an appropriate proportion of Federal particiation in each proposed corporation. The maximum amount of Federal participation may not exceed 90 percent of the total cost of the venture. However, the committee anticipates that in most such ventures the Federal share will be considerably less than 90 percent.

Section 109. Support Through Price Guarantees

Where the method of Federal assistance proposed pursuant to section 107 is in the form of price supports for the products of demonstrations of new energy technologies, section 109 sets forth the guidelines to be followed by the Chairman.

The Chairman is required to determine the types and sizes of facilities that would demonstrate the technical, environmental, and economic feasibility of a particular energy technology. To aid him in making this determination, the Chairman may award planning grants to obtain studies of the costs associated with the demonstration of a technology or individual system. Such planning grants also are to be used by prospective bidders in the preparation of detailed and comprehensive bids to construct demonstration facilities.

Under subsection 109(b), such planning grants could be awarded to one or more firms for the purpose of financing studies of the full cycle economic and environmental costs associated with demonstration of proposed technologies. This could include the preparation of a detailed and comprehensive bid. Such planning grants as authorized to be awarded also may be used to retain independent consultants to evaluate the technical competence and feasibility of projects. Following completion of such studies, the Chairman then would invite the private sector to bid on the minimum amount of Federal price support

needed to construct the specified demonstration plant. The price supports would be in the form of a guaranteed sale price for the product produced by the plant. The price would be guaranteed by the Federal Government.

Provision is made in subsection 109(d) for the monitoring by the Environmental Protection Agency of the construction plans and the actual construction of the demonstration plant, together with all related facilities. The Administrator of the EPA is authorized to require that the best available pollution control technologies be installed on all demonstration facilities. Where such environmental control requirements result in unanticipated costs the Chairman is authorized to renegotiate the new control prices accordingly.

When submitting proposals to the Congress pursuant to section 110, it is required by subsection 109(e) that the estimated amount of the Federal price supports over the life of the demonstration facility be indicated by the Chairman. The committee intends that the congressional authorization of such ventures include the full amount of such price supports at the time of designation of the successful bidders.

Upon appropriation of such moneys they are to be placed in a Competitive Research and Development Price Support Fund established in the Treasury of the United States pursuant to subsection 109(f). These moneys are to be made available to the Chairman in carrying out any price support programs including their associated administrative expenses.

Section 110. Congressional Approval

Congressional notification is required by section 110 for those proposals pursued under section 105 where the potential Federal investment is estimated to be in excess of $10 million. Section 110 requires the preparation of and transmittal to the Congress of a report on each proposal. A suggested content for such reports outlined in section 110(a).

Where the total estimated Federal contribution exceeds $10 million but does not exceed $50 million the Chairman is authorized to proceed with the negotiation of the necessary agreements for implementation of the proposals as set forth in the report. However, the report must rest before the Congress for 60 calendar days before any funds may be expended.

Where the total estimated Federal contribution exceeds $50 million a specific congressional authorization would be required by subsequent legislation.

Section 111. Determination of Need for Federal Participation

Section 111 sets forth several criteria for the guidance of the Chairman of the Management Project in assigning priorities for Federal assistance among promising research and development. The individual criteria are self-explanatory. The general objectives of the priorities are to apply the available Federal research funds to the most critical energy problems, and to those problem areas which are least likely to be treated adequately by industrial or other non-Federal research efforts.

The committee intends to insure that particular attention is to be given to fostering the expeditious transfer of the results of research

on new energy technologies into commercial application by the private sector through Federal assistance and participation in joint Government-industry ventures.

Section 112. Patent Policy and Mandatory Licensure

Section 112 sets forth a general patent policy and supplementary policies governing background patents, the handling of patent rights where a corporation is the form of Federal assistance, and a procedure for the capturing and establishing reasonable royalties for patents essential to the demonstration and commercial application of new energy technologies.

In section 112(a) the committee adopted as the general patent policy for the act the President's Statement of Government Patent Policy, as amended. This policy would govern the Chairman's administration of patents resulting from and held by the Federal Government and non-Government participants in federally assisted projects pursuant to the act. Under this policy the Government would be required to acquire title to any inventions resulting from research and development activities carried out with Federal funding pursuant to S. 1283.

However, clause 112(a)(2) requires that the Chairman when administering patents pursuant to the act be required to make a case-by-case determination as to whether a requested license is granted on a royalty-free basis or upon a basis of charges designed to recover part or all of the costs of the research. The committee's intent is to provide maximum flexibility in the handling of patent rights consistent with the President's Statement of Government Patent Policy set forth in clause 112(a)(3) and subsections 102 (b) and (c).

A supplementary policy is set forth in subsection 112(b) governing patent procedures where a corporation is the selected structure for Government-industry demonstration of a new energy technology. Clause 112(b)(1) provides that a corporation set up under the act shall receive a royalty-free license in any invention made pursuant to the act.

Clause 112(b)(2) further requires that any corporation established pursuant to the act shall license to responsible parties at reasonable terms, including reasonable royalties, any patent obtained by the corporation with respect to any invention or discovery made in performance of any activity conducted pursuant to the act. It also is provided that any net royalty income shall accrue to the corporation during its existence and shall be available for use by the corporation. Authority is provided for a corporation to grant licenses which extend beyond the date of dissolution of the corporation.

On and after the dissolution of the Federal share or the corporation, however, the Administrator of General Services is authorized to administer such patent and vested with the sole right to issue licenses. In the issuances of licenses the participants in the corporation are to receive royalty-free licenses.

Nevertheless, the Chairman may recommend variations from this policy which he believes are in the public interest for consideration by the Congress at the time when specific corporations are proposed for authorization.

Background Patents

The Presidential policy statement does not provide for the mandatory surrender of rights in background patents owned by contractors or grantees which are essential to the eventual introduction into commerce of technologies such as those which the committee envisions being developed pursuant to this Act. Clause 112(a)(3) provides that where a participant holds background patents, trade secrets, or proprietary information which are to be employed in and are requisite to a proposed energy research and development project the Chairman shall enter into an agreement which will provide equitable protection to the participant's rights.

Such rights are to be fully protected during the demonstration phase; however, when commercial application of a technology developed under the act follows the research activity, licensing is to be made available for background patents in addition to patents arising from the joint ventures. Such background patents, trade secrets, or proprietary information are to be made available to any qualified applicant on reasonable license terms including suitable confidentiality agreements, reasonable royalties and such other conditions as the Chairman deems applicable, taking into account that the commercial viability of the total energy process or system was achieved with the assistance of public funds.

A definition of "background patent" has been added which is limited to U.S. patents and patents pending which would be infringed by the practice of a new technology developed under the act.

Mandatory Licensure

Subsection 112(c) provides a procedure by which the Chairman can acquire patents rights to (or trade secrets in) means which are essential to the successful demonstration or introduction into commerce of a new energy technology assisted pursuant to the act. The Committee's concern is for enabling the Management Project to obtain access to patent rights held by non-participants in joint government-industry ventures where, as determined by the Chairman, the capture of such rights is essential to the successful demonstration and commercial application of a new energy technology. In the language of the bill, the committee intends that such capture be restricted to those instances where the Attorney General determines, upon application of the Chairman, that

> (A) In the implementation of the requirements of this act a right under any U.S. letters patent, which is being used or intended for public or commercial use and not otherwise reasonably available, is necessary to the development and demonstration of an energy system or technology pursuant to this act, and
>
> (B) There are no reasonable alternative methods to accomplish such purpose; and
>
> (2) That the unavailability of such right may result in a substantial lessening of competition or tendency to create a monopoly in any line of commerce in any section of the country.

On the basis of such a determination the Attorney General may certify so to a district court of the United States which, in turn, may issue an order requiring the person who owns such patent to license it on such reasonable terms and conditions as the court, after hearing, may determine.

Section 113. Presidental Review

In recognition that a formal reorganization of Federal energy agencies and activities has been proposed, section 113(a) would facilitate orderly transfer of the functions established by this measure to an appropriate new agency when it is established. The section requires the President to make recommendations to the Congress:

(1) in connection with any reorganization plan involving the energy research agencies, or

(2) upon the authorization of any such reorganization by the Congress.

Subsection 113(b) requires that, if no permanent reorganization of Federal energy research and development R. & D. agencies is accomplished within two years, the President shall submit to the Congress a report on status of energy research and development together with his recommendations for future management arrangements.

Section 114. Administrative Provisions

The provisions of section 114 are self-explanatory.

Section 115. Powers

Section 115 includes administrative provisions which are self-explanatory.

Section 116. Cooperation of Federal Agencies

Section 116 authorizes Federal agencies to support the management project by providing information and personnel. The success of the interagency arrangements established by this measure will require the greatest cooperation among the agencies involved. The committee intended to facilitate such cooperation to the greatest possible extent.

Section 117. Congressional Access to Information

The establishment of the extensive new programs and policies contained in this measure and the urgency of the energy crisis demand the fullest cooperation between the Congress and the executive branch in resolving problems arising from the administration of the measure. Section 117 provides for continuing communication between the Chairman and the Congress to facilitate that cooperation.

Section 118. Environmental Evaluation

Section 118 authorizes and directs the Council on Environmental Quality to carry out a continuing assessment of the progress of energy research and development to evaluate the adequacy of attention to energy conservation and environmental concerns. One percent of the funds appropriated for energy research under the authority of this measure (subsection 120(b)) would be transferred to the Council on Environmental Quality to support such assessment activities.

The committee does not intend to increase or diminish in any way the responsibilities of any agency pursuant to existing environmental law and policies by this section. The committee also does not intend the Council on Environmental Quality to perform any research or development under the provisions of this section. The agencies which administer research and development programs will retain the responsibility to give full attention to energy conservation and environmental aspects of their programs. The responsibility of the Council on Environmental Quality under this provision is only to monitor, assess, and make recommendations concerning the adequacy of such research and development.

Section 119. Acquisition of Essential Materials

Section 119 authorizes the President to allocate materials in critical supply to support energy research and development efforts. The committee considers the expeditious progress of the energy research and development provided in this act to be vital to the achievement of other national goals.

Section 120. Authorization

An appropriation of $2 million in fiscal year 1974 is authorized by subsection 120(a) for the administrative expenses of the energy research management project to facilitate its prompt establishment. Appropriations of $10 million in each of fiscal years 1975 and 1976 are authorized for continuation of this work. It is anticipated that a reorganization will have been accomplished to establish a permanent energy research organization prior to the fiscal year 1977 budget cycle. If this is not the case, continuation of the authority will be necessary.

The provisions of this subsection 120(b) are self-explanatory.

Subsection 120(c) requires the Chairman to prepare an annual progress report setting forth the progress achieved in carrying out the research strategy set forth in the measure.

Title II—Geothermal Energy

Section 201. Short Title

The short title of this title is the "Geothermal Energy Act of 1973."

LOAN GUARANTEE PROGRAM

Section 202.

The Secretary of the Interior is authorized by section 202 to guarantee loans made by financial institutions to qualified borrowers for the purpose of geothermal energy development. Up to 75 percent of the cost of the proposed project could be guaranteed; however, no more than $25 million could be guaranteed for any single project nor more than $50 million for any borrower. The probable major application of geothermal resources in the short-term future will be for the production of electric power. The financial structure of electric utilities and other potential participants in such ventures, however, does not presently facilitate entry into costly, high-risk, geothermal developments. The objective of Federal guarantees is to reduce the financial uncertainties until more extensive experience with the technology exists.

Section 203

The Secretary is authorized pursuant to section 203 to contract with the lender to guarantee such loans and to make payment in accordance with the guarantee in the event of default by the borrower. In the event that a borrower becomes unable to pay interest charges and is

in danger of default, the Secretary may, if he finds it to be in the public interest, pay the interest in behalf of the borrower and permit the borrower to continue the project.

If a borrower is in default, and the Secretary has made payments to the lender on his behalf, the Attorney General is authorized to take action to recover the amounts of the payments from the assets of the defaulting borrower which are associated with the project. The intent of this limitation is to generally confine the risk taken by the borrower to the amount of his investment in the geothermal venture.

If the borrower has invested other borrowed capital in the venture, however, the Federal rights to the assets of the venture shall take precident over those of other creditors.

Section 204

Section 204 provides for a life of the loan guarantee program limited to 10 calendar years.

Section 205

Section 205 provides that a Geothermal Resources Development Fund be established in the Treasury to be available for the purposes of the loan guarantee program.

Section 206

The uses and disposition of the fund are set forth in section 206.

Section 207

Appropriations to the fund not to exceed $50 million annually are authorized in section 207.

Section 208

Section 208 requires annual financial reports on the operation of the fund.

COORDINATION OF FEDERAL ACTIVITIES IN GEOTHERMAL ENERGY EXPLORATION, RESEARCH, AND DEVELOPMENT

Section 209

Section 209 sets forth that the policy of the Congress to encourage the development of geothermal energy through resource inventory, research, and financial and technical assistance for the construction of pilot and demonstration geothermal developments.

Section 210

In section 210 the Secretary of the Interior is authorized and directed to carry out a program of resources inventory and research into the geological forms of geothermal resources.

Section 211

Section 211 directs the Secretary to coordinate the geological research program with the technological research program of the Atomic Energy Commission.

Section 212

In section 212 the Secretary is authorized to employ private firms or cooperate with Federal, State, and local agencies to obtain assistance in carrying out the resources inventory.

Section 213

The Administrator of the National Aeronautics and Space Administration is directed in section 213 to prepare and transmit to the Secretary within 6 months a proposal for the employment of space technologies and the capabilities of NASA in inventorying geothermal resources.

Section 214

Section 214 directs the Secretary to submit the exploration plan and schedule to the President and the Congress within 1 year. Annual progress reports would be required thereafter.

Section 215

Section 215 authorizes the Atomic Energy Commission, in cooperation with industry, to undertake a research and development program to develop processes and equipment for the utilization of all forms of geothermal energy.

Section 216

Section 216 authorizes the Commission to enter into cooperative agreements with non-Federal entities for the construction, operation, and maintenance of demonstration developments for the production of electric or heat energy from geothermal resources. The non-Federal participants would be expected to make some contribution in the form of funds, rights in property, services, or other valuable consideration. The amount of the non-Federal contribution would be left to the discretion of the Commission on a case-by-case basis.

It is anticipated that several such demonstrations would be selected to reflect the development of a variety of geothermal resource types, the application of a variety of energy development and utilization technologies and a variety of conditions of energy and by-product needs.

The Commission is authorized to proceed with such developments in which the estimated Federal investment will not exceed $10 million.

The Commission is authorized to investigate potential agreements for major demonstration facilities (in which the Federal investment will exceed $10 million) and to submit proposals to proceed with such agreements to the Congress for authorization.

In preparing proposals for cooperative agreements with non-Federal entities to construct major geothermal energy facilities, the committee expects that non-Federal participants shall be selected which have the financial, technical, and management competence to perform the functions required of them pursuant to the agreement.

Section 217

Appropriations are authorized in section 217 for fiscal years 1974, 1975, and 1976, as follows:

(a) to the Secretary of the Interior, $10 million annually.
(b) to the Atomic Energy Commission, $35 million annually.
(c) to NASA, such amounts as may be required.

Section 218

Section 218 includes definitions which are self-explanatory.

VII. COST ESTIMATES

In accordance with section 252(a) of the Legislative Reorganization Act of 1970 (Public Law 91–150, 91st Cong.) the committee provides the following estimate of cost of this measure.

TITLE I

(1) For administration, in fiscal year 1974 $2,000,000 and in fiscal years 1975 and 1976—$10 million each fiscal year.

(2) For research and development programs, in each of fiscal years 1974 and 1975 $800 million and such sums as are authorized in subsequent annual authorization acts.

(3) It is estimated that the authorities and directions granted by title I would result in average new expenditures of $1 billion annually over the next 10 years.

TITLE II

(1) To be placed in a special fund to insure loans, $50 million annually.

(2) To carry out other provisions of title II, $45 million annually in fiscal years 1974, 1975, and 1976, and such amounts as may be required for the participation of the National Aeronautics and Space Administration in geothermal resources inventories.

VIII. EXECUTIVE COMMUNICATIONS ON S. 1283 AND S. 2465

FEDERAL POWER COMMISSION,
Washington, D.C., September 28, 1973.

Hon. HENRY M. JACKSON,
Chairman, Committee on Interior and Insular Affairs, U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: in response to your request of May 7, 1973, we enclose 50 copies of the report of the Federal Power Commission on S. 1283.

The Office of Management and Budget advises that there is no objection to the submission of this report from the standpoint of the administration's program.

Sincerely,

JOHN N. NASSIKAS,
Chairman.

FEDERAL POWER COMMISSION,
Washington, D.C., July 25, 1973.

Hon. ROY L. ASH,
Director, Office of Management and Budget, Executive Office of the President, Washington, D.C.

(Attention: Mrs. Louise Garziglia, Legislative Reference Division, Room 7201, Executive Building).

DEAR MR. ASH: The Senate Committee on Interior and Insular Affairs has requested the Commission's views on S. 1283 to establish a national energy research, development, and demonstration program.

We enclose six copies of our proposed report on this bill and request advice as to whether it would be in accord with the administration's program.

Sincerely,

JOHN N. NASSIKAS,
Chairman.

FEDERAL POWER COMMISSION, REPORT ON S. 1283—93D CONGRESS

A BILL To establish a national program for research, development, and demonstration in fuels and energy and for the coordination and financial supplementation of Federal energy research and development; to establish development corporations to demonstrate technologies for shale oil development, coal gasification development, advanced power cycle development, geothermal steam development, and coal liquefaction development; to authorize and direct the Secretary of the Interior to make mineral resources of the public lands available for said development corporations; and for other purposes

The purposes and principal provisions of this legislation which would be known as the National Energy Research and Development Policy Act are explained in the introductory statement by Senator Jackson, the chief sponsor of S. 1283 (Congressional Record, March 19, 1973, pp. S5021–S5037). Among other things, it contemplates, as a means of meeting long-range national needs, the appropriation of approximately $2 billion annually of Federal funds over a 10-year period to carry out a massive program of research, development, and demonstration projects for innovation or improvement in the areas of fuel and energy resources production and utilization technology, including commercialization of alternative forms.

To implement this program the bill would establish an Energy Research Management Project (Project), composed of an Assistant Secretary of the Interior, an AEC Commissioner, an FPC Commissioner, an Assistant Administrator of EPA, and an Assistant Administrator of NASA, each designated by the agency or department head; also designated as members are the Director of the National Science Foundation, other representatives from agencies which the President finds have significant energy research and development roles, and a full-time Chairman appointed by the President subject to Senate confirmation. The Project would review Federal research and development (R. & D.) and formulate a comprehensive energy R. & D. strategy for the Federal Government. The Project would receive $800 million annually for 5 years to supplement ongoing energy R. & D. programs of Federal agencies and to initiate and maintain new energy programs or activities utilizing the facilities, capabilities, expertise, and experience of Federal agencies, national laboratories, universities, nonprofit organizations, and industrial entities. Federal departments and agencies would be authorized to make funds available to the Project and also to detail personnel to it on a reimbursable basis.

The other five titles of S. 1283 would establish five Government-industry corporations jointly managed and funded to bring to the stage of commercial application the energy technologies of shale oil production, coal gasification, advanced power cycles, coal liquefaction, and geothermal energy. Each corporation would select two or more promising methods for achieving its objective, build demonstration

facilities for each method, and finally construct full-scale, commercial-size facilities. The Secretary of the Interior is directed to make available to the corporation certain Federal lands which contain minerals necessary to carry out the research programs.

ENERGY R. & D. PROBLEMS

The short-term energy outlook indicates shortfalls of supply for the foreseeable future. The major concern of energy research and development should be the solution of the supply problem, which includes the attendant considerations of cost, conservation, systems reliability, and environmental protection.

A fundamental requirement is an improved technological capability for developing existing primary energy resources. Existing technologies for extraction, processing, distribution, and consumption must be upgraded to satisfy increasingly more stringent environmental protection standards.

Coal represents one of our most abundant remaining resources. However, owing in part to environmental restrictions, coal now provides less than 20 percent of our energy demands. Several programs are now underway which show promise of harmonizing increased coal utilization with environmental protection.

With respect to oil and gas, we must devote particular attention to the problems resulting from expansion of North Slope and OCS drilling programs. R. & D. should focus on drilling and completion in any water depths in addition to perfecting an environmentally sound pipeline technology for delivering oil and gas produced in these offshore and Arctic areas.

It should also be noted that increased reliance on imported LNG as a supplemental source of natural gas necessitates further research into safety standards and procedures, effects of LNG spills, long distance pipeline transport, and improved cryogenic systems. Major R. & D. commitments are also needed to optimize the process for direct gasification of crude oil and to fully explore the potential of nuclear stimulation of natural gas reserves.

Another fundamental requirement of the energy R. & D. program should be an emphasis on energy conservation, developing a technological capability sufficient to substantially improve the conversion of primary energy resources and electricity.

At the heart of the nuclear program is the R. & D. effort associated with the breeder reactor [1] which will achieve an almost 40-fold increase in the energy output of a pound of uranium. In conjunction with a contribution from the Federal Government that will ultimately amount to approximately $460 million, the non-Federal power industry has pledged nearly $250 million to the development of the liquid metal fast breeder reactor demonstration plant by Commonwealth Edison and TVA within the TVA system. The most dramatic illustration of new technology for the generation of electric power with virtually incalculable resource conservation and environmental benefits is the nuclear program.

[1] The National Power Survey projects an increase in nuclear capacity from 6,500 megawatts out of 340,000 megawatts or 1.9 percent in 1970, to 140,000 megawatts or 21 percent of 665,000 megawatts in 1980, or 37.7 percent, to 475,000 megawatts out of 1,260,000 in 1990. As a percentage of fuel use for thermal power generation, nuclear increases from 2 percent in 1970 to 31 percent in 1980 and 53 percent in 1990. Nuclear plants constitute about 50 percent of all construction scheduled to 1980 and over 75 percent of generating plants construction in the decade 1980–90.

However, excluding the breeder reactor, the present state of conversion technology leaves much to be desired. There is about a 70-percent loss in energy efficiency through conversion to electricity by fossil-fuel steam electric plants. Additionally, there is about 10-percent loss in kilowatt-hours between the generating plant bus bar and the electricity-consuming appliance.

There are presently several ongoing R. & D. programs that are promising, including those for coal liquefaction and gasification, nuclear fission and fusion, solar energy, geothermal power, and magnetohydrodynamics, among others. Government and industry have separate as well as cooperative roles to play in this energy effort. President Nixon's science and technology message in March of 1972 (8 Presidential documents 581), stressed the interrelationship of the private and public roles in meeting our technical and environmental goals through accelerated R. & D. efforts. He called for a "new partnership in science and technology" between Government and the private sector.

The free enterprise system has served this Nation well, and we believe it is in the national interest to allow the private sector to assume as much responsibility for the management and funding of energy R. & D. as possible. However, Government must take a leadership role by reorganizing its energy R. & D. activities into an effective centralized unit with authority to streamline energy responsibility and provide firm public policy guidance for planning and capital commitment by our enterprise system.

An improved conversion technology is one of the essential R. & D. projects that was long neglected as a result of an inadequate commitment to R. & D. by industry in recent years. The average expenditure on R. & D. by the investor-owned utilities for the years 1966 and 1970 was one-fifth of 1 percent.

The industry has recognized this deficiency and has responded by establishing the Electric Power Research Institute. Current funding goals for EPRI amount to $90 million for 1973 and $150 million for 1974. However, considering the fact that the Electric Utilities Industry R. & D. Goals Task Force has projected the need for an average annual expenditure of $1,120 million for the remainder of the century, an ever greater commitment is required.

COMMISSION ACTIONS

The Commission has taken steps to encourage an expanded research and development program in the private sector. The Uniform System of Accounts has been amended by the Commission to allow R. & D. expenditures to be recovered through charges to operating expenses and to allow jurisdictional companies to earn a return on unrecovered expenditures.[2]

On April 30, 1973, the Commission issued its Order 483 broadening the definition of allowable research and development expenditures and authorizing accounting procedures that will enable utilities to recover

[2] Order No. 408, 44 FPC 639 (1970).

through rates capital investments of $50,000 or more for research and development projects and programs.[3] These new regulations will permit jurisdictional utilities to apply for advance approval to treat such R. & D. expenditures as rate base items.

Energy research and development has been included as an integral part of the Commission's current National Power and National Gas Surveys. The new National Power Survey which was begun last year has a Technical Advisory Committee on Research and Development chaired by Dr. H. Guyford Stever, Director of the National Science Foundation. The committee's report is scheduled to be submitted this fall and will cover the whole spectrum of the electric industry R. & D. needs.

Our National Gas Survey, which is soon to be completed, is examining in depth the problems and needs of the three sectors of the natural gas industry: supply, transmission, and distribution. The research and development requirements of each of these segments of the industry are receiving close attention and the conclusions of the survey should provide important indications of future R. & D. requirements.

We must streamline and centralize energy responsibility in the Federal Government, including jurisdiction over energy R. & D. We must also adapt our budgetary priorities to provide for substantial increases in energy R. & D. funding levels.

ADMINISTRATION'S APPROACH

At present the institutional framework does not exist for effective coordination and execution of energy programs. Therefore it is vital that a commitment of resources on the scale necessary to effect long-range solutions be coupled with a program for unifying the presently fragmented energy-related activities of the Federal Government. The President has taken steps to do this by Executive Order No. 11726 of June 29, 1973, 38 F.R. 17711, establishing the Energy Policy Office and the concomitant renewal of his recommendation that a new Department of Energy and Natural Resources be established (S. 2135, 93d Cong.; H.R. 9090, 93d Cong.). We support the President's action and endorse the concept of a single coordinating agency with the power and responsibility for setting overall energy policy.

Recognizing this potential, the President's 1974 budget provides for substantially increased funding of energy research and development. In the President's most recent energy message, 9 "Presidential Documents" 867, he focused on the importance of R. & D. on new forms of energy to meet the country's long-term energy needs. The President announced initiation of a $10 billion 5-year R. & D. program beginning in fiscal year 1975 and recommended an additional $100 million for the acceleration of existing projects during fiscal 1974, 9 "Presidential Documents" 867, 870.

AGENCY VIEWS

The Commission endorses the objectives of S. 1283 and we concur in the bill's finding that our national energy problems can be solved "if a national commitment is made now to accord the proper priority, to dedicate the necessary financial resources, and to enlist our unequaled scientific and technological capabilities to develop new options and new management systems to serve national needs, conserve vital resources, and protect the environment."

[3] Order No. 483, 38 F.R. 12113 (1973).

Initially, we believe it is essential that energy policy and the management of energy research and development be centralized and that industry and Government both share in these management responsibilities. The Government's primary obligation in our view is to establish national energy policies and priorities that can be relied on as a planning guide by all segments of our society. To accomplish this there must be a major reorganization of energy responsibility in Government, preferably along the lines recommended by the President in his energy message of June 29, 1973.

The free enterprise system should be allowed the leeway and flexibility to provide the resources and technology required for a secure and reliable national energy supply. Government should provide the funds and programs that are beyond the scope or budget of the industrial sector and participate cooperatively with industry efforts.

R. & D. funding levels should be significantly increased in the next few years along the lines recommended by the President in his June 29 message.

The Commission supports greater Federal spending for research and development on energy technology, but we do not recommend the enactment of S. 1283 at this time. In our view, enactment of either S. 2135 or H.R. 9090 is a more logical first step to solving our Nation's energy R. & D. problems. We believe it would be premature as the bill contemplates, to create the complex and specialized public-private corporate structure for the management of energy research and development and dedicate substantial funds to such R. & D. efforts until we have achieved the more fundamental needs of reorganizing energy responsibility in Government and establishing legislative and administrative energy policies to define our energy goals as a Nation.

FEDERAL POWER COMMISSION,
JOHN N. NASSIKAS,
Chairman.

U.S. ATOMIC ENERGY COMMISSION,
Washington, D.C., October 4, 1973.

Hon. HENRY M. JACKSON,
Chairman, Committee on Interior and Insular Affairs,
U.S. Senate, Washington, D.C.

DEAR SENATOR JACKSON: The Atomic Energy Commission is pleased to reply to your letter of May 7, 1973, requesting our views on S. 1283, entitled "the National Energy Research and Development Policy Act of 1973."

While we support the ultimate objective of the bill—namely, to solve the national energy problem by a vigorous and concerted national effort—we believe that the proposed legislative approach poses substantial drawbacks and problems and we would not favor its enactment. Our reasons are summarized below.

We note that a virtually identical [1] bill, H.R. 6038, was introduced in the House on March 22, 1973, by Representative Gray.

[1] Two variances in the bills appear in sections 408 and 608.

Under title I of the bill (secs. 101–112), there would be created an "Energy Research Management Project" composed of designated agency members from the Interior Department, AEC, Federal Power Commission, National Science Foundation, Environmental Protection Agency, NASA, and such other representatives as the President may deem appropriate. The declared congressional findings refer to the critical shortage of energy, and the stated congressional policy would include the need for reliable, economical, and environmentally acceptable energy systems. The management project would therefore be empowered to undertake a comprehensive energy research and development program for the Federal Government. For each of the 5 fiscal years beginning fiscal year 1974, the new management project would receive appropriations of $800 million, which could be used to fund existing Federal agency programs or for contracts or grants to commercial and educational organizations.

Under titles II through VI of the bill, which contain parallel or identical sections, there would be established five distinct development corporations having specified periods of duration and funding, as follows: (1) Coal Gasification Corporation, having a duration of 10 years, with an appropriation of $6 million for fiscal year 1974 and such sums thereafter as necessary; (2) Shale Oil Development Corporation, having a duration of 8 years, with an appropriation of $5 million for fiscal year 1974 and such sums thereafter as necessary; (3) Advanced Power Cycle Development Corporation, having a duration of 10 years, with an appropriation of $6.5 million for fiscal year 1974 and such sums thereafter as necessary; (4) Geothermal Energy Development Corporation, having a duration of 15 years, with an appropriation of $8 million for fiscal year 1974 and such sums thereafter as necessary; and (5) Coal Liquefaction Corporation, having a duration of 12 years, with an appropriation of $5 million for fiscal year 1974 and such sums thereafter as necessary.

Each of these new Corporations would have a nine-man Board of Directors, with five members thereof appointed by the President with Senate advice and consent, and four members Presidentially appointed upon recommendations from private entities having contractual arrangements with the Corporations. As specified in section 202(d) (and parallel sections in titles III–VI), the contemplated contracts with private firms would include private financial assistance to the Corporations. The essential task of each Corporation would be to select the best method—from a technical, environmental, and economical standpoint—of developing the particular technology, and to build one or more demonstration-type facilities for each technological method selected. The Secretary of the Department of the Interior would, subject to specified limitations, be authorized to make public lands available to the new Corporations for developing energy resources required in each technology area.

The new energy research management project, under title I, would result in the creation of an agency having a broad overall Federal energy program responsibility and acting essentially as an overlay on other Federal agencies already committed to solving energy problems. By requiring agencies already fully committed to current energy programs to furnish the new management project with personnel, as the bill does, existing high priority research and development efforts could be significantly impaired by the diversion of agencies' expertise and technical management capabilities. We recognize, however, that the bill would permit the management project to make use of AEC's scientific and engineering expertise and laboratories and facilities by way of fund transfers.

Prior to establishing national statutory goals, we believe an extensive review of all ongoing and proposed national programs in the energy field should be made to determine their relative priority. The resulting balancing of programs against our available resources could well indicate a different mix of programs than those recommended in the bill. In fact, the President in his energy message of June 29 directed us to undertake such a review for the purpose of recommending an integrated research and development program for the Nation.

The establishment of Government corporations having private financial support in areas such as coal gasification, oil shale development, advanced power cycles, geothermal energy, and coal liquefaction is one possible method of Federal support of energy R. & D. which, at the same time, attempts to assure that the technology will be commercialized in the shortest possible time. However, the differences in the specified lifetimes of the several corporations, when coupled with the specified funding levels, appear to imply a higher degree of knowledge of the developmental costs and developmental time requirements than present knowledge and experience would indicate.

For your consideration, additional comments and recommendations regarding specific provisions in the bill are attached.

The Office of Management and Budget has advised that there is no objection to the presentation of this report from the standpoint of the administration's program.

Sincerely,

DIXY LEE RAY, *Chairman.*

S. 1283: AEC ADDITIONAL COMMENTS ON SPECIFIC PROVISIONS

TITLE I.—ENERGY RESEARCH MANAGEMENT PROJECT

(1) Current agency manpower and efforts directed to development of energy technologies could be adversely affected by implementation of the following provisions: Section 104(c)(2) would require the participation of key technical staff of the agencies represented on the energy research management project team. Section 105 would require similar capability for technical analyses to examine the urgency of proposed tasks and of potential results of research and development. Section 110(1) would also place a requirement on the involved agencies to report on their activities involving the management project. Section 110(2) indicates that the staff for the energy management project would be provided by the agencies involved.

(2) Section 104(b)(2) identifies a number of technologies requiring support, including "solvent refined coal." However, this is only one example of a coal liquefaction process, and we believe it much more desirable to identify coal liquefaction in general rather than one specific process. Also, the identified technologies omit coal gasification, a

very significant technology for which an in situ approach has been proposed by AEC.

(3) Section 104(c) would permit the new agency to supply funds to other agencies to accomplish designated energy research and development, or support such work directly with the research facility. It is not evident that such an arrangement would be an improvement over direct support of needed research by existing Government agencies.

(4) Section 104(d) refers to proposed joint Government-industry corporations, and it is not clear how these would coordinate or overlap with the five new corporations to be created under titles II–VI. Nor is it clear how these latter corporations would coordinate with the proposed energy research management project.

(5) Section 112 would provide funds to the new agency for fiscal year 1974, not to exceed $800 million. We question whether a new organization could effectively and usefully spend any such significant sum in its first year of operation.

GENERAL COUNSEL OF THE DEPARTMENT OF COMMERCE,
Washington, D.C., October 25, 1973.

Hon. HENRY M. JACKSON,
Chairman, Committee on Interior and Insular Affairs, U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: This is in response to your request for the views of this Department concerning S. 1283, a bill to establish a national program for research, development, and demonstration in fuels and energy and for the coordination and financial supplementation of Federal energy research and development; to establish development corporations to demonstrate technologies for shale oil development, coal gasification development, advanced power cycle development, geothermal steam development, and coal liquefaction development; to authorize and direct the Secretary of the Interior to make mineral resources of the public lands available for said development corporations; and for other purposes; to be cited as the "National Energy Research and Development Policy Act of 1973."

The bill would establish an energy research management project which would have an annual budget of $800 million to finance research and development efforts. Five separate single-purpose corporate ventures would also be established to advance to the stage of commercial application five different potential energy technologies. These five technologies are coal gasification, shale oil, advanced power cycles, geothermal resources, and coal liquefaction.

The composition of the Corporations is common to all five Corporations. There would be a board of nine directors. Five members would be appointed by the President with advice and consent of the Senate. The other four members would be appointed by the President on the basis of recommendations from any non-Federal entity which has contracted to participate in the Corporation in question.

The bill would authorize each Corporation to set up demonstration facilities to determine the technical, environmental and economic feasibility of each energy resource project and establish commercial facilities if the demonstration proves successful.

The Department does not support the bill for the following reasons:

The President in his energy message of April 18, 1973, reasserted the administration's commitment to increase our energy knowledge and develop a more comprehensive and intergrated national energy policy. This policy recognizes that for the short term future, our research and development program must provide improved technologies to extract and utilize our existing fuel resources. The Federal budget for the fiscal year 1974 provides for an increase in energy research and development funding of 20 percent over the 1973 level. Further, on June 29, 1973, the President proposed that $10 billion be spent over the 5 years beginning fiscal year 1975 for energy research and development.

The administration's energy program is funded at the most effective rate at which the Nation's financial resources can be expended without waste. It is an amount that has been arrived at after careful studies of the various technologies that appear to hold the most promise for improving the Nation's energy supply.

The bill (S. 1283) on the other hand, would provide a fixed rate of funding and a fixed number of years for each of the five specific energy sources. This is too rigid an approach to solve a problem as complex and all-encompassing as energy research and development and its commercial application.

The administration has, or is in the process, of creating certain organizations which will in the short term perform the same functions proposed to be performed by the Energy Research Management Project created by S. 1283. For the long term, the President is proposing legislation to establish a Department of Energy and Natural Resources building on legislation submitted in 1971 with additional emphasis on energy programs. An Energy Policy Office has been established in the Executive Office of the President. Functions of the Director of this office include recommending policies and guidelines on energy matters and coordination of all energy related programs within the executive branch. He is also responsible for the development of comprehensive plans and programs to insure adequate and dependable supplies of energy.

While we concur in general with the objectives of S. 1283, its programs would overlap and duplicate energy research and development programs proposed or already underway as outlined in the President's Energy Message of 1971 and 1973.

In addition to the above objections, we oppose enactment of section 106 of the bill regarding rights to inventions and technical data. The administration has uniformly recommended against including guidance on patent policy in individual pieces of legislation providing for support of research and development. Rather, we recommend congressional enactment of a uniform patent policy applicable to all Government research and development. Until such an enactment, it is our opinion that the memorandum and statement of Government patent policy issued by President Nixon on August 23, 1971, will adequately protect the public interest.

Also, paragraph (b) of section 106 would establish a precedent for acquiring rights to privately developed or background patent and technical data position. Presently, most legislation requiring the Government to acquire title to inventions resulting from Government-

sponsored research expressly exempts the contractor's background position. It is anticipated that if paragraph (b) is enacted many of the most qualified prospective contractors would refuse to contract, thereby defeating the purpose of the program that the bill is intended to support.

We have been advised by the Office of Management and Budget that there would be no objection to the submission of our report to the Congress from the standpoint of the administration's program.

Sincerely,

KARL E. BAKKE,
General Counsel.

GENERAL COUNSEL OF THE DEPARTMENT OF DEFENSE,
Washington, D.C., October 25, 1973.

Hon. HENRY M. JACKSON,
Chairman, Committee on Interior and Insular Affairs, U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: Reference is made to your request to the Secretary of Defense for the views of the Department of Defense with respect to S. 1283, 93d Congress, a bill to establish a national program for research, development, and demonstration in fuels and energy and for the coordination and financial supplementation of Federal energy research and development; to establish development corporations to demonstrate technologies for shale oil development, coal gasification development, advanced power cycle development, geothermal steam development, and coal liquefaction development; to authorize and direct the Secretary of the Interior to make mineral resources of the public lands available for said development corporations; and for other purposes.

Enactment of the subject bill would establish an Energy Research Management Project, an organization consisting of an Assistant Secretary of the Department of the Interior, a Commissioner of the Atomic Energy Commission, a Commissioner of the Federal Power Commission, the Director of the National Science Foundation, an Assistant Administrator of the Environmental Protection Agency, an Assistant Administrator of the National Aeronautics and Space Administration and other persons appointed by the President. This organization would review Federal policies and programs in the energy field and formulate comprehensive policies and procedures for energy research and development with due regard for conservation and environmental factors. There would also be established five separate Government corporations to sponsor research into specialized areas and to establish demonstration-type facilities. These corporations would be the following: the Coal Gasification Development Corp., the Shale Oil Development Corp., the Advanced Power Cycle Development Corp., the Geothermal Development Corp., and the Coal Liquefaction Corp. The bill specifies the duration of each corporation, its functions and administrative procedures.

As a large consumer of all forms of energy, the Department of Defense is vitally concerned with adequate supplies of dependable low-cost energy in all forms. Accordingly, the Department of Defense supports any effort to improve the availability of energy and to assure

reasonable cost. As to whether S. 1283 represents the best means of achieving these objectives, this Department defers to those agencies directly involved.

The Office of Management and Budget advises that, from the standpoint of the administration's program, there is no objection to the presentation of this report to the committee.

Sincerely,

L. NIEDERLEHNER,
Acting General Counsel.

EXECUTIVE OFFICE OF THE PRESIDENT,
OFFICE OF MANAGEMENT AND BUDGET,
Washington, D.C., November 1, 1973.

Hon. HENRY M. JACKSON,
Chairman, Committee on Interior and Insular Affairs, U.S. Senate, New Senate Office Building, Washington, D.C.

DEAR MR. CHAIRMAN: This is in response to your request of May 7, 1973, for the views of the Office of Management and Budget on S. 1283, a bill to be cited as the "National Energy Research and Development Act of 1973."

In its report to your committee, the Department of the Interior recommends against enactment of S. 1283. The Department describes the initiatives announced in the President's energy messages of April 18 and June 29, 1973, and states that it considers the administration program to be funded at the most effective rate at which our resources can be expended without waste. Further, the Department states that S. 1283 does not offer the degree of flexibility needed for an efficient and effective research program and could have the effect of concentrating research efforts on five energy sources without adequate exploration of other energy sources and alternative technological processes. The Department points out that the Federal Government is working closely with industry to bring new technologies to a commercially practical state of development, and notes the various changes in organization of the Department and of the executive branch that have been made or proposed this year.

We concur in the views expressed by the Department of the Interior and likewise recommend against enactment of S. 1283.

Sincerely,

WILFRED H. ROMMEL,
Assistant Director for Legislative Reference.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION,
Washington, D.C., November 6, 1973.

Hon. HENRY M. JACKSON,
Chairman, Committee on Interior and Insular Affairs, U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: This is in further reply to your request for the comments of the National Aeronautics and Space Administration on the bill S. 2465, "To authorize the Secretary of the Interior to guarantee loans for the financing of commercial ventures in geothermal

energy; to coordinate Federal activities in geothermal energy exploration, research, and development; and for other purposes."

S. 2465 has as its purpose the encouragement of research and development of geothermal energy in order to bring this energy source to the point of practical and commercial application.

Title I establishes a loan guarantee program under the Secretary of the Interior. The Secretary would be authorized to guarantee loans made by financial institutions to qualified borrowers for the purposes of exploration, development, acquisition of rights in geothermal resources, and construction and operation of facilities to bring these resources to use in the commercial production of energy. Loan guarantees would be available for up to 75 percent of the aggregate cost of the project. A geothermal resources development fund would be establishment in the Treasury and be available to the Secretary of the Interior for carrying out this program.

Title II states the policy of the Congress to encourage private industry with Federal assistance and leadership to develop and bring to the point of practical application the production of energy from geothermal sources.

The Secretary of the Interior, through the U.S. Geological Survey, would develop and carry out a plan for the overall exploration of all forms of geothermal resources on Federal and non-Federal lands. He would also conduct surveys leading to a national inventory of geothermal resources and make available maps and other documents to facilitate commercial development. NASA is authorized and directed (section 205) to prepare a proposal for the use of space technologies and the services and facilities of NASA for exploration and mapping of geothermal resources. This report would be due in 6 months from enactment of this legislation.

The Atomic Energy Commission (AEC) is given the lead research and development role in cooperation with private industry to bring geothermal resources to the point of commercial feasibility for the production of useful energy (section 207). AEC is given a broad charter to conduct all the necessary research, development, engineering, laboratory and field experiments and marketing, engineering and economic studies, etc. The Commission is instructed to coordinate its efforts with those of the Department of the Interior to prevent duplication. The AEC is also given authority to investigate potential interagency agreements and cooperative agreements with non-Federal entities and public utilities for the construction of commercial facilities.

The legislation would require NASA to prepare a proposal, as noted above, for the use of space technologies and/or NASA facilities and services for the exploration and mapping of geothermal resources. In section 209 there is authority to be appropriated to NASA "such amounts as may be required in fiscal years 1974, 1975, 1976 to carry out the requirements of section 205." Thus the only authority granted to NASA is the preparation of a report to be submitted within 6 months from enactment. Since there is no authority to do research and development work, the authorization for appropriations in 3 fiscal years is puzzling. It would seem that if NASA's proposal for the employment of space technologies and NASA services

is acceptable to the Secretary of the Interior, he should have the specific authority to ask NASA to perform the necessary work. If this bill is to be considered further, we suggest that it be so amended.

As to the major policy considerations relating to whether S. 2465 should be enacted, the National Aeronautics and Space Administration defers to the Department of the Interior since it would assume the primary role under this legislation.

The Office of Management and Budget has advised that, from the standpoint of the administration's program, there is no objection to the submission of this report to the Congress.

Sincerely,

GERALD D. GRIFFIN,
Assistant Administrator for Legislative Affairs.

U.S. DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SECRETARY,
Washington, D.C., November 6, 1973.

Hon. HENRY M. JACKSON,
Chairman, Committee on Interior and Insular Affairs,
U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: This responds to your request for the views of this Department concerning S. 2465, a bill "To authorize the Secretary of the Interior to guarantee loans for the financing of commercial ventures in geothermal energy; to coordinate Federal activities in geothermal energy exploration, research, and development; and for other purposes."

Although we support the general objective of encouraging development of geothermal energy sources, to the extent that the bill provides new authority for loan guarantees in title I, of direct Federal support for geothermal development in title II we recommend that the bill not be enacted at this time.

S. 2465 would establish a 10-year Federal program of guaranteeing loans by financial institutions for certain private geothermal resource developments. Annual appropriations of $50 million plus administrative costs would be authorized, and loan guarantees could not exceed 75 percent of the cost of the project for which the loan is made. The bill also makes provision for the cooperative exploration, research and development of geothermal resources by Federal agencies. Among these provisions is authority to make direct Federal investments in certain geothermal projects.

Both the loan guarantee and the new exploration, research, and development authority are premature in view of the present Federal activities and policies for the development of geothermal energy. This Department is in the process of issuing regulations under the Geothermal Steam Act of 1970 (30 U.S.C. 1001–1025) with a view to leasing and development of geothermal resources by nongovernmental parties. This accords with our view that the most appropriate initial approach is for private enterprise to bear basic responsibility for such development, supplemented by Federal research and guidance. Adequate statutory authority exists for Federal action carry-

ing out this responsibility. Indeed, we believe that the cooperative exploration, research, and development program provided for by S. 2465 is largely duplicative of existing authority, except to the extent it provides for direct Federal development of geothermal resources. Private industry has already undertaken to harness geothermal energy and we believe it can carry out this function, as energy needs require. Should future events cast doubt on the ability of non-Federal entities to do this, both the loan guarantee program and a program of direct Federal participation in geothermal development would warrant further consideration.

The Office of Management and Budget has advised that there is no objection to the presentation of this report from the standpoint of the administration's program.

Sincerely yours,

JOHN W. KYL,
Assistant Secretary of the Interior.

U.S. ATOMIC ENERGY COMMISSION,
Washington, D.C., November 26, 1973.

Hon. HENRY M. JACKSON,
Chairman, Committee on Interior and Insular Affairs,
U.S. Senate.

DEAR MR. JACKSON: Thank you for the opportunity to comment on S. 2465, a bill "[t]o authorize the Secretary of the Interior to guarantee loans for the financing of commercial ventures in geothermal energy; to coordinate Federal activities in geothermal energy exploration, research, and development; and for other purposes."

The Atomic Energy Commission is sympathetic to the purposes of S. 2465. However, at this time we do not support its enactment.

S. 2465 consists of two titles. Title I, a loan guarantee program, would be administered by the Department of the Interior, to encourage commercial development of energy production from geothermal sources.

Title II of the bill would cover a coordinated effort by the Department of the Interior, the Atomic Energy Commission, the National Aeronautics and Space Administration, and the National Science Foundation to encourage private industry through Federal assistance for the development and demonstration of practical means to produce useful, environmentally acceptable geothermal energy.

In his testimony prepared for presentation before the November 7 hearing of your Subcommittee on Water and Power Resources, Dr. Gerald Johnson, Director of the AEC's Division of Applied Technology, expressed the AEC's interest in cooperative research and development and demonstration programs in the field of geothermal energy. We are looking toward initiation in this current fiscal year of programs which would both broaden the technological base for geothermal energy utilization and accelerate the commercial development of the resource.

However, as pointed out by Dr. Johnson, S. 2465 is somewhat duplicative of existing authority in part. For example, section 31a(6) of the Atomic Energy Act of 1954, as amended (42 U.S.C. 2051a(6)) authorizes the AEC to make arrangements for the conduct of research and development activities relating to "the preservation and enhancement of a viable environment by developing more efficient methods to meet the Nation's energy needs." Dr. Johnson also noted the administration efforts presently underway concerning the planning of and funding for 5-year energy research and development programs, and the related organizational responsibilities for such programs. At this time, therefore, and for the reasons stated, the AEC does not support the enactment of S. 2465.

The Office of Management and Budget has advised that there is no objection to the presentation of this report from the standpoint of the administration's program.

Sincerely,

JOHN A. ERLEWINE,
Deputy General Manager.

IX. CHANGES IN EXISTING LAW

Subsection (4) of rule XXIX of the Standing Rules of the Senate requires a statement of any changes in existing law made by the bill ordered reported. S. 1283 as reported makes no amendment to or changes in existing laws.

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93d Congress
2d Session
HOUSE OF REPRESENTATIVES
REPORT
No. 93-1157

ESTABLISHING A NATIONAL PROGRAM FOR RESEARCH AND DEVELOPMENT IN NON-NUCLEAR ENERGY SOURCES

REPORT

FROM THE

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS

[To accompany H.R. 13565]

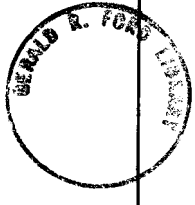

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TABLE OF CONTENTS

93D CONGRESS } HOUSE OF REPRESENTATIVES { REPORT
2d Session } { No. 93-1157

ESTABLISHING A NATIONAL PROGRAM FOR RESEARCH AND DEVELOPMENT IN NONNUCLEAR ENERGY SOURCES

JUNE 26, 1974.—Committed to the Committee of the Whole House on the State of the Union and ordered to be printed

Mr. HALEY, from the Committee on Interior and Insular Affairs, submitted the following

REPORT

together with

DISSENTING VIEWS

[To accompany H.R. 13565]

The Committee on Interior and Insular Affairs, to whom was referred the bill (H.R. 13565), to establish a national program for research and development in nonnuclear energy sources, having considered the same, report favorably thereon with an amendment and recommend that the bill as amended do pass.

The amendment is as follows:

Page 1, beginning on line 3, strike out all after the enacting clause and insert in lieu thereof the following:

That this Act may be cited as the "Federal Nonnuclear Energy Research and Development Act of 1974".

SECTION 1. The Congress hereby finds that—

(a) The Nation is suffering from a shortage of environmentally acceptable forms of energy.

(b) A major reason for this energy shortage has been our failure to organize and formulate a vigorous, comprehensive research and development strategy designed to assure the wise planning and effective conduct of a cohesive, fully dimensioned National research and development program.

(c) The Nation's energy needs can be met if a national commitment is made now to dedicate the necessary financial resources, to enlist our scientific and technological capabilities, and to accord the proper priority to developing new nonnuclear energy options to serve national needs, conserve vital resources, and protect the environment.

(d) The Energy Reorganization Act of 1974 provides for a coalescence of National energy research and development functions in the Executive branch, and for thorough, centrally-directed exploration and development of all potentially beneficial energy sources and energy utilization techniques, including research and development for the conservation of energy.

(e) The urgency of the Nation's energy challenge will require commitments similar to those undertaken in the Manhattan and Apollo projects; it will require that the Nation undertake a long-range, top-priority research and development program.

GENERAL POLICY

SEC. 2. (a) It is the policy of the Congress to establish and vigorously conduct a centralized, comprehensive, national program of basic and applied research and development, including demonstrations of practical applications, of all potentially beneficial energy sources and utilization of technologies, within the Energy Research and Development Administration as provided for in the Energy Reorganization Act of 1974. In carrying out this program, the Administrator shall be governed by the terms of this Act with respect to all nonnuclear aspects of the research, development and demonstration program, and the policies and the provisions of the Atomic Energy Act of 1954, as amended, shall continue to apply to nuclear research, development and demonstration projects.

(b) The Administrator (as defined in section 11) shall—

(1) aggressively pursue research and development programs in a wide range of nonnuclear energy technologies in order to insure adequate, reliable, economical, and environmentally acceptable energy sources and systems to support the essential needs of modern society;

(2) develop the technology and information base necessary to support development of the widest possible range of options available for future energy policy decisions;

(3) investigate the capability for, and in general, the option of energy self-sufficiency for the United States through the development of socially and environmentally acceptable methods for the utilization of domestic nonnuclear energy sources;

(4) pursue the development of new energy sources in such a way as to encourage the fullest possible private participation and to shift the burden of spending to the private sector as early in the development process as is possible;

(5) as he deems advisable, consult with representatives of science, industry, agriculture, labor, conservation organizations, State and local governments, as well as with all appropriate Federal Government agencies;

(6) pursue research and development of nonnuclear energy sources in such a way as to facilitate the commercial availability of adequate supplies of energy to all regions of the United States;

(7) include, to the greatest extent practicable, in Federal research and development programs authorized by this Act, small businesses and individual inventors;

(8) examine and if feasible implement methods by which Federal research and development expenditures authorized by this Act, are utilized to broaden the base of ownership of energy industry capital;

(9) to the degree feasible provide for a program for the international exchange of energy and energy-related technologies.

(c) Public access to information: The Administrator shall promptly make all records available for public inspection and for copying at reasonable rates, upon any request for records which (A) reasonably describes such records, and (B) is made in accordance with published rules stating the time, place, fees to the extent authorized by statute, and procedure to be followed. For purposes of this subsection, the term "records" includes records as used in section 552 of title 5 of the United States Code, and all communications, documents, reports, information, and physical objects received or transmitted by the Administrator or his employees under this Act, except for foreign policy and national defense matters exempted by section 552(b)(1) of title 5 of the United States Code and for trade secrets, know-how, and proprietary information exempted by section 7 of this Act and by section 552(b)(4) of title 5 of the United States Code.

SEC. 3. The Congress authorizes and directs that, to the fullest extent possible, the Federal program in research and development authorized by this Act shall be designed and executed according to the following principles:

(a) Energy conservation shall be a primary consideration in the design and implementation of the Federal nonnuclear energy program. For the purposes of this Act, energy conservation means both improvement in efficiency of energy production and use and reduction in energy waste.

(b) The environmental and social consequences of a proposed technological undertaking shall be analyzed and considered in evaluating its potential. Consistent with the requirements of this Act, the Administrator shall assign priority to those technologies which, while offering a substantial potential yield of useful energy, minimize the aggregate economic, environmental and social costs.

(c) Any program for the development of a technology which may require significant consumptive use of water after the technology has reached the stage of commercial application shall include thorough consideration of the impacts of such technology on water resources pursuant to the provisions of section 10. For any energy technology requiring significant water use, the availability of an adequate water supply for the demonstration phase of its development shall be a precondition of Federal assistance in demonstration projects and the availability of an adequate water supply for commercial application shall be a precondition of Federal assistance in projects of commercial application.

(d) Federal involvement in energy research, development, and commercial application shall be limited, consistent with other responsibilities under this Act, to those areas where there is the least likelihood that the private sector will achieve the desired goal without Federal assistance. Factors to be considered in evaluating this likelihood include, but are not limited to—

(1) the degree of risk in the proposed undertaking;

(2) the magnitude of the capital investment involved;

(3) the potential for recapturing development costs in the open market; and

(4) the availability of risk capital to interested non-Federal entities.

(e) In determining the Federal energy research and development policy, a high priority and heavy emphasis shall be assigned to those energy sources which are renewable.

SEC. 4. The Administrator shall—

(a) review the current status of nonnuclear energy resources, giving consideration to research and development being conducted by Federal and non-Federal entities;

(b) formulate a comprehensive energy research and development strategy for the Federal Government designed to advance the policies set forth in this Act;

(c) conduct a study, the final results of which shall be submitted to the Congress within twelve months after the date of enactment of this Act, to determine the amount of scientific, technical, and entry-level manpower necessary to adequately implement an effective national energy research and development program, including recommendations of action necessary for the training and locating of any needed qualified scientific, technical, and entry-level personnel;

(d) in allocating Federal moneys authorized by this Act, give consideration to all nonnuclear energy technologies, including but not limited to conservation measures, including increases in the efficiency of energy production, transmission, improved drilling techniques, and use as well as reduction of energy waste, opportunities for reuse and recycling, basic materials research, coal gasification and liquefaction including solvent refining, means by which the combustion of coal may be made environmentally acceptable, oil and gas recovery, oil shale, solar power, wind power, ocean thermal gradients, geothermal power, and hydrogen gas systems; and

(e) in conducting Federal research and development programs in the technologies set forth in subsection (d) above, give emphasis to—

(1) the full range of energy conservation technologies including but not limited to—

(A) productive use of waste through the reuse of agricultural wastes, garbage, and sewage through combustion and conversion. Conversion technologies to be investigated shall include pyrolysis, chemical reduction and bioconversion, and use of waste heat from industrial, residential, and commercial sources.

(B) electrical generation and transmission through (i) improvements in the efficiency of generation through advances in gas turbine technologies, combined cycles, magnetohydrodynamics, and commercial fuel cells; (ii) storage systems to allow more efficient load following, including the use of inertial energy storage systems;

and (iii) improvements in transmission through advances in cryogenic methods.

(C) reuse and recycling: through a vigorous attempt to discover new opportunities and technologies for reuse and recycling of consumer products and in industrial processes.

(D) advanced urban and architectural design: through total systems approaches to energy use in the residential and commercial sectors, improvements in home design and insulation technologies. small thermal storage units, and increased efficiency in electrical appliances and in lighting fixtures.

(E) transportation: through advanced urban design and traffic systems, improvements in automobile design for increased efficiency and lowered emissions, including investigation of the full range of alternatives to the internal combustion engine, and systems of efficient public transportation.

(2) solar energy systems, including but not limited to—

(A) residential and commercial heating, cooling and in particular combined heating and cooling systems;

(B) central power stations; and

(C) low-cost, stable, photovoltaic cells.

(3) geothermal energy resources, including but not limited to—

(A) improved methods and techniques for resource assessment of geothermal energy;

(B) methods for extracting energy from hot dry rock; and

(C) methods for utilizing geopressured hot water, including possible extraction of methane gas.

(4) coal resources including but not limited to—

(A) the acceleration of the commercial demonstration of facilities to produce gas from coal;

(B) the improvement of coal liquefaction and solvent-refining technology;

(C) the development and application of magnetohydrodynamics; and

(D) the accumulation of a wide range of options for making the direct utilization of coal or coal derivatives environmentally acceptable, including stack gas cleanup, fluidized bed combustion and precombustion coal cleaning technologies, and in situ coal gasification.

(5) Oil and gas resources including but not limited to—

(A) the improvement of methods for secondary and tertiary recovery;

(B) the improvement of methods for the prevention of marine oil-spills, and methods for spill cleanup.

(6) The acceleration of the commercial demonstration of the production of oil from shale by all possible technologies including in situ technologies.

(7) The utilization of windpower.

(8) The use of hydrogen as a fuel and as an energy storage system.

FORMS OF FEDERAL ASSISTANCE

SEC. 5. (a) GENERAL GUIDELINES.—

(1) In developing proposals pursuant to this Act, the Administrator may utilize various forms of Federal assistance and participation which may include but are not limited to—

(A) joint Federal-industry experimental, demonstration, or commercial corporations consistent with the provisions of subsection (b) of this section;

(B) contractual arrangements with, or grants to, non-Federal participants;

(C) contracts for the construction and operation of federally owned facilities;

(D) Federal purchases or guaranteed price of the products of demonstration plants or activities consistent with the provisions of subsection (c) of this section;

(E) Federal loans to conduct demonstrations of new technologies, and

(F) incentives, including financial awards, to individual inventors. such incentives to be designed to encourage the participation of a large number of such inventors.

(b) MODEL CORPORATIONS.—Joint Federal-industry corporations proposed pursuant to this Act shall conform to the following guidelines:

(1) Each such corporation is authorized to design, construct, operate, and maintain one or more experimental, demonstration or commercial-size facilities, or other operations which will ascertain the technical, environmental, and economic feasibility of a particular energy technology. In carrying out this function, the corporation shall be empowered, either directly or by contract, to utilize commercially available technologies, perform tests, or design, construct, and operate pilot plants as may be necessary for the design of the full-scale facility.

(2) Each corporation shall have—

(A) a Board of nine directors consisting of individuals who are citizens of the United States, of whom one shall be elected annually by the Board to serve as Chairman. The Board shall be empowered to adopt and amend bylaws. Five members of the Board shall be appointed by the President of the United States, by and with the advice and consent of the Senate, and four members of the Board shall be apointed by the President on the basis of recommendations received by him from any non-Federal entity or entities entering into contractual arrangements to participate in the corporation;

(B) a President and such other officers and employees as may be named and appointed by the Board (the rates of comensation of all officers and employees shall be fixed by the Board); and

(C) the usual power conferred upon corporations by the laws of the District of Columbia.

(3) An appropriate time interval shall be established for the term of Federal participation in the corporation at the expiration of which the Board of Directors shall take such action as may be necessary to dissolve the corporation or otherwise terminate Federal participation and financial interests. In carrying out such dissolution, the Board of Directors shall dispose of all physical facilities of the corporation in such manner and subject to such terms and conditions as the Board determines are in the public interest, and a share of the appraised value of the corporate assets proportional to the Federal participation in the corporation, including the proceeds from the disposition of such facilities, on the date of its dissolution, after satisfaction of all its legal obligations, shall be made available to the United States and deposited in the Treasury of the United States as miscellaneous receipts. All patent rights of the corporation shall, on such date of dissolution, be vested in the Administrator: *Provided*, That Federal participation may be terminated prior to the time established in the authorizing Act upon recommendation of the Board of Directors.

(4) Any commercially valuable product produced by demonstration facilities shall be disposed of in such manner and under such terms and conditions as the corporation shall prescribe. All revenues received by the corporation from the sale of such products shall be available to the corporation for use by it in defraying expenses incurred in connection with carrying out its functions under this title.

(5) The estimated Federal share of the construction, operation, and maintenance cost over the life of each corporation shall be determined to facilitate the congressional authorization of the full amount at the time of establishment of the corporation.

(6) The Federal share of the cost of each such corporation shall reflect (A) the technical and economic risk of the venture, (B) the probability of any financial return to the non-Federal participants arising from the venture, (C) the financial capability of the potential non-Federal participants, and (D) such other factors as the Administrator may set forth in proposing the corporation: *Provided*, That in no instance shall the Federal share exceed 90 per centum of the cost.

(7) (A) Prior to the establishment of any joint Federal-industry corporation pursuant to this Act, the Administrator shall submit to Congress a report setting forth in detail the consistency of the establishment of the corporation with the principles and directives set forth in section 3 and this section, and the proposed purpose and planned activities of the corporation.

(B) No such corporation shall be established unless previously authorized by specific legislation enacted by the Congress.

(C) SUPPORT THROUGH PRICE GUARANTEES.—Competitive systems of price supports proposed pursuant to this Act shall conform to the following guidelines:

(1) The Administrator shall determine the types and capacities of the desired full scale, commercial size facility, or other operation which would demonstrate

the technical, environmental, and economic feasibility of a particular energy technology.

(2) The Administrator may award planning grants for the purpose of financing a study of the full cycle economic and environmental costs associated with the demonstration facility selected pursuant to subsection (1) of this section. Such planning grants may be awarded to industrial entities, Federal agencies, government laboratories, universities, or non-profit organizations.

(3) Following the completion of the studies pursuant to the planning grants awarded under subsection (2) of this section, the Administrator shall invite bids from all interested parties to determine the minimum amount of Federal price support needed to construct the demonstration facility. The Administrator may designate one or more competing entities, each to construct one commercial demonstration facility. Such designation shall be made on the basis of those entities, (A) commitment to construct the demonstration facility at the minimum level of Federal price supports, (B) detailed plan of environmental protection, and (C) proposed design and operation of the demonstration facility.

(4) The estimated amount of the Federal price supports of the demonstration facilities' product over the life of such facilities shall be determined by the Administrator to facilitate the congressional authorization of the full amount of such support amounts at the time of the designation of the successful bidders.

REPORTS TO CONGRESS

SEC. 6. (a) The Administrator shall submit to Congress no later than sixty days from the end of each fiscal year a report detailing his organization's activities carried out pursuant to this Act during said fiscal year. The Administrator shall keep Congress fully and currently informed of his activities pursuant to this Act. Neither the Administrator nor any employee may refuse to testify or submit information to the Congress or any duly authorized committee thereof.

(b) The Administrator shaH also submit to Congress an annual research and development program report in which short-term and long-range Federal nonnuclear energy research and development plans and individual expenditures of moneys authorized for Federal nonnuclear research and development are set forth in detail. The report shall be submitted to the Congress no later than ninety legislative days prior to each fiscal year. The report shall include a statement setting forth the following:

(1) the anticipated research, development, and application objectives to be achieved by the proposed program;

(2) the economic, environmental, and societal significance which the proposed program may have;

(3) the total estimated cost of individual program items;

(4) the estimated relative financial contributions of the Federal Government and non-Federal participants in the research and development program;

(5) the relationship of the proposed program to any Federal national energy or fuel policies; and

(6) the relationship of any short-term plans and individual program expenditures to long-range programs and goals.

PATENT POLICY

Sec. 7. (a) (1) (A) Any research, development, demonstration, or projects contracted for, sponsored, or cosponsored by the Government pursuant to this Act shall require as a condition of Federal participation that all information—whether patented or unpatented, in the form of trade secrets, know-how, proprietary information or otherwise—resulting in whole or in substantial part from federally assisted research (hereinafter referred to as "resultant technology") shall receive the widest practicable dissemination to the general public, including, but not limited to, nongovernmental United States interests capable of bringing about further development, utilization, and commercial applications of such results.

(B) Every contractor performing any work under such federally assisted research authorized by this Act shall fully and completely identify any resultant technology to the Administrator promptly after discovery thereof.

(C) Such resultant technology shall promptly be made available to the public through licensing, dedication, or publication or otherwise as provided by law.

(2) (A) (i) The United States shall acquire all rights throughout the world to any resultant technology, and shall acquire title to any patents issuing in respect thereof unless the Administrator waives all or any part of the rights of the United States to such invention in conformity with the provisions of subsection (a) (2) (A) (ii) of this section: Provided, however, That in order to stimulate prompt and effective use of the resultant technology developed by the contractor.

(a) every contractor shall receive a royalty-free, non-exclusive license to any United States patent issuing on the resultant technology, such license to be for the term of such patent, except that it shall be subject to revocation by the Administrator commencing five years after issuance of the patent if any person then requests an exclusive license and the Administrator determines that it would be in the public interest to grant such license pursuant to the provisions of subparagraphs (a) (2) (C) and (a) (2) (D) of this section, and

(b) the Administrator may, in his discretion, at the time of awarding of the contract, grant all patent rights outside the United States to the contractor subject to a royalty-free, non-exclusive license to the Government together with the right to grant sublicenses for governmental purposes, under the conditions that and in return for the contractor's agreement to (1) file at the contractor's expense United States patent applications corresponding to the foreign applications and (2) transfer title to such United States patent applications and any patent issuing thereon to the Government at such times as the Administrator designates.

(ii) Under such regulations in conformity with this subsection as the Administrator shall prescribe, he may, upon request by the applicant, waive all or any part of the rights of the United States under this section with respect to any invention or class of inventions made or which may be made by the applicant in the performance of any work required by any contract or grant if the interests of the United States and the general public will be served thereby and the Administrator determines after opportunity for an on-the-record adjudicatory public hearing held in accordance with the provisions of the Administrative Procedure Act, that—

(a) at the time of awarding the contract or grant,

(1) the participation of the applicant is necessary for the expeditious development or commercial application of the resultant technology and the applicant's participation is conditioned upon obtaining a waiver;

(2) there is a reasonable basis to believe that the effect of the waiver will not be substantially to lessen competition, or tend to create a monopoly, in any line of commerce in any section of the country;

(3) the public interest will be served by such waiver in view of the applicant's intentions, plans, and ability itself to utilize the invention;

(4) the applicant, in furtherance of its established commercial position not substantially based on government funded research, has a substantial investment of technical or financial resources in research and development directly related to the work to be done under the contract or grant;

(5) the contract or grant is not for the operation of a Government-owned facility, nor for coordinating or directing the work of others, nor for the creation, development, or improvement to the point of practical application of any product, process, or method which either is intended for use by the general public or is or will be required for use by law; and

(6) the contract or grant is not in a field of technology in which the Government has been the principal developer; or

(b) after the identification of the invention,

(1) private risk capital is necessary for the development and commercialization of the resultant technology and is likely to be forthcoming only upon the grant of such waiver; and

(2) the provisions of (3) through (6) of subsection (a) (2) (A) (ii) and (a) (2) (C) (iv) of this section have been satisfied.

(iii) Any waiver granted pursuant to the provisions of subsection (a) (2) (A) (ii) of this section shall be made upon such terms and conditions as the Administrator shall determine to be required for the protection of the interests of the United States and the general public, including such conditions as are required to insure that the requirements of subparagraphs (a) and (b) of subsection (ii) will be satisfied. Any waiver pursuant to subsection (ii) shall be made subject to the same restrictions as are applicable to exclusive and partially exclusive licenses under subsection (a) (2) (D) of this section.

(B) The Administrator shall license, after due notice thereof. all patents to which the United States is entitled pursuant to this Act to all qualified applicants

therefor, on nonexclusive and nondiscriminatory terms and under reasonable conditions, except as provided by subparagraph (C) of this paragraph. The Administrator shall make a determination, case by case, as to whether to effectuate the purposes of this Act, patent licenses shall be granted, on a royalty free basis or upon a basis of charges designed to recover part or all of the costs of the Federal research.

(C) The Administrator may license patents to which the United States is entitled pursuant to subparagraph (A) of this paragraph, on an exclusive or partially exclusive basis, subject to the provisions of this subparagraph and subparagraph (D) of this paragraph. The Administrator may grant such a license, if he determines, after opportunity for an on-the-record public proceeding conducted in accordance with the provisions of the Administrative Procedure Act, that—

(i) the availability of nonexclusive licensing pursuant to subparagraph (B) of this paragraph has in fact failed to result in substantial utilization of the invention;

(ii) exclusive or partially exclusive licensing is a necessary incentive to call forth risk capital and expenses to bring the invention to the point of practical or commercial application;

(iii) the public interest will be served by the proposed license, in view of the applicant's intentions, plans, and ability himself to utilize the invention; and

(iv) the grant of such license will not tend unduly to lessen competition nor to increase concentration in any section of the country in any line of commerce to which the technology relates.

(D) Any exclusive or partially exclusive license granted pursuant to subparagraph (C) of this paragraph—

(i) shall provide for the reservation of an irrevocable, nonexclusive, royalty-free, unrestricted right throughout the world to make, have made, use, and sell the invention, by or on behalf of the United States (including any governmental agency and any corporation established pursuant to this Act), any State or subdivision or instrumentality thereof, and any foreign government pursuant to any existing or future treaty or agreement of the United States;

(ii) shall provide for the licensee to provide written reports to the Administrator, upon his request, at reasonable intervals, concerning the utilization that is being made or is intended to be made of the invention, and such other information as the Administrator may, in his discretion, determine is necessary to effectuate the purposes of this Act or otherwise protect the public interest;

(iii) shall provide for termination of the exclusive or partially exclusive rights of the licensee three years after the grant of the license, and at any three-year interval thereafter, if the Administrator determines, in an on-the-record adjudicatory public hearing conducted in accordance with the provisions of the Administrative Procedure Act preceding the expiration of such three-year period, that the licensee did not take effective steps to implement the intentions and plans referred to in subparagraph (C) (iii) of this paragraph; that such plans have not in fact resulted, or within a reasonable time thereafter will not result, in substantial utilization of the licensed invention; or that such exclusivity has tended substantially to lessen competition or to increase concentration in any section of the country in any line of commerce to which the subject matter of the invention relates: Provided, however, That the Administrator shall hold such a hearing and make such a determination at any three-year interval after the grant of the license, upon the written request therefore by any interested person: Provided, further, That in any such proceeding, the licensee, on the basis of a showing by him, shall have the burden of demonstrating compliance with the provisions of this subdivision.

(iv) shall provide that the Administrator may grant a nonexclusive, nondiscriminatory, unrestricted and reasonable license to all qualified applicants therefor, upon terms reasonable under the circumstances if the Administrator determines that the granting of such a license is necessary to fulfill health, safety, energy, or other public needs, or when Government regulations require use of the technology; and

(v) may contain such other terms and conditions as the Administrator, in his discretion, determines are necessary or appropriate to effectuate the purposes of this Act or otherwise protect the public interest.

(b) (1) Whenever a participant in any program, contract, or energy research and development project pursuant to this Act holds background patents, trade secrets, know-how, or proprietary information which will be employed in the proposed program, contract, or research and development project (hereinafter referred to as "background technology") the Administrator shall consider in determining whether to acquire rights to background technology (A) the participation of industry, (B) the equitable protection for privately developed technology, and (C) the commercial availability of research results. Where a background agreement is determined to be appropriate, the agreement shall provide that when the program, contract, or energy research and development project reaches the stage of commercial application, any of the participant's previously developed background technology will be made available to any qualified applicant upon a finding by the Administrator that the background technology is necessary to achieve commercial application of the energy process or system developed under this Act.

(2) (A) Agreements pursuant to subsection (b) (1) shall provide that such background technology be made available on reasonable and nondiscriminatory license terms, including suitable agreements on confidentiality, which appropriately compensate the participant on the basis of the relative significance of his background technology, and his share of costs to the achievement of the commercial viability of the total energy process or system.

RELATIONSHIP TO ANTITRUST LAWS

SEC. 8. (a) Nothing in this Act shall be deemed to convey to any individual, corporation, or other business organization immunity from civil or criminal liability, or to create defenses to actions, under the antitrust laws.

(b) As used in this section, the term "antitrust laws" means—

(1) the Act entitled "An Act to protect trade and commerce against unlawful restraints and monopolies", approved July 2, 1890 (15 U.S.C. 1 et seq.), as amended;

(2) the Act entitled "An Act to supplement existing laws against unlawful restraints and monopolies, and for other purposes", approved October 15, 1914 (15 U.S.C. 12 et seq.), as amended;

(3) the Federal Trade Commission Act (15 U.S.C. 41 et seq.), as amended;

(4) sections 73 and 74 of the Act entitled "An Act to reduce taxation, to provide revenue for the Government, and for other purposes", approved August 27, 1894 (15 U.S.C. 8 and 9), as amended; and

(5) the Act of June 19, 1936, chapter 592 (15 U.S.C. 13, 13a, 13b, and 21a).

ENVIRONMENTAL EVALUATION

SEC. 9. (a) The Council on Environmental Quality is authorized and directed to carry out a continuing analysis of the conduct of research and development of energy technologies to evaluate—

(1) the adequacy of attention to energy conservation methods, and

(2) the adequacy of attention to environmental protection and the environmental consequenecs of the application of energy technologies.

(b) The Council on Environmental Quality, in carrying out the provisions of this section, may employ consultants or contractors and may by fund transfer employ the services of other Federal agencies for the conduct of studies and investigations.

(c) The Council on Environmental Quality shall hold annual public hearings on the conduct of energy research and development and the probable environmental consequences of trends in the application of energy technology. The transcript of the hearings shall be published and made available to the public.

(d) The Council on Environmental Quality shall make such reports to the President, the Administrator, and the Congress as it deems appropriate concerning the conduct of energy research development. The President as a part of the annual Environmental Policy Report required by section 201 of the National Environmental Policy Act (83 Stat. 854) shall set forth the findings of the Council on Environmental Quality concerning the conduct of energy research and development and the probable environmental consequences of trends in the application of energy technology.

WATER RESOURCE EVALUATION

SEC. 10. (a) The Water Resources Council shall undertake assessments of water resource requirements and water supply availability for any energy tech-

nology and any probable combinations of energy technologies which are the subject of research and development efforts authorized by this Act, and the commercial development of which could have significant impacts on water resources. In the preparation of its assessment, the Council shall—

(1) utilize to the maximum extent practicable data on water supply and demand available in the files of member agencies of the Council;

(2) collect and compile any additional data it deems necessary for complete and accurate assessments;

(3) give full consideration to the constraints upon availability imposed by treaty, compact, court decree, and existing water rights previously granted pursuant to State law;

(4) assess the effects of development of such technology on water quality;

(5) include estimates of cost associated with production and management of the required water supply, and the cost of disposal of waste water generated by the proposed facility or process;

(6) assess the environmental, social, and economic impact of any change in use of currently utilized water resource that may be required by the proposed facility or process;

(7) consult with the Council on Environmental Quality; and

(8) provide an assessment to the Administrator as to the availability of an adequate water supply for proposed undertakings.

(b) Upon completion of the assessment, and at least ninety days before submission of the report to the Administrator, notice of completion shall be printed in the Federal Register and the report shall be made freely available to the general public for comment and evaluation.

(c) The Council shall include a broad survey and analysis of regional and national water resource availability for energy development in the biennial assessment required by section 102(a) of the Water Resources Planning Act (P.L. 89–80).

THE ADMINISTRATOR

SEC. 11. For the purposes of this Act, the term "Administrator" means the Administrator of the Energy Research and Development Agency upon the creation of such agency by law.

APPROPRIATION AUTHORIZATION

SEC. 12. There are authorized to be appropriated to the Administrator—

(a) to carry out the purposes of this Act, in fiscal year 1975, $1,300,000,000 and in fiscal year 1976, $1,800,000,000, no more than $500,000 of which shall be made available by fund transfer in each fiscal year to the Council on Environmental Quality for the purposes authorized and directed by section 9, and no more than $1,000,000 of which shall be made available by fund transfer in each fiscal year to the Water Resources Council for the purposes authorized and directed by section 10; and

(b) for expenses incurred in administering this Act, including such amounts as may be expended for consulting services and including funds transferred to other Federal agencies in compensation for personal services, such funds as may be necessary in each fiscal year.

(c) Notwithstanding subsection (a) of this section, no appropriation shall be made to the Administrator under this Act or the Energy Reorganization Act of 1974 in connection with any demonstration project entailing an estimated cost in excess of $10 million, or in connection with a Federal loan in excess of $5 million, unless previously authorized by legislation enacted by the Congress; and no joint Federal-industry corporation shall be established unless previously authorized by legislation enacted by the Congress.

LEGISLATIVE HISTORY

The Environmental Subcommittee of the Committee on Interior and Insular Affairs began hearings on the subject of energy research and development on May 16, 1973, considering the bill H.R. 6602. During the course of subsequent hearings, a large number of related energy research and development bills were referred to the subcommittee including the following: H.R. 8404 (Mr. Reid), H.R. 9535 (Mr. Ruppe), H.R. 9943, (Mr. Ruppe), H.R. 10640 (Mr. Lent), H.R.

11480 (Mr. Carter), H.R. 11512 (Mr. Fascell), H.R. 11723 (Mr. Teague), H.R. 11724 (Mr. Teague), H.R. 11728 (Mr. Conte), H.R. 11777 (Mr. Stubblefield), H.R. 11826 (Mr. Mazzoli), H.R. 11856 (Mr. Udall), H.R. 11857 (Mr. Udall), H.R. 11906 (Mr. Snyder), H.R. 11907 (Mr. Broyhill of Virginia), H.R. 11932 (Mr. Synder, (H.R. 12082 (Mr. Perkins), H.R. 12484 (Mr. Bingham), and S. 1283.

Subsequent hearings were held on May 23, June 13, December 10, and December 18, 1973. Hearings continued with full day sessions on January 21, February 1, and February 19, 1974. In all, the subcommittee received testimony from more than 40 individuals both as witnesses and in statements submitted for the record.

The subcommittee began markup on February 4, 1974. H.R. 11857 (Mr. Udall and others) was chosen as the subcommittee markup vehicle. During the 7 days of open subcommittee markup sessions, two separate committee prints were prepared (dated February 19 and February 25). Upon the conclusion of subcommittee consideration, a clean bill, H.R. 13565 (March 18), was introduced with the bipartisan sponsorship of 18 members of the committee.

Five sessions of open full committee consideration of this legislation began on May 22, 1974 and were concluded with a voice vote to report the bill as amended on June 12, 1974.

During the period of subcommittee and full committee consideration of this legislation a closely related measure, the Energy Reorganization Act of 1974, was being considered in the Government Operations Committees of both Houses of the Congress. This legislation authorized a reorganization of government agencies, particularly the Atomic Energy Commission, so as to constitute a single body responsible for all energy research and development Administration (ERDA). The House passed this bill on December 19, 1973, and as of the date of this report the legislation is pending in the Senate.

H. R. 13565, the subject of this report, was written with the intent of providing the necessary parallel programmatic legislation to ERDA. As described in more detail elsewhere in this report, this bill provides the program and policy guidance as well as the funding authorizations for ERDA's nonnuclear efforts, while nuclear research and development will continue to be guided by the Atomic Energy Act of 1954 and the Joint Committee on Atomic Energy. Thus, upon enactment into law, these two pieces of legislation will jointly provide the necessary administrative and programmatic framework for the Nation's energy research and development effort.

BACKGROUND AND NEED FOR THE LEGISLATION

The petroleum shortage of the past year has brought home to every American citizen a fact that previously had been recognized by only a few experts—that the United States is faced with a serious, and apparently increasing, energy shortage. Demand for energy of all types has grown steadily in the past twenty years and particularly sharply since the late sixties. On the other hand domestic production of fossil fuels has slowed and the gap between domestic demand and domestic supply is steadily widening. In the opinion of many experts, domestic production of oil and gas will never again reach the peak it achieved in 1972 even when Alaskan production is fully developed.

The pattern of American energy use, the ever increasing demand and the widely acknowledged waste, can be traced back to the unspoken assumption that energy and virgin natural resources will continue to be available in unlimited supply. An obvious consequence of this attitude has been wide acceptance of wasteful and highly inefficient practices. A less obvious consequence, but one which is nevertheless clearly related, has been the lack of a vigorous national energy research and development program. By virtually every measure, Federal effort and spending on energy research and development has lagged well behind what is necessary. In a comprehensive report on energy research and development, the Energy Task Force of the Science and Astronautics Committee, concluded that:

> The Nation as a whole spends about 2.5% of its more than one trillion gross national production for research and development . . . with about 10% of the GNP directly related to energy, and with the technologically intensive nature of the energy industries, it is not unreasonable to expect that 10% of the national research and development effort be assigned to energy. This would mean an annual expenditure of $2.5 to $3 billion, almost twice our current energy research and development funding. It will take at least an additional billion dollars a year to bring the total effort into line with needs. This increased level of effort is consistent with funding levels in other areas of national importance.

Within these admittedly inadequate funding levels, the uneven distribution of funds between nuclear and nonnuclear research and development has further slowed progress in nonnuclear areas. The situation is summarized in Table I. Note that the nonnuclear category includes the whole range of fossil and non-fossil energy sources as well as conversion processes, environmental control technologies and basic research. The report cited just above further concluded that:

> Research and development for nuclear power have long dominated the Federal energy research and development budget . . . A better balance in energy research and development priorities must be established. This should be done by increasing significantly expenditures for nonnuclear energy research and development.

In a report on the *Nation's Energy Future* prepared at the request of President Nixon and published in December of 1973, the Chairman of the Atomic Energy Commission, Dr. Dixie Lee Ray, concluded that:

> Present energy problems stem, in large part, from the lack of a coordinated national energy research and development program over the last twenty years. Only nuclear power has received sustained support at adequate levels.

TABLE I.—FEDERAL ENERGY RESEARCH AND DEVELOPMENT FUNDING

[In millions of dollars]

	Nuclear	Nonnuclear	Total	Percent nonnuclear of total
Fiscal year:				
1970	320.9	63.7	384.6	19
1971	337.4	84.0	421.6	24
1972	410.8	122.7	533.5	23
1973	477.5	155.9	633.4	25
1974	617.4	383.6	1,001.0	38
1975	1,507.7	762.07	2,269.8	33

Thus, overall energy research and development funding has been inadequate, and funding for nonnuclear energy has been even more so. However, funding, no matter how essential, is not the whole picture. The nation's energy research and development program has also suffered from the lack of a centralized planning and policy making body. Energy research and development has been fragmented and carried out by numerous Federal agencies. The Congress has recognized this situation, and has acted to rectify it through the creation of a new, centralized, energy research and development agency, the Energy Research and Development Administration (ERDA). The report of the House Government Operations Committee described ERDA's mission as follows:

> ERDA will exercise central responsibility for policy planning, management, support and conduct of research and development programs and projects involving all energy sources. . . . The scope of possible energy sources and utilization techniques that ERDA may explore will be virtually unbounded . . . It will cover new directions as yet unvisualized. The vigorous pursuit of all promising energy sources and technologies will be a major ERDA mission under this bill.

Thus ERDA will provide the administrative structure for energy research and development, encompassing both nuclear and nonnuclear efforts. This bill has been explicitly designed to provide the Congressionally defined priorities and guidelines, the policies and the funding levels which the Administrator of this new agency is to follow in his nonnuclear research and development undertakings. Nuclear policy and program guidance will continue to be provided by the Atomic Energy Act of 1954. Nothing in this Act should be construed to impinge upon or affect the Administrator's duties or actions in the field of nuclear research and development, nor alter congressional committee jurisdiction in this area.

During the course of its consideration of this legislation, the committee heard from a large number of expert witnesses in a variety

of fields. The message these witnesses conveyed is that the United States possesses significant, as yet untapped, energy capacity both from domestic fossil resources (coal, outer continental shelf oil and oil shale) and potentially much greater resources from renewable sources such as solar radiation, ocean thermal gradients, and geothermal power. Equally important, the United States can in effect tap a large new energy source by developing technologies to eliminate unnecessary waste and greatly increase efficiency of energy use in end use, combustion, transmission, extraction—indeed in all phases of energy utilization.

The committee concluded that the energy supply problem can be greatly improved by a long-range, top priority commitment to the necessary research and development. However, this commitment will have to be a serious one on the scale of national dedication that was committed to the Manhattan Project and the Apollo Program.

MAJOR ELEMENTS OF THE PROGRAM

A. Design of the program

In designing the substance of the research and development program, the Committee attempted to reach a balance between too much and too little specificity. On the one hand, the Committee intended to exert strong Congressional guidance anad direction over the design and implementation of the programs to be undertaken pursuant to this legislation, while on the other hand it recognized the difficulty of predicting the future of a broad research program which may be profoundly affected by new advances and unexpected discoveries. The Committee's solution was to leave a good deal of flexibility in its listing of specific technologies which are to be pursued, while at the same time setting forth those areas which the Committee deems worthy of special emphasis and high priority, and providing a set of five principles to shape the design and execution of the Federal program in non-nuclear energy research.

Section 3 of the bill sets forth these guidelines in detail. The first concerns energy conservation, The Committee determined that advances in energy conservation technology including both the means to improve the efficiency of energy production and energy use and reduction in energy waste, is to be a prime consideration in decisions of the program's administrator. Since energy conservation, particularly the development of new technologies to improve the efficiency of energy production and use, has been and continues to be badly neglected, the Committee intended to make clear its conviction that every barrel of oil saved is a barrel that need not be produced.

In subsection 3(b), the Committee directs that the economic, environmental and social consequences of a proposed technological undertaking should be given heavy weight in the Administrator's decisions. All too often, adverse environmental and social side effects of a technological undertaking have been ignored or gone unrecognized at the time a major initial commitment was made. The intent of this subsection is to insure that in choosing among different available alternatives, the administrator consider both the direct energy benefit of the proposed undertaking as well as the aggregate economic, environmental, and social advantages and disadvantages.

The third guideline reflects the Commission's concern about the effects of the development of energy resources on water quality and availability. Accordingly, HR 13565 provides that demonstration and commercial application phases of the development of any energy technology be eligible for Federal assistance only when the necessary water resources have been carefully analyzed, and an adequate supply, in terms of both quantity and quality, appears to be available.

Subsection 3(d) deals with limiting Federal involvement in energy research and development to the greatest extent possible to those areas where there is the least likelihood that the private sector can achieve the desired goals in the absence of such assistance. The Nation's long-range commitment to developing an adequate domestic energy supply will require a healthy partnership between government and private industry, and the vigorous participation of both sectors. Common sense dictates, therefore, that each sector spend its resources in efforts to which it is most suited, and that Federal involvement be concentrated in areas where private efforts are least likely, such as those entailing a high degree of risk, a very high front-end capital investment, or a small initial potential for re-capturing development costs in the open market.

Finally, subsection 3(e) states that "a high priority and heavy emphasis shall be assigned to those energy sources which are renewable." The Committee believes that effort should necessarily be concentrated in areas which promise the largest energy benefit, and therefore those renewable resources which are available to use in virtually unlimited supply (such as direct solar radiation, ocean thermal gradients, wind energy, geothermal, etc.) should be pursued with particular emphasis. Since different capital and manpower investments yield different benefits in different areas of endeavor, the Committee does not intend to imply that the Administrator must spend a particular number of dollars, or designate a particular number of man-years in order to satisfy this principle. It does intend that the overall effort to develop these resources should be given a high and continuing priority.

The particulars of the nonnuclear energy and research development program are set forth in more detail in section 4. Subsection 4(d) lists significant currently known technologies and procedures, while subsection 4(e) develops in more detail the programs which are to be accorded emphasis. The general areas within which particular efforts are to be given emphasis include the full range of energy conservation technologies, solar and geothermal energy utilization, certain technologies and processes related to fossil fuels, and the use of hydrogen.

In summary, the Committee feels that section 3 provides a well-defined framework within which the program will be designed according to Congressionally defined priorities and principles, while section 4 allows the administrator broad flexibility within which to develop the best possible nonnuclear energy research and development program.

B. Implementation of the program

The various forms of Federal assistance which may be used in achieving the most vigorous and successful national energy research and development program are set forth in section 5. They include the formation of joint Federal-industry corporations, Federal contracts and grants for both research and development, federally guaranteed

purchases or prices for the products of private undertakings, Federal loans, and other incentives including financial awards.

The purpose, structure, and cost of a joint Federal-industry corporation were deemed such as to merit a case by case consideration by the Congress and specific legislation tailored to each proposal. However, general guidelines for the form of such joint Federal-industry corporations are set forth in the bill in order to provide congressional guidance to the Administrator in preparing proposals for submission to the Congress.

Similarly, guidelines are provided in H.R. 13565 for the use of Federal price guarantees, although specific congressional approval will be required for any individual project of this type. Guaranteed Federal purchases and Federal loans in excess of $5 million will also require specific congressional approval.

In order to aid the Congress in making its energy research and development appropriations consistent with overall national energy policy and with other national economic, environmental and social goals, the Administrator is directed to submit to the Congress a program report at least 90 legislative days prior to the beginning of each fiscal year. In this report he is directed to set forth the short and long-range objectives of his agency as well as the proposed individual expenditures for the coming year. In addition, the Administrator is required to submit an annual report to the Congress within 60 days of the end of each fiscal year, detailing his organization's activities carried out pursuant to this Act during that fiscal year. These reporting procedures are intended to provide the Congress with the necessary information to evaluate the energy research and development program and to insure that it is consistent with the Nation's overall energy policy.

C. Administration of the program

As this legislation was specifically designed to blend with the Energy Reorganization Act of 1974, few administrative provisions are included. All powers in this bill are delegated to the Administrator of ERDA as set forth in the Reorganization Act, which contains the necessary administrative regulations and direction, including organization of the new agency, powers of the Administrator, functions and units transferred from existing government departments, qualifications of chief personnel and the acquisition and construction of necessary facilities.

D. Patent policy

One of the most important and complex issues presented by energy research and development legislation is the treatment of commercial rights and technology resulting from the Federally funded projects undertaken pursuant to the Act. On the one hand, a strong argument has been made that in all cases all technology developed under a publicly financed program should belong to the public. A patent grant is designed to induce the development of new technology. In the case of governmentally financed research, however, the participant is already compensated directly by the government for the development of the technology, and there is no reason, so the argument goes, that he should also receive the windfall of the additional compensation of a monopoly grant at the consumers' expense. This argument is particularly forceful in the area of government sponsored energy research and development, for it makes little sense to publicly finance the development of new technology only to allow resultant energy technology to be tied up by a few private concerns that hold exclusive rights.

On the other hand, it has been asserted with equal vigor that while in many cases resulting technology should be made available to the public on a non-exclusive basis, there are also many situations where the granting of exclusive rights is necessary to accomplish goals that are consistent with the purpose of a government sponsored energy research and development program, e.g., the participation of the private sector, the commercialization for general use of specialized government research, protection of technology which the participant has already developed as a result of his own efforts (and not other government funding).

During extensive hearings on this issue, the Committee received contrasting recommendations from the Department of Commerce (which spoke for the Administration) and the Department of Justice (which spoke on its own behalf). The Department of Commerce advocated a broad grant of federal discretion to the Administrator to waive to private contractors the rights of the United States in resulting technology, while the Department of Justice argued that such a course was unnecessary to accomplish the goals of the Act. The Justice Department favored a patent provision which would require that the government take title to all resulting technology and that such technology be made available on a non-exclusive basis. If exceptions were to be provided to this policy, the Justice Department maintained that congressionally determined criteria should be set forth in the statute to guide the actions of the Administrator.

The Committee chose a middle course. H.R. 13565 permits the Administrator to waive title to government financed energy research, both before and after the potential invention is identified, under certain general guidelines. It also permits the Administrator to grant exclusive rights to contractors after the invention is identified under similar criteria. The general statutory criteria set forth as guidelines to the Administrator relate to the applicant's commercial position, his preexisting investment in the area of technology involved, plans to utilize the resulting technology, as well as the subject matter of the research, possible effects on competition arising from the grant of exclusive rights, and the necessity to grant such rights in order to expeditiously develop the technology.

Where title is waived or where exclusive or partially exclusive rights are granted, such rights are subject to conditions set forth in the bill. Thus certain irrevocable rights to the United States will be reserved, reports regarding utilization of the technology must be filed with the administrator, and the period of exclusivity is subject to termination in certain circumstance. Moreover, the Administrator may include such additional conditions as may be in the public interest or otherwise necessary to achieve the purposes of the Act. It should also be noted that the waiving of title or the grant of an exclusive license is subject to the opportunity for a hearing.

The Committee believes that the combination of objective criteria for granting of greater rights, provisions for termination of the period of exclusivity and opportunity for public notice and citizen participation will result in protecting the public interest. The Admnistrator

will, however, have the flexibility necessary to achieve the full cooperation of the private sector in the energy research and development program to be carried out under the Act.

The Committee also chose to address the issue of the availability of a participant's background technology which may be a necessary componnt of the energy process or system which is a result of research and development funded under the program. The term "background technology" is defined as background patents, trade secrets, know-how or proprietary information which will be employed in the proposed program, contract or research and development project.

In order to assure that background technology will be generally available once the project reaches the point where it may be used commercially, H.R. 13565 grants the Administrator the discretion to enter into an agreement with the participant to provide the nondiscriminatory licensing of such background technology which may be necessary for commercial application of the government financed technology. The applicant will, of course, be compensated for the use of his background technology, and the amount of compensation shall be based upon the relative significance of his background technology and his share of costs to the achievement of the commercial viability of the total energy process or system.

During Subcommittee deliberations, statutory language was considered which would have required the participant to make his background technology available to all applicants. At the urging of the Department of Commerce, this language was rejected in favor of the Department's proposal providing that the Administrator may acquire rights to background technology giving consideration to (a) the participation of the industry; (b) the equitable protection for privately developed technology; and (c) the commercial availability of research results. In approving this provision, the Committee has given the Administrator the flexibility he will need to assure that research results will be available for general use while also appropriately protecting privately developed rights.

E. Water resource and environmental evaluations

The necessarily massive production of energy from existing and new sources cannot help but have a very great environmental impact. Consequently, the Council on Environmental Quality is directed to carry out a continuing analysis of the ongoing development of energy technologies and their impact on the Nation's commitment to a cleaner and more carefully protected environment. As a part of its study the Council is directed to hold annual public hearings, and to make transcripts of these hearings available to the general public. When it deems it appropriate, the Council may make special reports to the Congress, the President or the Administrator, concerning the conduct of the research and development programs supported in whole or in part by the Federal government.

Similarly the production and utilization of many forms of energy will have a significant impact on water resource availability and water quality. This is particularly true in the arid West where much of the Nation's readily available coal reserves lie. Accordingly, this legislation directs the Water Resources Council, an independent Federal agency which is the overall coordinator of Federal activities in the water resource field, to prepare assessments of water resource requirements and water supply availability for an energy technology or combination of technologies undertaken pursuant to this Act, which might have a significant impact on water availability. The Council is directed to use its own considerable human and informational resources, in addition to any additional data it may be necessary to collect. After careful study, the Council is directed to provide the Administrator with an assessment of the apparent availability of an adequate water supply for a proposed undertaking. Of course, the Committee does not intend that this section in any way shall be construed to alter or modify other unrelated congressional enactments regarding water resources, such as section 201 of the Act of September 30, 1968 (82 Stat. 885).

Full consideration of water supply, and the involvement of the Water Resources Council, in the design of the Federal nonnuclear energy and development program, has been included in order to avoid the commitment of major Federal funds and support to the development of technologies which upon reaching commercial scale would require more water than is available without imposing unwarranted demands upon other necessary water uses.

The general goal for both the Council on Environmental Quality and the Water Resources Council in their involvement with the ERDA Administrator in the nonnuclear energy research and development effort, is to look far enough ahead at foreseeable adverse side effects of proposed undertakings so that costly mistakes can be avoided and the necessarily limited Federal resources spent most wisely.

SECTION-BY-SECTION ANALYSIS

The short title of this Act is "Federal Nonnuclear Energy Research and Development Act of 1974."

Section 1. Statement of findings

The congressional findings regarding the present United States energy shortage and the outlook for the future are set forth in this section. It is noted that a major reason for the current energy shortage is the Nation's failure to implement a vigorous and comprehensive national energy research and development program but that this failure can be overcome if appropriate financial, scientific and technical resources are committed to the development of nonnuclear energy options.

In addition, the findings recognize that the Energy Reorganization Act of 1974 will provide for the reorganization and consolidation of energy research and development programs within the Executive Branch to implement a centrally directed program of energy research and development of all potentially beneficial energy sources including energy conservation research and development. Finally, the committee finds that meeting the Nation's energy challenge will require a commitment similar to that of the Manhattan and Apollo Projects.

Section 2. General policy

This section declares that it is the policy of the Congress to establish and vigorously conduct a comprehensive national energy research and development program of all potentially beneficial energy sources and utilization technologies within the Energy Research and Development Administration. In carrying out the nonnuclear aspects of this

program, the Administrator shall be governed by the provisions of this Act, while the policies and provisions of the Atomic Energy Act of 1954, as amended, shall continue to apply to nuclear research, development and demonstration projects.

Subsection 2(b) sets forth declarations of general policy designed to guide the Administrator in the development and implementation of the program to achieve the goals of the Act. The Administrator is directed to:

Pursue a wide-ranging research program in nonnuclear energy technologies to insure adequate, reliable, economical and environmentally acceptable energy sources and systems;

Develop a technology and information base necessary to support the widest possible range of options available for future energy policy decisions;

Instigate the capability of energy self-sufficiency for the United States through the development of socially and environmentally acceptable energy sources;

Encourage private participation through a shift of the burden of spending to the private sector as early in the development program as is possible consistent with goals of the Act;

Consult with representatives of appropriate fields of expertise and of government agencies;

Pursue the program so as to encourage the commerical availability of energy supplies to all regions of the United States;

Insofar as is practicable, include small business and individual inventors in the Act's programs;

If feasible, implement methods to broaden the base of ownership of energy industry capital; and

To the degree feasible, provide for a program for international exchange of energy related technologies.

Subsection 2(c) directs that the public shall have access to all records that are not related to foreign policy or national defense matters or which constitute trade secrets, know-how, and proprietary information.

Section 3. General principles

This section directs that the program authorized by this Act be designed and executed according to certain principles. In particular:

Energy conservation shall be a primary consideration in the design and implementation of the program. For the purposes of this Act, energy conservation is defined broadly, to include both reduction in energy waste of all kinds, and improvements in the efficiency of energy production, conversion and use.

Second, the Administrator must consider the environmental and social consequences of any proposed technological undertaking and give priority to those endeavors which offer a substantial potential energy benefit and minimize the aggregate economic, environmental and social costs.

Third, where it is foreseeable that any technology in the development stage may require significant consumptive use of water for that technology's successful commercial application, the design of the technology's development program shall include thorough consideration of the impacts of such commercial application of the technology on water

resources pursuant to section 10 of the Act. In addition, prior to granting Federal assistance for a demonstration project requiring significant water resources, the Administrator must determine that there will be an adequate water supply for actual commercial application of the technology should the demonstration project prove successful.

Fourth, consistant with other responsibilities under this Act, Federal involvement shall be limited to those areas where, there is the least likelihood that the private sector will achieve the desired goal without Federal assistance.

Finally, the Administrator is directed to assign a high priority and heavy emphasis to renewable resources in the formulation of energy research and development policy.

Section 4. Duties of the Administrator

Under this section the Administrator is directed to review the current status of nonnuclear energy resources and the nonnuclear research and development effort, and formulate a comprehensive Federal research and development strategy to achieve the objectives of this Act within 12 months after the date of enactment. The Administrator is to conduct a study to determine the level of scientific and technical manpower required by these objectives and submit the results of this study to the Congress.

Subsection 4(d) directs the Administrator to consider all nonnuclear energy technologies (including those listed in this subsection and others) while subsection 4(e) directs the Administrator to give emphasis to specific areas of development. The listing of subject areas in subsection 4(d) is not intended to limit the actions of the Administrator. In particular, the following areas are to receive emphasis:

The full range of energy conservation technologies.—As noted earlier, conservation techniques are considered to be of equal importance to the development of new energy sources. These should include the productive use of organic and inorganic wastes, the use of waste heat, greater efficiency in energy conversion technologies thereby reducing both heat pollution rejected to the environment, and the necessary fuel to produce a given output, and methods of reuse and recycling.

Improvements in home and transportation efficiency.—Which currently account for nearly half of U.S. energy use.

Use of solar energy.—Solar energy should receive special attention, because it is an energy source available in unlimited supply, and one whose use produces little or no environmental pollution.

Geothermal energy.—The use of geothermal energy appears near to commercial feasibility in areas where dry steam is directly available. Unfortunately, this type of resource comprises a small fraction of the total available geothermal energy, and further research is needed to exploit the much larger potential power from dry hot rock or geopressured hot water zones.

Coal.—While the United States is blessed with vast reserves of coal, the use of coal involves serious environmental hazards. To make direct utilization of coal more environmentally acceptable, such methods as stack gas clean-up, fluidized bed combustion, use of magnetohydrodynamics, or development of solvent refined coal can be pursued to reduce the sulphur and particulate emissions. Moreover section 4(e) directs that emphasis shall be placed on the acceleration and improvement of coal liquefaction or gasification technologies.

Oil and gas.—As only a limited amount of gas and oil can be extracted by present techniques, emphasis is to be assigned to the improvement of methods for secondary and tertiary recovery, and to improve the environmental acceptability of off-shore drilling, the Administrator is also directed to pursue development of more reliable techniques to prevent oil spills and better methods of oilspill clean-up.

Oil shale.—Since reserves of oil in the form of oil shales are extremely large, the Administrator is directed to pursue the demonstration of the production of oil from shale by environmentally acceptable technologies including in situ technologies.

Wind power.—Even though the present cost of power from the wind is high, the non-polluting character and renewable nature of wind power justifies the emphasis on efforts to develop this source.

The hydrogen economy.—In the long-run, as supplies of oil and natural gas become increasingly inadequate, the use of hydrogen obtained from the disassociation of water using power from solar or other sources would help supply energy of a convenient form.

Section 5. Forms of Federal assistance

Subsection 5(a)(1) suggests possible methods of Federal assistance the Administrator may use to achieve the objectives of this Act. These include joint Federal-industry corporations, grants to non-Federal participants, contracts for the construction and operation of federally owned facilities, Federal price guarantees, incentives such as financial awards to individual investors, or Federal loans to conduct demonstrations of new technologies.

Subsection (b) provides the guidelines by which the Administrator may develop proposals for joint Federal-industry corporations to construct and maintain experimental, demonstration or commercial-size facilities. Included are guidelines for the corporation's board of directors, officers, dissolution of the corporation, and disposal of products, as well as criteria for the determination of the Federal share of the cost of any corporation. It is specified that no corporation shall be established unless so authorized by Congress and provision is made for submission of a specific proposal to the Congress.

Section 5(c) also provides guidelines for the establishment of assistance through price supports for the products of a facility which would demonstrate the technical. environmental and economic feasibility of a particular energy technology. Any arrangement to provide for Federal purchases or guaranteed price is subject to the congressional approval required under Section 12.

Section 6. Reports to Congress

This section directs the Administrator to submit to Congress within 60 days of the end of each fiscal year a report detailing his organization's activities during that fiscal year. The Administrator must keep Congress fully and currently informed of his activities pursuant to this Act, and neither he nor his employees may refuse to testify or submit information to the Congress or any duly authorized committee thereof.

The Administrator shall also submit to Congress an annual research and development program report in which short-term and long-range Federal nonnuclear energy research and development plans and proposed expenditures are set forth in detail.

Section 7. Patient policy

This section sets forth policy to guide the allocation of patient rights in programs implemented pursuant to the Act.

Section 7(a) provides that resultant technology (*i.e.* information—whether patented or unpatented, in the form of trade secrets, know-how, proprietory information, or otherwise—resulting in whole or in part from federally assisted research) shall receive the widest practicable dissemination to the general public. Normally, the United States shall acquire all rights to resultant technology and shall require title to any patents issued thereon. Licenses are normally to be granted on a nonexclusive basis. The contractor is entitled to a royalty free nonexclusive license which can be terminated under certain conditions and the Administrator is empowered to grant all patent rights outside the United States subject to a nonexclusive license to the United States. The provision is made for the granting of rights greater than a nonexclusive license to qualified applicants when certain criteria set forth in the bill are met.

Rights of the United States may be waived at a time of contracting after opportunity for a hearing, when the Administrator determines that:

The applicant's participation is necessary to achieve the development of the technology;

There is reasonable basis to believe that waiver will not have an anti-competitive effect;

The public interest will be served;

The applicant has an established non-governmental commercial position and the research and development are related to the subject of the contract or grant;

The contract or grant is not for operation of a government owned facility, supervisory nature, or the product is for use for the general public or required by law; and

The contract or grant is not in a field principally developed by the Government.

Waiver may occur after identification of the invention if it is found that private risk capital necessary for development of the resultant technology is likely to be forthcoming only upon waiver, and the appropriate criteria for advanced waiver are met. The termination of anti-competitive effect for the purposes of post-identification waiver is to be judged on the basis of the same test applicable when an exclusive license is sought.

An exclusive license may be granted if the Administrator determines, after the opportunity for a hearing that the availability of a nonexclusive license has not resulted in substantial utilization of the technology, the availability of rights granted in a nonexclusive license is necessary to call forth risk capital, the public interest will be served, and the granting of such rights will not tend unduly to lessen competition or increase concentration in any section of the country in any line of commerce to which the technology relates.

Both pre- and post-identification waiver, and the granting of exclusive or partially exclusive rights are subject to the conditions that—

The United States shall retain certain irrevocable rights;

The licensee shall provide reports to the Administrator regarding the use of the technologies;

The rights may be terminated after 3 years if the technology is not being utilized or the exclusivity has had an anti-competitive effect;

Nonexclusive rights may be granted if necessary to fulfill health, safety, energy or other public needs; and

Other appropriate provisions to effectuate the purposes of the Act or otherwise protect the public interest.

Section 7(b) addresses the subject of background technology (*i.e.* background patents, trade secrets, know-how, or proprietory information which may be employed in the proposed program, contract, or research and development project). The Administrator may determine to acquire rights in such background technology upon consideration of the participation of industry, the equitable protection for privately developed technology and the commercial availability of research results. When determined to be necessary for commercial application of an energy process or system, background technology will be made available after the project has reached the stage of commercial application. The participant shall be compensated for background technology on the basis of the relative significance of that technology and his share of costs to the achievement of the commercial viability of the total energy process or system.

Section 8. Relationship to anti-trust law

Nothing in this Act is deemed to convey to any individual or corporation immunity from civil or criminal liability or to create defenses to actions under the anti-trust laws.

Section 9. Environmental evaluation

This section authorizes the Council on Environmental Quality to continually analyze the conduct of research and development in order to evaluate the adequacy of attention to energy conservation methods, and to environmental protection and the environmental consequences of the application of energy technologies.

The Council on Environmental Quality is required to hold annual hearings on probable environmental consequences of the application of energy technology which shall be published and made available to the public. They shall report to the President, the Administrator, and the Congress on the conduct of energy research and development.

Section 10. Water resource evaluation

This section directs the Water Resources Council to make assessments of water resource requirements and water supply availability for any energy technology which is the subject of efforts authorized by this Act, and the commercial development of which could have significant impacts on water resources. This assessment must include a positive or negative finding as to the availability of an adequate water supply for the proposed undertakings, and the report must be made freely available to the general public for comment and evaluation.

Section 11. The Administrator

The term "Administrator" is defined as the Administrator of the Energy Research and Development Agency upon the creation of such agency by law.

Section 12. Authorization

To carry out the purposes of this Act, this section authorizes appropriations to the Administrator of $1.3 billion for fiscal year 1975 and $1.8 billion for fiscal year 1976. Fund transfers for each fiscal year are authorized in the amount of $500,000 for the Council on Environmental Quality and $1,000,000 for the Water Resources Council for the purposes of carrying out these agencies' responsibilities under the Act.

Notwithstanding these authorizations, congressional approval is required prior to any appropriations to the Administrator for the purpose of a demonstration project entailing an estimated cost of $10 million or more and for a Federal purchase or price guarantees, or Federal loan in excess of $5 million.

COST

In accordance with section 252(a) of the Legislative Reorganization Act of 1970 (Public Law 91-150, 91st Cong.) the Committee provides the following estimate of cost of this measure:

(1) For Administration in fiscal years 1974, 1975, and 1976—$10 million each fiscal year.

(2) For research and development programs in fiscal year 1975—$1.3 billion and in fiscal year 1976—$1.8 billion, and in such sums as are authorized in subsequent annual authorization acts.

COMMITTEE RECOMMENDATION

The Committee on Interior and Insular Affairs recommends the enactment of H.R. 13565, as amended. The motion ordering the bill reported favorably was adopted by a voice vote.

EXECUTIVE COMMUNICATIONS

The recommendations of the White House, the Office of Management and Budget, and the Department of the Interior follow:

THE WHITE HOUSE,
Washington, D.C., February 6, 1974.

Hon. MORRIS K. UDALL,
Chairman, Environmental Subcommittee of the Interior and Insular Affairs Committee, House of Representatives, Washington, D.C.

DEAR MR. CHAIRMAN: On January 31, 1974, Messrs. Frank Zarb and John Sawhill testified on behalf of the Administration as to the best Federal Government organization for energy research and development. In reviewing the question and answer exchanges with the Committee members, we feel that some confusion may still exist and that a more thorough statement in writing would assist the Committee in understanding our position.

The organization for energy R&D cannot be considered by itself, but must be related to the total energy responsibility. In addition, energy R&D is integrally related to the management of all of our natural resources. Finally, as you indicated in your own remarks, the Federal role and programs are only a part of the total answer, and great care is needed in keeping the Federal role in proper perspective with the private sector responsibility.

For several years, it has been clear that a new Federal organization is needed to coordinate both energy and natural resources. In March, 1971, the President submitted to the Congress a modernized expanded Department of Natural Resources to solve this problem. The current energy situation has heightened the need for such an organization. We still firmly believe that such a major cabinet department is the most effective organization structure for the government in integrating and managing its energy/natural resource responsibilities, and in its ultimate form would contain both ERDA and FEA. We have always recognized that such a major departmental reorganization involves the concerns of a great many interests and would require careful Congressional scrutiny and perhaps some change before it could be enacted.

Therefore, we have felt free to make constructive changes where needed, in many instances to reflect the views or interests in the Congress. This has been especially true in the energy related areas.

Pending Congressional action, last Fall the President, by Executive Order, established the Federal Energy Office. However, recognizing that FEO lacked appropriate statutory basis and authority, we simultaneously submitted legislation calling for creation of such an organization—designated the Federal Energy Administration, which has been described in detail in Congressional hearings.

At the same time, we felt it necessary to move urgently on the energy R&D front. We feel a sense of urgency because we recognize that we are facing the need for a rapid buildup and upgrading of our total energy R&D program, especially in the fossil fuels area and in solar and geothermal work where our government capabilities are very small. Even though the results from such R&D work may be years away, we feel we must move immediately to assemble and train the high skills which the program demands.

After looking at a number of alternatives, we concluded that we could build up our total energy R&D capability most rapidly and across the widest range of programs, by building on the capabilities of an existing agency—in this case, the Atomic Energy Commission, with its existing national research laboratories, contract management staffs and experienced R&D management skills. This was the genesis of the Energy Research and Development Administration legislation which has already passed the House. We see ERDA not as a threat to the need for fossil fuels research, but rather as our best opportunity to bring R&D in fossil fuels, geothermal and solar energy swiftly up to necessary levels of funding and technical excellence, by making use of the organization, management, authority, physical facilities, and technical expertise which will be assembled in ERDA. Without ERDA we have no existing agency capable of the task.

One of the least understood dimensions of the Federal role in facing up to our national energy problems is what we have called "energy resource development." The great bulk of responsibility for assuring that we have supplies of energy to meet our demands lies with the private sector. It is our assessment however, that there are a great many ways in which the Federal Government, working with the private sector, can encourage and help it to expand energy production. This may involve cutting governmental red-tape, eliminating or simplifying constraints which tend to curtail production, strengthening economic incentives for production, expediting Federal or State/local

decisions, and a variety of other means. FEO, and FEA when enacted, would serve this role within the framework of the total National energy policy which it would be instrumental in developing. This kind of energy resource development uses existing technology and can pay off over the next several years, particularly in the 1974–80 time frame. It is in this area that industry anticipates that $200–500 billion of investment over the next 5–10 years will be needed.

With this in mind, the respective roles of FEA and ERDA can be made clear. FEA's responsibilities include dealing with the current crises by establishing allocation, rationing (if needed), price controls and conservation programs to equitably balance shortages of fuel supplies in relation to demand. FEA would collect, analyze and assess data on energy supplies and consumption and make policy recommendations. FEA would also have responsibility for the Federal role in expanding supplies of energy using available technologies. This includes expediting energy resource development projects such as the Alaskan pipeline, Outer Continental Shelf leasing, as well as greater use of coal, oil shale and other energy resources. It would also study the role of government in assuring that adequate economic incentives exist for industry development of domestic energy resources.

The Energy Research and Development Administration is proposed as a central agency for the management and leadership of Federal energy R&D programs for the purpose of developing new or improved technologies for energy production, conversion and utilization. The *development* of *technology* (energy R&D) is ERDA's responsibility. The *development* of *expanded energy supplies* with available technology is FEA's role.

The technology development involves high risk, strong management and a joint Federal/private sector relationship. Our ERDA proposal and the $10 billion R&D program are designed to achieve the technology goal. In arriving at her $10 billion program, Chairman Ray's analysis indicated that industry may spend as much as $12 billion for energy R&D over the next five years for this purpose.

As you know, FEO currently has responsibility for coordinating overall energy matters within the Executive Branch. Once FEA and ERDA are established there may still be the need for a small central office in the Executive Office of the President to provide coordination. Alternatives are being carefully considered.

In summary, the Administration felt that, because of the urgent need for immediate action and the apparent difficulty in enacting a Department of Energy and Natural Resources it was necessary to obtain FEA and ERDA. Both ERDA and FEA are designed to stand alone as fully functioning organizations meeting real and important needs. Even when enacted and operating however, the President has asked the Congress to turn its attention once again to the consideration of DENR as the best ultimate organizational solution for the Federal role in energy and natural resources.

I hope that this further clarification will aid your Subcommittee in its deliberations. Should you have further questions, please feel free to contact either of us, and we appreciate the opportunity to express our views to you and your Subcommittee.

Sincerely.

ROY L. ASH,
WILLIAM E. SIMON.

EXECUTIVE OFFICE OF THE PRESIDENT,
OFFICE OF MANAGEMENT AND BUDGET,
Washington, D.C., March 8, 1974.

Hon. MORRIS UDALL,
House of Representatives,
Washington, D.C.

DEAR CONGRESSMAN UDALL: It is my understanding that your subcommittee will soon be marking up H.R. 11856, a bill to establish a national program for research, development and demonstration in fuels and energy and for the coordination and financial supplementation of Federal energy research and development. As you know, the Administration is opposed to the organizational aspects of this bill because we believe there is need for a more comprehensive reorganization of energy R&D functions such as provided for in the proposed Energy Research and Development Administration.

However, I would like to take this opportunity to present the Administration's position on a number of other, nonorganizational provisions of this bill. These are:

(1) The requirement that the Chairman (of the Management Project) submit to the Congress "specific actions and proposals" including plans for Federal assistance.

(2) The requirement that the Chairman submit detailed plans to the Congress for commercially demonstrating a number of *specific energy technologies.*

(3) The requirement that the Chairman submit to the Congress, for its approval, a detailed report on any proposed pilot or demonstration project which is estimated to require a total Federal investment greater than $10 million.

(4) The patent policy and licensing provisions.

(5) The "flat" funding schedule provided by authorizations of $800 million per year for the next two fiscal years.

DETAILED COMMENTS

(1) The requirement of Section 107(a) that the Chairman, within six months, transmit to the Congress a Federal energy research strategy which includes "specific anticipated actions and proposals . . . for the most effective approach, through Federal assistance" to achieve solutions to short-term energy problems could have the effect of bringing private sector investment to a near standstill. Such a requirement would force the Government to expose detailed plans for cost-sharing and other possible incentive programs involving Federal assistance. This would encourage industry to await the exposure of such plans before committing any sizeable investments in energy R&D. Thus, such a requirements would have an opposite effect to that intended, seriously impairing the Government's ability to bargain effectively with the private sector in establishing cooperative funding arrangements.

(2) The requirements of Section 107(a), (b), and (c) to submit recommendations, including specific anticipated actions and proposals, for the most effective approach to demonstrating a number of *specific technologies* are overly restrictive. Although many of the technologies listed in Section 107 may very well warrant commercial demonstration, it is unlikely that all of them will or that others, not explicitly

identified, will not. Therefore, the requirement that the Government develop detailed demonstration plans for technologies, some of which may never prove technically, economically or environmentally feasible, is wasteful and could even misrepresent the intentions of the Government with regard to funding. Furthermore, relying on the Government to develop all such plans does not properly recognize the important role of industry in at least participating in the selection of projects and planning for the commercial demonstration phase.

(3) The requirement of Section 111(a) that, for each pilot plant or demonstration project that may be considered, the Chairman must prepare and transmit to the Congress a detailed report which must be considered by Congress for 60 calendar days before the expenditure of any funds, is overly restrictive, inflexible, and potentially unresponsive to urgent R&D needs. Such a requirement could result in a four to six month delay in initiating a project of even modest size. Furthermore, the preparation and review of the requisite documents will require a substantial expenditure of staff effort that could be otherwise applied to the substantive aspects these energy R&D programs.

(4) The patent policy and mandatory licensing provisions of Section 113 are not conducive to improved and expanded Government/industry cooperation. The stringency of these patent provisions amounts to a "Government-take-all" policy that provides no incentive for industry to enter into an arrangement with the Government which would speed the development of a technology which had originally been developed in the private sector. The Administration believes that patent policies for developing new energy technologies should provide equitable arrangements for both industry and the taxpayer.

(5) The funding schedule authorized in H.R. 11856 is unrealistic and inflexible. The additional $800 million per year for non-nuclear energy R&D does not provide for an orderly program growth over time. A more reasonable program, and one that would ensure maximum effectiveness, would provide for a growing expenditure rate and one that could be altered depending upon the result of particular R&D projects and upon the degree of private sector participation.

In summary, the Administration is opposed to H.R. 11856 both on the basis of its organizational provisions as well as several of its substantive provisions.

Members of my staff would be happy to discuss these concerns of the Administration with you and the Committee at your convenience.

With warm regards,

Sincerely,

ROY L. ASH, *Director.*

U.S. DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SECRETARY,
Washington, D.C., May 15, 1974.

Hon. JAMES A. HALEY,
Chairman, Committee on Interior and Insular Affairs, House of Representatives, Washington, D.C.

DEAR MR. CHAIRMAN: This is in response to your request for the views of this Department on H.R. 6602, a bill to be cited as the "National Energy Research and Development Policy Act of 1973".

We oppose the enactment of H.R. 6602.

H.R. 6602 would establish an "Energy Research Management Project" which would be responsible for developing a comprehensive national fuels and energy research and development program. The Management Project would coordinate the expenditures of a new $800 million fund which would be supplemental to the existing Federal budget for energy research and development. H.R. 6602 would also establish five separate corporations to demonstrate technologies for coal gasification, oil shale, advanced power cycle, geothermal steam and coal liquifaction developments.

The bill authorizes each corporation to set up demonstration facilities to determine the technical, environmental and economic feasibility of the projects and to establish commercial-size facilities if the demonstration projects prove successful. The corporations would be authorized to dispose of the energy product under their own rules. Each corporation would receive Federal funds amunting to between $5–$8 million annually for fiscal year 1974, and unspecified amounts for the following 8–15 years, depending upon the corporation. These funds would be matched by the private sector in ratios ranging from 1:1 to 4:1 Federal to private funds.

During the lifetimes of the corporations, Federal agencies would be directed to furnish information and services on request. The Secretary of the Interior would be authorized and directed to make available for use of the corporation in connection with its research, Federal lands under his jurisdiction (except lands within the national parks, wilderness and refuge system, lands on the Outer Continental Shelf, and Indian lands) which contain specified resources, when such resources are deemed necessary by the corporation. This use would be subject to terms and conditions promulgated by the Secretary to protect the environment and other resource values of the lands involved.

The Administration fully recognizes the need for a comprehensive national energy policy. We have continually sought to assure that the growth of this Nation is not hampered by insufficient or prohibitively expensive energy supplies. In 1971, President Nixon sent the first message ever submitted by a President to the Congress on energy policies. A number of specific steps were recommended at that time to meet the increasing demands for energy in America. Those steps included expanded research and development to obtain more clean energy, increased availability of energy resources located on Federal lands, increased efforts in development of nuclear power, and creation of the Department of Natural Resources to plan and manage our energy program. This commitment has resulted in a 50% increase in our energy research and development efforts since 1971.

In his Energy Message of April 18, 1973, the President reasserted his commitment to increase our energy knowledge by building upon our accomplishments and to develop a more comprehensive and integrated national energy policy. To carry out this policy he suggested the implementation of a broad based program. A cornerstone in this effort is the determination to increase domestic energy production in a manner consistent with our economic, environmental and security interests. This policy recognizes that for the short term future, our research and development program must provide improved technologies to extract and utilize our existing fuel resources. The Federal budget for the fiscal year 1974 provides for an increase in energy research and development funding of 20% over the 1973 level. In addition, the 1974 budget provides for a new $25 million central energy fund administered by this Department to provide additional money for non-nuclear research and development. The central fund is designed to give the needed flexibility for rapid exploration of new, especially promising, energy technologies with near term payoffs.

The Administration's energy program provides that $771 million be applied to the energy research and development program in 1974. We consider this to be the most effective rate at which our financial resources can be expended without waste. It is an amount that has been arrived at after careful studies of the various technologies that appear to be the most promising in improving energy supply. In addition, the central energy fund will provide the flexibility we require to quickly shift support to those research programs that appear to be most promising. This will avoid a loss of momentum in critical research and enable us to utilize this country's capabilities in the most efficient manner.

We support the objectives of H.R. 6602 which recognize the need to develop our domestic fossil fuel resources and to centralize responsibility for overview, direction, and coordination of energy research and development. We believe, however, that H.R. 6602 does not represent an effective, efficient or productive alternative to the Administration's proposed energy research and development program.

The funding authorized by H.R. 6602 for the Management Project and for the development corporations represents in 1974 an increase of over 107% from that provided in the Administration's budget, raising the total to $1.63 billion. H.R. 6602 also represents nearly a 700% increase in non-nuclear energy development. We believe these increases in funding are beyond the levels of efficient utilization, especially over the next few years.

The selection of the five specific energy sources for development at a fixed rate of funding and for a fixed number of years seems too rigid a research program. It does not appear to offer the degree of flexibility needed for operating an effective and efficient research program in which future rate of funding and time required would be dependent on progress, possible "breakthroughs", and evolving technological and economic developments. The proposed legislation could have the effect of concentrating research efforts on the five energy sources identified in the bill without adequately exploring the full range of other promising energy sources and alternative technological processes.

Furthermore, we do not feel that the proposed development corporations are necessary to ensure government-industry cooperation in bringing new technologies to a state where they are commercially practical. In the present or planned government organization of energy research and development we are encouraging close government cooperation in developing commercially viable technology. For example, industry is currently contributing $240 million out of $700 million for the commercial demonstration of the LMFBR. The American Gas Association is contributing $10 million per year to a $30 million per year cooperative effort to develop coal gas technology. In addition, the government is actively exploring the possibility of cooperative projects in other areas.

The President's energy research and development program represents a reasonable strategy of research on nuclear fission and fusion,

fossil fuels, including coal, oil, oil shale, and gas, geothermal power, and solar energy, with careful consideration for the protection of our environment. There is heavy emphasis on research on converting coal to clean-burning liquid and gaseous fuels. We have three pilot plants for coal conversion processes now operating, and six others in various stages of planning and construction. We are studying processes for converting coal to liquids, gases, and directly to electric power, with a special emphasis on eliminating pollutants and increasing efficiency through advanced power cycles and magnetohydrodynamics development. We are conducting research on coal mining and seeking ways to extract coal with less injury to the environment and to human health and safety. We have an extensive program of research designed to improve our ability to extract oil and gas and to increase recovery. The Department has an ongoing program of research on extraction of oil from shale and development of geothermal energy. These research programs are closely tied to our oil shale and geothermal leasing programs.

We believe that within the Administration there is an existing organization which will in the short term perform the same functions proposed to be performed by the Management Project created by H.R. 6602. For long term solutions, the President is proposing legislation to establish a Department of Energy and Natural Resources building on legislation submitted in 1971 with additional emphasis on energy programs.

By Executive Order No. 11712 dated April 18, 1973, a National Energy Office has been established in the Executive Office of the President. Functions of the Director of this office include recommending policies and guidelines on energy matters and to coordinate all energy related programs within the Executive Branch. He is also responsible for the development of comprehensive plans and programs to ensure availability of adequate and dependable supplies of energy.

The Department of the Interior has also been reorganized to strengthen activities relating to energy and minerals. The new Assistant Secretary for Energy and Minerals has expanded responsibilities which incorporate all departmental energy activities. The Department is developing a full capacity for gathering and analysis of energy data. The Office of Energy Conservation has been created to seek means of reducing energy demands. The Department has also strengthened its capacity for overseeing and coordinating a broader range of energy research and development.

The programs and steps outlined in the President's Energy Messages of 1971 and 1973 as well as ongoing research programs appear to eliminate the basis for enactment of H.R. 6602. While we concur in general with the objectives of H.R. 6602, it appears the programs proposed by this legislation would overlap and duplicate energy research and management programs already underway and result in the uneconomical expenditure of Federal funds.

The Office of Management and Budget has advised that there is no objection to the presentation of this report from the standpoint of the Administration's program.

Sincerely yours,

ROGERS C. B. MORTON,
Secretary of the Interior.

DISSENTING VIEWS OF CONGRESSMAN CRAIG HOSMER

H.R. 13565, the "Federal Nonnuclear Energy Research and Development Act of 1974", is an improved version of a legislative measure referred to the Committee on Interior and Insular Affairs six months ago. Initially, it was the companion to S. 1283, a bill the Senate approved on Decembr 7, 1973. This action was quickly overtaken by a major event 12 days later—passage in the House of H.R. 11510, "The Energy Reorganization Act of 1973". I had the privilege of cosponsoring H.R. 11510 with Representatives Chet Holifield, Mel Price and Frank Horton. A companion Senate ERDA bill, S. 2744, was reported out unanimously by the Government Operations Committee on May 29, 1974. It is expected to reach the Senate Floor in a few days.

The Energy Reorganization Act will create a new, independent Executive agency called the Energy Research and Development Administration (ERDA), to manage and carry out a cohesive, comprehensive national research and development program encompassing all forms of energy and energy utilization techniques. The scope of possible energy sources and energy utilization technologies that ERDA will explore and develop will be virtually unlimited. It will embrace all the energy sources and technologies referred to in subsection 4(e) of H.R. 13565 as well as others, including nuclear energy. It will cover new directions as yet unvisualized.

In addition, the ERDA bill provides more than just the organizational framework for the great national quest we must promptly and vigorously undertake to assure an adequate supply of clean energy for the decades ahead. With a frugality of language, the ERDA bill adequately portrays the intended objectives, programs and means of performance, and the applicable authorities and responsibilities. It will assure that all promising new and improved sources, and means of use, of clean energy are appropriately developed whether or not H.R. 13565 ever becomes law.

Nevertheless, I have supported, and still favor, a modified version of H.R. 13565 that would follow along after enactment of the ERDA bill and complement its essential purposes and motivation. I have spent long hours to help obtain this objective, working with members of the Committee on Interior and Insular Affairs, discussing the ERDA measure with Representative Chet Holifield who managed that bill in the House, and obtaining the views of Senator Jackson respecting a suitable companion for S. 1283 in light of the imminent creation of ERDA. My efforts culminated in a new edition of H.R. 13565. On May 20, 1974, I introduced H.R. 14892 in co-sponsorship with Representatives Sam Steiger and Don Young. Our cleaned-up version of this energy policy legislation incorporated the energy programs enum- on the Environment. It excised those features of the Sub-committee's bill that violated generally accepted scientific and technological standards of conducting research and development or were otherwise unsound. Additionally, our bill, H.R. 14892, was expressly geared to ERDA and its missions as provided for in the Energy Reorganization Act, including the continuing exploration and development of nuclear energy.

I commend to my colleagues in the House, for their attention and consideration the revised edition of H.R. 13565, which H.R. 14892 represents. The provisions of H.R. 14892 are as follows:

[H.R. 14892, 93d Cong., 2d sess.]

A BILL To establish a national program for research and development in energy sources

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as the "National Energy Research and Development Act of 1974".

SECTION 1. The Congress hereby finds that—

(a) The Nation is suffering from a shortage of environmentally acceptable forms of energy.

(b) A major reason for this energy shortage has been our failure to organize and formulate a vigorous, comprehensive research, and development strategy designed to assure the wise planning and effective conduct of a cohesive, fully dimensioned national research and development program.

(c) The Nation's energy needs can be met if a national commitment is made now to dedicate the necessary financial resources, to enlist our scientific and technological capabilities, and to accord the proper priority to developing new energy options to serve national needs, conserve vital resources, and protect the environment.

(d) The Energy Reorganization Act of 1974 provides for a coalescence of national energy research and development functions in the executive branch, and for thorough, centrally directed exploration and development of all potentially beneficial energy sources and energy utilization techniques, including research and development for the conservation of energy.

(e) The urgency of the Nation's energy challenge will require commitments similar to those undertaken in the Manhattan and Apollo projects; it will require that the Nation undertake a long-range, top-priority, research and development program.

GENERAL POLICY

SEC. 2. It is hereby declared to be the policy of the Congress to establish and vigorously conduct a National program of basic and applied research and energy development, including demonstrations of practical applications, encompassing all potentially beneficial energy sources and utilization technologies.

NATIONAL ENERGY RESEARCH AND DEVELOPMENT PROGRAM

SEC. 3. (a) The Administrator of the Energy Research and Development Administration, hereafter referred to as the "Administrator", shall—

(1) formulate a proposed ten-year national energy research and development program, including a description of the principal features, objectives, planned approaches, and projections pertaining to each energy source and category of utilization technology to be encompassed by the program; and, thereafter, develop annual addenda or revisions updating the adopted program in the light of progress or past results, contemplated changes, amended plans or projections, and extensions of the initial ten-year time frame;

(2) conduct a study, in consultation with other executive agencies having general jurisdictions or knowledge in regard to manpower studies or data, to determine the numbers and types of scientific, technical and other personnel necessary to carry out effectively the overall, long-range energy research and development effort in this country, including recommendations of actions necessary for the training of such personnel; and, thereafter develop annual addenda or revisions updating such findings; and

(3) submit the proposed program and addenda or revisions thereto provided for in subsection (1) of this subsection, and the results of the study and the addenda or revisions provided for in subdivision (2) of this subsection, to appropriate congressional committees. The material provided for in subdivision (1) shall be submitted at least forty-five days in advance of implementation thereof.

(b) In formulating the program and developing the addenda or revisions provided for in subdivision (1) of subsection (a) of this section, and in implementing the adopted program, as revised from time to time, the Administrator shall comply with the provisions of this Act, the Energy Reorganization Act of 1974, and such other requirements as may be imposed by Congressional authorizations pursuant to Sec. 8 or by other statutes.

(c) As used in this Act, the term "research and development" means (1) theoretical analyses, exploration, or experimentation, (2) the extension of investigative findings and theories of a scientific or technical nature, including the experimental production and testing of models, devices, equipment, materials and processes, and (3) demonstration of practical applications and of advances in commercial or industrial applications.

SCOPE OF RESEARCH AND DEVELOPMENT

SEC. 4. (a) In carrying out his responsibilities under the Energy Reorganization Act of 1974, the Administrator shall, among other things—

(1) vigorously conduct research and development activities in a wide range of energy technologies in order to insure adequate, reliable, economical, and environmentally acceptable energy sources and systems to support the essential needs of modern society;

(2) develop the technology and information base necessary to support development of the widest possible range of options available for future energy policy decisions;

(3) investigate the capability for and, in general, the option of energy self-sufficiency for the United States through the development of socially and environmentally acceptable methods for the utilization of domestic energy sources;

(4) intensively pursue research and development directed toward improvement in efficiency and reliability of means of energy production, conversion, storage, transmission and use in the reduction of energy waste, and in other energy conservation technology areas;

(5) assure that the national research and development program includes appropriate attention to the high desirability of advancing technologies in such areas as—

(i) recycling and reuse, including productive use of agricultural and animal wastes, garbage, sewage, and industrial materials and processes;

(ii) magnetohydrodynamics, fuel cells, gas turbines, and other improved means of generating energy;

(iii) inertial and other types of energy storage systems;

(iv) systems approaches to energy use in residential, commercial, and industry sectors;

(v) energy conservation through improvements in home design, insulation techniques, and electrical equipment and processes;

(vi) transportation vehicles and systems, including improvements of and alternatives to the internal combustion engine, and the development of efficient means of public transportation;

(vii) solar energy systems, including residential and commerical heating, cooling, and combined heating and cooling systems, central power stations, and photovoltaic cells;

(viii) geothermal energy resources, including improved means of assessing such resources, developing hot dry rock, developing geopressured hot water, and extraction of useful materials;

(ix) coal resources, including improved means of extraction of surface and subsurface deposits, reclamation of mining sites, converting coal to gaseous, liquid, or other forms of clean energy sources, and utilizing coal and coal derivatives in an environmentally acceptable manner;

(x) oil and gas resources including improved means of secondary and tertiary recovery, and of preventing and coping with marine oil spills;

(xi) extraction and utilization of hydrogen as a fuel source;

(xii) means of utilizing tidal and wind power;

(xiii) nuclear processes; and

(xiv) process heat and other energy-related processes.

(6) to the extent determined by the Administrator to be feasible and consistent with his responsibilities, provide for a program for the international exchange of energy-related technologies.

(b) Pursuant to the authority and directions of this Act, the Administrator shall transmit to the Congress—

(1) in the proposed program provided for in subdivision (1) of subsection (a) of section 3, the Administrator's recommendations for a vigorous Federal research and development strategy and priorities designed to achieve solutions to immediate and short-term (to the early 1980's) energy supply system and associated environmental problems, including specific anticipated actions and proposals for the most effective approach, through Federal assistance—

(i) to accelerate the demonstration of technologies for producing a low-sulfur fuel suitable for boiler use;

(ii) to accelerate the demonstration of technologies for producing substitutes for natural gas, including coal gasification; the Administrator shall particularly consider the desirability of inviting proposals from potential participants based upon Federal assistance and participation in the form of a joint Federal-industry corporation, and the Administrator's recommendations in this regard shall include a report on the desirability and viability of using this form of Federal assistance or participation;

(iii) to accelerate the demonstration of technologies for producing syncrude and liquid petroleum products from coal; the Administrator shall particularly consider the desirability of inviting proposals from potential participants based upon Federal assistance and participation through guaranteed prices or purchase of the products, and the Administrator's recommendations in this regard shall be accompanied by a report on the desirability and viability of using this form of Federal assistance or participation;

(iv) to accelerate the demonstration of advanced power cycles for the generation of electricity from coal, including technologies which employ the production of low British thermal unit gas from coal;

(v) to accelerate the demonstration of geothermal energy technologies;

(vi) (A) to accelerate the demonstration of the production of syncrude from oil shale, and (B) to assist the research and development of in situ methodologies for the production of syncrude from oil shale;

(vii) to demonstrate new and improved methods for the extraction of petroleum resources, including secondary and tertiary recovery of crude oil;

(viii) to demonstrate new and improved methods for the extraction of coal resources, including lignite, bituminous, and anthracite coal;

(ix) to demonstrate the economics and commercial viability of solar energy for residential and commercial energy supply applications;

(x) to accelerate the commercial demonstration of environmental control systems including particulate and sulfur oxides emission control systems, necessary for the timely implementation of air pollution standards and water pollution standards established pursuant to Federal or State law;

(xi) to investigate the use of tidal power for supplying electrical energy; and

(xii) to demonstrate new and innovative energy conservation technologies.

(2) In the proposed program provided for in subdivision (1) of subsection (a) of section 3, the Administrator's recommendations for a vigorous Federal research and development strategy and priorities designed to achieve solutions to middle-term (the early 1980's to 2000) energy supply system and associated environmental problems, including specific anticipated actions and proposals for the most effective approach, through Federal assistance—

(i) to improve the economics and cost-effectiveness of the technologies set forth in the research and development strategy recommended pursuant to subdivision (1);

(ii) to advance improvements in the methods and technologies for the transportation and storage of electric energy;

(iii) to demonstrate advanced power cycles for the generation of electricity which represent significant improvements in the efficiency of conversion of energy resources to electricity;

(iv) to demonstrate hot dry rock geothermal energy technologies;

(v) to demonstrate advanced solar energy technologies;

(vi) to determine the economics and commercial viability of the use of hydrogen as a primary energy source;

(vii) to demonstrate the use of fuel cells for central station electric power generation;

(viii) to determine the economics and commercial viability for producing synthetic energy supplies from agricultural products and wastes; and

(ix) to determine the economics and commercial viability of the production and use of methane gas as an energy source.

(3) Within one year following the submission of the proposed program provided for in subdivision (1) of subsection (a) of section 3, the Administrator's recommendations for a Federal research and development strategy and priorities designed to achieve solutions to long-term (beyond 2000) energy supply systems and associated environmental problems, including specific anticipated actions and proposals for the most effective approach, through Federal assistance—

(i) to further improve the economics and cost-effectiveness of the technologies set forth in the research and development strategy recommended pursuant to subdivision (1) and (2); and

(ii) to advance the use of hydrogen as a primary energy source.

(4) In the proposed program provided for in subdivision (1) of subsection (a) of section 3, the Administrator's recommendations, for each of the time frames set forth in subdivisions (1), (2), and (3) of this subsection, respecting the research and development strategy for nuclear options pursuant to the Atomic Energy Act of 1954, as amended, and the Energy Reorganization Act of 1974.

FORMS OF FEDERAL ASSISTANCE

SEC. 5. (a) In the conduct of research and development activities pursuant to the Energy Reorganization Act of 1974, the various forms of Federal assistance and participation may, among other things, include—

(1) joint Federal-industry corporations consistent with the provisions of subsection (b) of this section;

(2) Federal purchases or guaranteed price of the products of demonstration plants or activities under contractual arrangements for demonstration projects; and

(3) Federal loans under contractual arrangements for demonstration projects.

(b) MODEL CORPORATIONS.—Joint Federal-industry corporations proposed pursuant to this Act shall be subject to congressional authorization pursuant to section 8, and shall, except as otherwise so specifically authorized, conform to the following guidelines:

(1) Each such corporation is authorized to design, construct, operate, conduct, and maintain one or more experimental demonstration facilities, or other operations which will ascertain the technical, environmental, and economic feasibility of a particular energy technology. In carrying out this function, the corporation shall be empowered, either directly or by contract, to utilize commercially available technologies, perform tests, or design, construct and operate pilot plants as may be necessary or incident to the design of a full-scale facility.

(2) Each corporation shall have—

(A) a Board of nine directors consisting of individuals who are citizens of the United States, of whom one shall be elected annually by the Board to serve as Chairman. The Board shall be empowered to adopt and amend bylaws. Five members of the Board shall be appointed by the President of the United States, by and with the advice and consent of the Senate, and four members of the Board shall be appointed by the President on the basis of recommendations received by him from non-Federal entities including those proposing to enter into contractual arrangements to participate in the corporation's activities;

(B) a President and such other officers and employees as may be named and appointed by the Board (the rates of compensation of all officers and employees shall be fixed by the Board; and

(C) the usual power conferred upon corportions by the laws of the District of Columbia.

(3) An appropriate time interval shall be established for the term of Federal participation in the corporation at the expiration of which the Board of Directors, shall take such action as may be necessary to dissolve the corporation or otherwise terminate Federal participation and financial interests. In carrying out such dissolution, the Board of Directors shall dispose of all physical facilties of the corporation in such manner and subject to such terms and conditions as the Board determines are in the public interest, and a share of the appraised value of the corporate assets proportional to the Federal participation in the corporation, including the proceeds from the disposition of such facilities, on the date of its dissolution, after satisfaction of all its legal obligations, shall be made available to the United States and deposited in the Treasury of the United States as miscellaneous receipts. All patent rights of the corporation shall, on such date of dissolution, be vested in the Administrator: *Provided*, That Federal participation may be terminated prior to the time established in the authorizing Act upon recommendation of the Board of Directors.

(4) Any commercially valuable product produced by demonstration facilities shall be disposed of in such manner and under such terms and conditions as the corporation shall prescribe. All revenues received by the corporation from the sale of such products shall be available to the corporation for use by it in defraying

expenses incurred in connection with carrying out its functions under this Act.

(5) The estimated Federal share of the construction, operation, and maintenance cost over the life of each corporation shall be determined to facilitate the congressional authorization of the full amount at the time of establishment of the corporation.

(6) Each corporation shall comply with the specific patent and dissemination of information requirements provided for in the pertinent congressional authorization for the creation of the corporation.

(7) Prior to the establishment of any joint Federal-industry corporation pursuant to this Act, the Administrator shall submit to Congress a report setting forth in detail the consistency of the establishment of the corporation with the objectives of the Energy Reorganization Act of 1974 and this Act, and the proposed purpose and planned activities of the corporation.

PATENT POLICY

SEC. 6. (a) The provisions of chapter 13 of the Atomic Energy Act of 1954, as amended, shall continue to apply to atomic or nuclear matters and activities.

(b) The provisions of chapter 13 of the Atomic Energy Act of 1954, as amended, shall also be deemed to be applicable to nonnuclear energy matters and activities; for such purpose, (i) "this Act" shall be deemed to refer to the Energy Reorganization Act of 1974 and this Act, (ii) "Special nuclear material or atomic energy" shall be deemed to be replaced by "nonnuclear energy", (iii) the text of section 152 with the exception of the first sentence, and subdivisions (1) through (4) of subsection 153(c), shall be deemed to be deleted; and (iv) sections 151, 158, and 160 shall be deemed to be deleted, and provisions referring to such sections or to secrecy shall be deemed inapplicable.

RELATIONSHIP TO ANTITRUST LAWS

SEC. 7. (a) Nothing in this Act shall be deemed to convey to any individual, corporation, or other business organization immunity from civil or criminal liability, or to create defenses to actions, under the antitrust laws.

(b) As used in this section, the term "antitrust laws" means—

(1) the Act entitled "An Act to protect trade and commerce against unlawful restraints and monopolies", approved July 2, 1890 (15 U.S.C. 1 et seq.), as amended;

(2) the Act entitled "An Act to supplement existing laws against unlawful restraints and monopolies, and for other purposes", approved October 15, 1914 (15 U.S.C. 12 et seq.), as amended;

(3) the Federal Trade Commission Act (15 U.S.C. 41 et seq.), as amended;

(4) sections 73 and 74 of the Act entitled "An Act to reduce taxation, to provide revenue for the Government, and for other purposes", approved August 27, 1894 (15 U.S.C. 8 and 9), as amended; and

(5) the Act of June 19, 1936, chapter 592 (15 U.S.C. 13, 13a, 13b, and 21a).

APPROPRIATION AUTHORIZATION

SEC. 8. (a) There are authorized to be appropriated to the Administrator for nonnuclear energy—

(1) to carry out the purposes of this Act, in fiscal year 1975, $1,300,000,000 and in fiscal year 1976, $1,800,000,000; and

(2) such amounts as may be authorized by the Congress in subsequent fiscal years.

(b) Section 261 of the Atomic Energy Act of 1954, as amended shall remain applicable to nuclear activities.

(c) Nothwithstanding subsection (a) of this section, no appropriation shall be made to the Administrator under this Act or the Energy Reorganization Act of 1974 in connection with any demonstration project entailing an estimated cost in excess of $10 million, or in connection with any arrangement to provide for Federal purchases or guaranteed price of products, or in connection with a Federal loan in excess of $5 million, unless previously authorized by legislation enacted by the Congress; and no joint Federal-industry corporation shall be established unless previously authorized by legislation enacted by the Congress.

Following enactment of the Energy Reorganization Act, I believe an appropriate edition of H.R. 13565 could serve a worthwhile purpose in relation to our national research and development quest for abundant clean energy. When H.R. 13565 is considered by the House, I shall offer amendments to remedy the several major objectionable features remaining in the bill.

Section 1 of H.R. 13565 contains a number of appropriate findings by the Congress, including: "The urgency of the Nation's energy challenge will require commitments similar to those undertaken in the Manhattan and Apollo projects—." These missions were not hobbled by unwise or ambiguous statutory stipulations. ERDA's legislative charter should, similarly, be basically sound. The ERDA bill must be enacted, without undue encumbrance, to pursue all scientifically and technologically promising energy research and development quarries like a hungry lion stalking game. The ERDA bill must not be forced to play the role of the ass in Aesop's fable who found a lion's skin that hunters had left to dry, donned it, and sallied forth in public, momentarily attracting great attention and respect—until he was compelled to bray.

CRAIG HOSMER.

DISSENTING VIEWS OF STEVE SYMMS—H.R. 13565

Although I am cognizant of the need to substantially increase secure energy supplies in the United States, I am opposed to the passage of H.R. 13565 and hope that you will join me in opposition to this legislation on the Floor of the House.

H.R. 13565 is another bill in the line of federal legislation which has helped and is helping this nation to back away from energy decision-making by the private sector. The federal establishment has developed a habit of interfering with private decision-making in the energy field sometimes at the behest of private decision-makers. I do not think the results of such federal interference have been salutory for

the nation. For example, since 1954 the Federal Power Commission has been regulating the price of natural gas sold in interstate markets. As a result of the artificially low price resulting from such regulation, the nation has, to some degree, become hooked on natural gas, burning it under boilers and in industrial facilities in situations in which such use might not have occurred were free market forces allowed to set the price of this fuel. Now we have a real shortage. Another example: for many years the petroleum companies have enjoyed tax benefits such as the depletion allowance and intangibles drilling deduction. Have these benefits stimulated the necessary domestic exploration and expansion of recoverable reserves which they were intended to stimulate? No, they have not, mainly because these "incentives" in conjunction with other incentives such as the foreign tax credit have had unforeseen by-products: investment overseas, diversion of profits, vertical integration, etc., which have tended to undercut the desired effect of increased exploration and production at home. But the point is not that the incentives should be re-structured or made "more perfect." It is that they, like most federal government interferences in the marketplace, having produced unforeseen artificialities which interfere with the laws of supply and demand, should be scrapped. In my opinion, we would have been better off without them.

H.R. 13565 would authorize $3.1 billion over the next two fiscal years for the purpose of establishing and conducting a program of non-nuclear energy research and development. Why should Congress make this money available to private enterprise in the energy industry, especially when all indications are that energy industries are producing, in 1974, the cash flow to conduct research and development without federal assistance? The profits of Exxon, admittedly about the biggest energy company in the world, were $2.4 billion for 1973 alone. The profits of 22 major oil companies in 1973 totaled nearly $10 billion. I suggest that the reason we are thinking of passing H.R. 13565 is more a function of energy politics—the need to show the folks back home that we are paying attention to energy supply problems—than anything else. There really is no reason why the private sector will not be able to handle energy research and development by itself, unless the private sector has grown so dependent on the federal dole that it will not lift a hand to do the job itself. I hope this is not the case.

And what does H.R. 13565 do for the beneficiary of the funds made available under the legislation? It makes such beneficiary subject to the designs of federal bureaucrats administering the 35 pages of "policy" set forth in H.R. 13565. I am amazed that many of the nation's leading energy industry organizations are supporting legislation like H.R. 13565. If I were they I would not want the monies (really not very much when measured against the tremendous amounts of capital, $200–$500 billion, which we heard in testimony will have to be spent in energy development over the next decade by the private sector). I would rather skip the money, and have greater flexibility than H.R. 13565 allows, to conduct my own research and development operations.

Yours for a free society,

STEVE SYMMS.

CORRECTED SHEET

S. 1283

Ninety-third Congress of the United States of America

AT THE SECOND SESSION

Begun and held at the City of Washington on Monday, the twenty-first day of January, one thousand nine hundred and seventy-four

An Act

To establish a national program for research and development in nonnuclear energy sources.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SHORT TITLE

SECTION 1. This Act may be cited as the "Federal Nonnuclear Energy Research and Development Act of 1974".

STATEMENT OF FINDINGS

SEC. 2. The Congress hereby finds that—

(a) The Nation is suffering from a shortage of environmentally acceptable forms of energy.

(b) Compounding this energy shortage is our past and present failure to formulate a comprehensive and aggressive research and development program designed to make available to American consumers our large domestic energy reserves including fossil fuels, nuclear fuels, geothermal resources, solar energy, and other forms of energy. This failure is partially because the unconventional energy technologies have not been judged to be economically competitive with traditional energy technologies.

(c) The urgency of the Nation's energy challenge will require commitments similar to those undertaken in the Manhattan and Apollo projects; it will require that the Nation undertake a research, development, and demonstration program in nonnuclear energy technologies with a total Federal investment which may reach or exceed $20,000,000,000 over the next decade.

(d) In undertaking such program, full advantage must be taken of the existing technical and managerial expertise in the various energy fields within Federal agencies and particularly in the private sector.

(e) The Nation's future energy needs can be met if a national commitment is made now to dedicate the necessary financial resources, to enlist our scientific and technological capabilities, and to accord the proper priority to developing new nonnuclear energy options to serve national needs, conserve vital resources, and protect the environment.

STATEMENT OF POLICY

SEC. 3. (a) It is the policy of the Congress to develop on an urgent basis the technological capabilities to support the broadest range of energy policy options through conservation and use of domestic resources by socially and environmentally acceptable means.

(b) (1) The Congress declares the purpose of this Act to be to establish and vigorously conduct a comprehensive, national program of basic and applied research and development, including but not limited to demonstrations of practical applications, of all potentially beneficial energy sources and utilization technologies, within the Energy Research and Development Administration.

(2) In carrying out this program, the Administrator of the Energy Research and Development Administration (hereinafter in this Act referred to as the "Administrator") shall be governed by the terms of this Act and other applicable provisions of law with respect to all nonnuclear aspects of the research, development, and demonstration pro-

CORRECTED SHEET

gram; and the policies and provisions of the Atomic Energy Act of 1954 (42 U.S.C. 2011 et seq.), and other provisions of law shall continue to apply to the nuclear research, development, and demonstration program.

(3) In implementing and conducting the research, development, and demonstration programs pursuant to this Act, the Administrator shall incorporate programs in specific nonnuclear technologies previously enacted into law, including those established by the Solar Heating and Cooling Act of 1974 (Public Law 93–409), the Geothermal Energy Research, Development, and Demonstration Act of 1974 (Public Law 93–410), and the Solar Energy Research, Development, and Demonstration Act of 1974 (Public Law 93–473).

DUTIES AND AUTHORITIES OF THE ADMINISTRATOR

SEC. 4. The Administrator shall—

(a) review the current status of nonnuclear energy resources and current nonnuclear energy research and development activities, including research and development being conducted by Federal and non-Federal entities;

(b) formulate and carry out a comprehensive Federal nonnuclear energy research, development, and demonstration program which will expeditiously advance the policies established by this Act and other relevant legislation establishing programs in specific energy technologies;

(c) utilize the funds authorized pursuant to this Act to advance energy research and development by initiating and maintaining, through fund transfers, grants, or contracts, energy research, development and demonstration programs or activities utilizing the facilities, capabilities, expertise, and experience of Federal agencies, national laboratories, universities, nonprofit organizations, industrial entities, and other non-Federal entities which are appropriate to each type of research, development, and demonstration activity;

(d) establish procedures for periodic consultation with representatives of science, industry, environmental organizations, consumers, and other groups who have special expertise in the areas of energy research, development, and technology; and

(e) initiate programs to design, construct, and operate energy facilities of sufficient size to demonstrate the technical and economic feasibility of utilizing various forms of nonnuclear energy.

GOVERNING PRINCIPLES

SEC. 5. (a) The Congress authorizes and directs that the comprehensive program in research, development, and demonstration required by this Act shall be designed and executed according to the following principles:

(1) Energy conservation shall be a primary consideration in the design and implementation of the Federal nonnuclear energy program. For the purposes of this Act, energy conservation means both improvement in efficiency of energy production and use, and reduction in energy waste.

(2) The environmental and social consequences of a proposed program shall be analyzed and considered in evaluating its potential.

(3) Any program for the development of a technology which may require significant consumptive use of water after the technology has reached the stage of commercial application shall

include thorough consideration of the impacts of such technology and use on water resources pursuant to the provisions of section 13.

(4) Heavy emphasis shall be given to those technologies which utilize renewable or essentially inexhaustible energy sources.

(5) The potential for production of net energy by the proposed technology at the stage of commercial application shall be analyzed and considered in evaluating proposals.

(b) The Congress further directs that the execution of the comprehensive research, development, and demonstration program shall conform to the following principles:

(1) Research and development of nonnuclear energy sources shall be pursued in such a way as to facilitate the commercial availability of adequate supplies of energy to all regions of the United States.

(2) In determining the appropriateness of Federal involvement in any particular research and development undertaking, the Administrator shall give consideration to the extent to which the proposed undertaking satisfies criteria including, but not limited to, the following:

(A) The urgency of public need for the potential results of the research, development, or demonstration effort is high, and it is unlikely that similar results would be achieved in a timely manner in the absence of Federal assistance.

(B) The potential opportunities for non-Federal interests to recapture the investment in the undertaking through the normal commercial utilization of proprietary knowledge appear inadequate to encourage timely results.

(C) The extent of the problems treated and the objectives sought by the undertaking are national or widespread in their significance.

(D) There are limited opportunities to induce non-Federal support of the undertaking through regulatory actions, end use controls, tax and price incentives, public education, or other alternatives to direct Federal financial assistance.

(E) The degree of risk of loss of investment inherent in the research is high, and the availability or risk capital to the non-Federal entities which might otherwise engage in the field of the research is inadequate for the timely development of the technology.

(F) The magnitude of the investment appears to exceed the financial capabilities of potential non-Federal participants in the research to support effective efforts.

COMPREHENSIVE PLANNING AND PROGRAMMING

SEC. 6. (a) Pursuant to the authority and directions of this Act and the Energy Reorganization Act of 1974 (Public Law 93–438), the Administrator shall transmit to the Congress, on or before June 30, 1975, a comprehensive plan for energy research, development, and demonstration. This plan shall be appropriately revised annually as provided in section 15(a). Such plan shall be designed to achieve—

(1) solutions to immediate and short-term (to the early 1980's) energy supply system and associated environmental problems;

(2) solutions to middle-term (the early 1980's to 2000) energy supply system and associated environmental problems; and

(3) solutions to long-term (beyond 2000) energy supply system and associated environmental problems.

(b)(1) Based on the comprehensive energy research, development, and demonstration plan developed under subsection (a), the Adminis-

trator shall develop and transmit to the Congress, on or before June 30, 1975, a comprehensive nonnuclear energy research, development, and demonstration program to implement the nonnuclear research, development, and demonstration aspects of the comprehensive plan.

(2) This program shall be designed to achieve solutions to the energy supply and associated environmental problems in the immediate and short-term (to the early 1980's), middle-term (the early 1980's to 2000), and long-term (beyond 2000) time intervals. In formulating the nonnuclear aspects of this program, the Administrator shall evaluate the economic, environmental, and technological merits of each aspect of the program.

(3) The Administrator shall assign program elements and activities in specific nonnuclear energy technologies to the short-term, middle-term, and long-term time intervals, and shall present full and complete justification for these assignments and the degree of emphasis for each. These program elements and activities shall include, but not be limited to, research, development, and demonstrations designed—

(A) to advance energy conservation technologies, including but not limited to—

(i) productive use of waste, including garbage, sewage, agricultural wastes, and industrial waste heat;

(ii) reuse and recycling of materials and consumer products;

(iii) improvements in automobile design for increased efficiency and lowered emissions, including investigation of the full range of alternatives to the internal combustion engine and systems of efficient public transportation; and

(iv) advanced urban and architectural design to promote efficient energy use in the residential and commercial sectors, improvements in home design and insulation technologies, small thermal storage units and increased efficiency in electrical appliances and lighting fixtures;

(B) to accelerate the commercial demonstration of technologies for producing low-sulfur fuels suitable for boiler use;

(C) to demonstrate improved methods for the generation, storage, and transmission of electrical energy through (i) advances in gas turbine technologies, combined power cycles, the use of low British thermal unit gas and, if practicable, magnetohydrodynamics; (ii) storage systems to allow more efficient load following, including the use of inertial energy storage systems; and (iii) improvement in cryogenic transmission methods;

(D) to accelerate the commercial demonstration of technologies for producing substitutes for natural gas, including coal gasification: *Provided*, That the Administrator shall invite and consider proposals from potential participants based upon Federal assistance and participation in the form of a joint Federal-industry corporation, and recommendations pursuant to this clause shall be accompanied by a report on the viability of using this form of Federal assistance or participation;

(E) to accelerate the commercial demonstration of technologies for producing syncrude and liquid petroleum products from coal: *Provided*, That the Administrator shall invite and consider proposals from potential participants based upon Federal assistance and participation through guaranteed prices or purchase of the products, and recommendations pursuant to this clause shall be accompanied by a report on the viability of using this form of Federal assistance or participation;

(F) in accordance with the program authorized by the Geothermal Energy Research, Development, and Demonstration Act

of 1974 (Public Law 93–410), to accelerate the commercial demonstration of geothermal energy technologies;

(G) to demonstrate the production of syncrude from oil shale by all promising technologies including in situ technologies;

(H) to demonstrate new and improved methods for the extraction of petroleum resources, including secondary and tertiary recovery of crude oil;

(I) to demonstrate the economics and commercial viability of solar energy for residential and commercial energy supply applications in accordance with the program authorized by the Solar Heating and Cooling Act of 1974 (Public Law 93–409);

(J) to accelerate the commercial demonstration of environmental control systems for energy technologies developed pursuant to this Act;

(K) to investigate the technical and economic feasibility of tidal power for supplying electrical energy;

(L) to commercially demonstrate advanced solar energy technologies in accordance with the Solar Research, Development, and Demonstration Act of 1974 (Public Law 93–473);

(M) to determine the economics and commercial viability of the production of synthetic fuels such as hydrogen and methanol;

(N) to commercially demonstrate the use of fuel cells for central station electric power generation;

(O) to determine the economics and commercial viability of in situ coal gasification;

(P) to improve techniques for the management of existing energy systems by means of quality control; application of systems analysis, communications, and computer techniques; and public information with the objective of improving the reliability and efficiency of energy supplies and encourage the conservation of energy resources; and

(Q) to improve methods for the prevention and cleanup of marine oil spills.

FORMS OF FEDERAL ASSISTANCE

SEC. 7. (a) In carrying out the objectives of this Act, the Administrator may utilize various forms of Federal assistance and participation which may include but are not limited to—

(1) joint Federal-industry experimental, demonstration, or commercial corporations consistent with the provisions of subsection (b) of this section;

(2) contractual arrangements with non-Federal participants including corporations, consortia, universities, governmental entities and nonprofit institutions;

(3) contracts for the construction and operation of federally owned facilities;

(4) Federal purchases or guaranteed price of the products of demonstration plants or activities consistent with the provisions of subsection (c) of the section;

(5) Federal loans to non-Federal entities conducting demonstrations of new technologies; and

(6) incentives, including financial awards, to individual inventors, such incentives to be designed to encourage the participation of a large number of such inventors.

(b) Joint Federal-industry corporations proposed for congressional authorization pursuant to this Act shall be subject to the provisions of section 9 of this Act and shall conform to the following guidelines except as otherwise authorized by Congress:

(1) Each such corporation may design, construct, operate, and maintain one or more experimental, demonstration, or commercial-size facilities, or other operations which will ascertain the technical, environmental, and economic feasibility of a particular energy technology. In carrying out this function, the corporation shall be empowered, either directly or by contract, to utilize commercially available technologies, perform tests, or design, construct, and operate pilot plants, as may be necessary for the design of the full-scale facility.

(2) Each corporation shall have—

(A) a Board of nine directors consisting of individuals who are citizens of the United States, of whom one shall be elected annually by the Board to serve as Chairman. The Board shall be empowered to adopt and amend bylaws. Five members of the Board shall be appointed by the President of the United States, by and with the advice and consent of the Senate, and four members of the Board shall be appointed by the President on the basis of recommendations received by him from any non-Federal entity or entities entering into contractual arrangements to participate in the corporation;

(B) a President and such other officers and employees as may be named and appointed by the Board (with the rates of compensation of all officers and employees being fixed by the Board); and

(C) the usual powers conferred upon corporations by the laws of the District of Columbia.

(3) An appropriate time interval, not to exceed 12 years, shall be established for the term of Federal participation in the corporation, at the expiration of which the Board of Directors shall take such action as may be necessary to dissolve the corporation or otherwise terminate Federal participation and financial interests. In carrying out such dissolution, the Board of Directors shall dispose of all physical facilities of the corporation in such manner and subject to such terms and conditions as the Board determines are in the public interest and consistent with existing law; and a share of the appraised value of the corporate assets proportional to the Federal participation in the corporation, including the proceeds from the disposition of such facilities, on the date of its dissolution, after satisfaction of all its legal obligations, shall be made available to the United States and deposited in the Treasury of the United States as miscellaneous receipts. All patent rights of the corporation shall, on such date of dissolution, be vested in the Administrator: *Provided*, That Federal participation may be terminated prior to the time established in the authorizing Act upon recommendation of the Board of Directors.

(4) Any commercially valuable product produced by demonstration facilities shall be disposed of in such manner and under such terms and conditions as the corporation shall prescribe. All revenues received by the corporation from the sale of such products shall be available to the corporation for use by it in defraying expenses incurred in connection with carrying out its functions to which this Act applies.

(5) The estimated Federal share of the construction, operation, and maintenance cost over the life of each corporation shall be determined in order to facilitate a single congressional authorization of the full amount at the time of establishment of the corporation.

(6) The Federal share of the cost of each such corporation shall reflect (A) the technical and economic risk of the venture, (B) the

probability of any financial return to the non-Federal participants arising from the venture, (C) the financial capability of the potential non-Federal participants, and (D) such other factors as the Administrator may set forth in proposing the corporation: *Provided*, That in no instance shall the Federal share exceed 90 per centum of the cost.

(7) (A) Prior to the establishment of any joint Federal-industry corporation pursuant to this Act, the Administrator shall submit to the Speaker of the House of Representatives and the President pro tempore of the Senate, and to the appropriate committees of the House of Representatives and the Senate a report setting forth in detail the consistency of the establishment of the corporation with the principles and directives set forth in section 5 and this section, and the proposed purpose and planned activities of the corporation.

(B) No such corporation shall be established unless previously authorized by specific legislation enacted by the Congress.

(c) Competitive systems of price supports proposed for congressional authorization pursuant to this Act shall conform to the following guidelines:

(1) The Administrator shall determine the types and capacities of the desired full-scale, commercial-size facility or other operation which would demonstrate the technical, environmental, and economic feasibility of a particular nonnuclear energy technology.

(2) The Administrator may award planning grants for the purpose of financing a study of the full cycle economic and environmental costs associated with the demonstration facility selected pursuant to paragraph (1) of this subsection. Such planning grants may be awarded to Federal and non-Federal entities including, but not limited to, industrial entities, universities, and nonprofit organizations. Such planning grants may also be used by the grantee to prepare a detailed and comprehensive bid to construct the demonstration facility.

(3) Following the completion of the studies pursuant to the planning grants awarded under paragraph (2) of this subsection regarding each such potential price supported demonstration facility for which the Administrator intends to request congressional authorization, he shall invite bids from all interested parties to determine the minimum amount of Federal price support needed to construct the demonstration facility. The Administrator may designate one or more competing entities, each to construct one commercial demonstration facility. Such designation shall be made on the basis of those entities, (A) commitment to construct the demonstration facility at the minimum level of Federal price supports, (B) detailed plan of environmental protection, and (C) proposed design and operation of the demonstration facility.

(4) The construction plans and actual construction of the demonstration facility, together with all related facilities, shall be monitored by the Environmental Protection Agency. If additional environmental requirements are imposed by the Administrator after the designation of the successful bidders and if such additional environmental requirements result in additional costs, the Administrator is authorized to renegotiate the support price to cover such additional costs.

(5) The estimated amount of the Federal price support for a demonstration facility's product over the life of such facility shall

be determined by the Administrator to facilitate a single congressional authorization of the full amount of such support at the time of the designation of the successful bidders.

(6) No price support program shall be implemented unless previously authorized by specific legislation enacted by the Congress.

(d) Nothing in this section shall preclude Federal participation in, and support for, joint university-industry nonnuclear energy research efforts.

DEMONSTRATIONS

SEC. 8. (a) The Administrator is authorized to—

(1) identify opportunities to accelerate the commercial applications of new energy technologies, and provide Federal assistance for or participation in demonstration projects (including pilot plants demonstrating technological advances and field demonstrations of new methods and procedures, and demonstrations of prototype commercial applications for the exploration, development, production, transportation, conversion, and utilization of energy resources); and

(2) enter into cooperative agreements with non-Federal entities to demonstrate the technical feasibility and economic potential of energy technologies on a prototype or full-scale basis.

(b) In reviewing potential projects, the Administrator shall consider criteria including but not limited to—

(1) the anticipated, research, development, and application objectives to be achieved by the activities or facilities proposed;

(2) the economic, environmental, and societal significance which a successful demonstration may have for the national fuels and energy system;

(3) the relationship of the proposal to the criteria of priority set forth in section 5(b)(2);

(4) the availability of non-Federal participants to construct and operate the facilities or perform the activities associated with the proposal and to contribute to the financing of the proposal;

(5) the total estimated cost including the Federal investment and the probable time schedule;

(6) the proposed participants and the proposed financial contributions of the Federal Government and of the non-Federal participants; and

(7) the proposed cooperative arrangement, agreements among the participants, and form of management of the activities.

(c)(1) A financial award under this section may be made only to the extent of the Federal share of the estimated total design and construction costs, plus operation and maintenance costs.

(2) For the purposes of this Act the non-Federal share may be in any form, including, but not limited to, lands or interests therein needed for the project or personal property or services, the value of which shall be determined by the Administrator.

(d)(1) The Administrator shall, within six months of enactment of this Act, promulgate regulations establishing procedures for submission of proposals to the Energy Research and Development Administration for the purposes of this Act. Such regulations shall establish a procedure for selection of proposals which—

(A) provides that projects will be carried out under such conditions and varying circumstances as will assist in solving energy extraction, transportation, conversion, conservation, and end-use problems of various areas and regions, under representative geological, geographic, and environmental conditions; and

(B) provides time schedules for submission of, and action on, proposal requests for the purposes of implementing the goals and objectives of this Act.

(2) Such regulations also shall specify the types and form of the information, data, and support documentation that are to be contained in proposals for each form of Federal assistance or participation set forth in subsection 7(a): *Provided*, That such proposals to the extent possible shall include, but not be limited to—

(A) specification of the technology;

(B) description of prior pilot plant operating experience with the technology;

(C) preliminary design of the demonstration plant;

(D) time tables containing proposed construction and operation plans;

(E) budget-type estimates of construction and operating costs;

(F) description and proof of title to land for proposed site, natural resources, electricity and water supply and logistical information related to access to raw materials to construct and operate the plant and to dispose of salable products produced from the plant;

(G) analysis of the environmental impact of the proposed plant and plans for disposal of wastes resulting from the operation of the plant;

(H) plans for commercial use of the technology if the demonstration is successful;

(I) plans for continued use of the plant if the demonstration is successful; and

(J) plans for dismantling of the plant if the demonstration is unsuccessful or otherwise abandoned.

(3) The Administrator shall from time to time review and, as appropriate, modify and repromulgate regulations issued pursuant to this section.

(e) If the estimate of the Federal investment with respect to construction costs of any demonstration project proposed to be established under this section exceeds $50,000,000, no amount may be appropriated for such project except as specifically authorized by legislation hereafter enacted by the Congress.

(f) If the total estimated amount of the Federal contribution to the construction cost of a demonstration project does not exceed $50,000,000, the Administrator is authorized to proceed with the negotiation of agreements and implementation of the proposal subject to the availability of funds under the authorization of appropriations pursuant to section 16: *Provided*, That if such Federal contribution to the construction cost is estimated to exceed $25,000,000 the Administrator shall provide a full and comprehensive report on the proposed demonstration project to the appropriate committees of the Congress and no funds may be expended for any agreement under the authority granted by this section prior to the expiration of sixty calendar days (not including any day on which either House of Congress is not in session because of an adjournment of more than three calendar days to a day certain) from the date on which the Administrator's report on the proposed project is received by the Congress. Such reports shall contain an analysis of the extent to which the proposed demonstration satisfies the criteria specified in subsection (b) of this section.

PATENT POLICY

SEC. 9. (a) Whenever any invention is made or conceived in the course of or under any contract of the Administration, other than nuclear energy research, development, and demonstration pursuant to the Atomic Energy Act of 1954 (42 U.S.C. 2011 et seq.) and the Administrator determines that—

(1) the person who made the invention was employed or assigned to perform research, development, or demonstration

work and the invention is related to the work he was employed or assigned to perform, or that it was within the scope of his employment duties, whether or not it was made during working hours, or with a contribution by the Government of the use of Government facilities, equipment, materials, allocated funds, information proprietary to the Government, or services of Government employees during working hours; or

(2) the person who made the invention was not employed or assigned to perform research, development, or demonstration work, but the invention is nevertheless related to the contract or to the work or duties he was employed or assigned to perform, and was made during working hours, or with a contribution from the Government of the sort referred to in clause (1).

title to such invention shall vest in the United States, and if patents on such invention are issued they shall be issued to the United States, unless in particular circumstances the Administrator waives all or any part of the rights of the United States to such invention in conformity with the provisions of this section.

(b) Each contract entered into by the Administration with any person shall contain effective provisions under which such person shall furnish promptly to the Administration a written report containing full and complete technical information concerning any invention, discovery, improvement, or innovation which may be made in the course of or under such contract.

(c) Under such regulations in conformity with the provisions of this section as the Administrator shall prescribe, the Administrator may waive all or any part of the rights of the United States under this section with respect to any invention or class of inventions made or which may be made by any person or class of persons in the course of or under any contract of the Administration if he determines that the interests of the United States and the general public will best be served by such waiver. The Administration shall maintain a publicly available, periodically updated record of waiver determinations. In making such determinations, the Administrator shall have the following objectives:

(1) Making the benefits of the energy research, development, and demonstration program widely available to the public in the shortest practicable time.

(2) Promoting the commercial utilization of such inventions.

(3) Encouraging participation by private persons in the Administration's energy research, development, and demonstration program.

(4) Fostering competition and preventing undue market concentration or the creation or maintenance of other situations inconsistent with the antitrust laws.

(d) In determining whether a waiver to the contractor at the time of contracting will best serve the interests of the United States and the general public, the Administrator shall specifically include as considerations—

(1) the extent to which the participation of the contractor will expedite the attainment of the purposes of the program;

(2) the extent to which a waiver of all or any part of such rights in any or all fields of technology is needed to secure the participation of the particular contractor;

(3) the extent to which the contractor's commercial position may expedite utilization of the research, development, and demonstration program results;

(4) the extent to which the Government has contributed to the field of technology to be funded under the contract;

(5) the purpose and nature of the contract, including the intended use of the results developed thereunder;

(6) the extent to which the contractor has made or will make substantial investment of financial resources or technology developed at the contractor's private expense which will directly benefit the work to be performed under the contract;

(7) the extent to which the field of technology to be funded under the contract has been developed at the contractor's private expense;

(8) the extent to which the Government intends to further develop to the point of commercial utilization the results of the contract effort;

(9) the extent to which the contract objectives are concerned with the public health, public safety, or public welfare;

(10) the likely effect of the waiver on competition and market concentration; and

(11) in the case of a nonprofit educational institution, the extent to which such institution has a technology transfer capability and program, approved by the Administrator as being consistent with the applicable policies of this section.

(e) In determining whether a waiver to the contractor or inventor of rights to an identified invention will best serve the interests of the United States and the general public, the Administrator shall specifically include as considerations paragraphs (4) through (11) of subsection (d) as applied to the invention and—

(1) the extent to which such waiver is a reasonable and necessary incentive to call forth private risk capital for the development and commercialization of the invention; and

(2) the extent to which the plans, intentions, and ability of the contractor or inventor will obtain expeditious commercialization of such invention.

(f) Whenever title to an invention is vested in the United States, there may be reserved to the contractor or inventor—

(1) a revocable or irrevocable nonexclusive, paid-up license for the practice of the invention throughout the world; and

(2) the rights to such invention in any foreign country where the United States has elected not to secure patent rights and the contractor elects to do so, subject to the rights set forth in paragraphs (2), (3), (6), and (7) of subsection (h): *Provided*, That when specifically requested by the Administration and three years after issuance of such a patent, the contractor shall submit the report specified in subsection (h)(1) of this section.

(g)(1) Subject to paragraph (2) of this subsection, the Administrator shall determine and promulgate regulations specifying the terms and conditions upon which licenses may be granted in any invention to which title is vested in the United States.

(2) Pursuant to paragraph (1) of this subsection, the Administrator may grant exclusive or partially exclusive licenses in any invention only if, after notice and opportunity for hearing, it is determined that—

(A) the interests of the United States and the general public will best be served by the proposed license, in view of the applicant's intentions, plans, and ability to bring the invention to the point of practical or commercial applications;

(B) the desired practical or commercial applications have not been achieved, or are not likely expeditiously to be achieved, under any nonexclusive license which has been granted, or which may be granted, on the invention;

(C) exclusive or partially exclusive licensing is a reasonable and necessary incentive to call forth risk capital and expenses

to bring the invention to the point of practical or commercial applications; and

(D) the proposed terms and scope of exclusivity are not substantially greater than necessary to provide the incentive for bringing the invention to the point of practical or commercial applications and to permit the licensee to recoup its costs and a reasonable profit thereon:

Provided, That, the Administrator shall not grant such exclusive or partially exclusive license if he determines that the grant of such license will tend substantially to lessen competition or result in undue concentration in any section of the country in any line of commerce to which the technology to be licensed relates. The Administration shall maintain a publicly available, periodically updated record of determinations to grant such licenses.

(h) Each waiver of rights or grant of an exclusive or partially exclusive license shall contain such terms and conditions as the Administrator may determine to be appropriate for the protection of the interests of the United States and the general public, including provisions for the following:

(1) Periodic written reports at reasonable intervals, and when specifically requested by the Administration, on the commercial use that is being made or is intended to be made of the invention.

(2) At least an irrevocable, nonexclusive, paid-up license to make, use, and sell the invention throughout the world by or on behalf of the United States (including any Government agency) and States and domestic municipal governments, unless the Administrator determines that it would not be in the public interest to acquire the license for the States and domestic municipal governments.

(3) The right in the United States to sublicense any foreign government pursuant to any existing or future treaty or agreement if the Administrator determines it would be in the national interest to acquire this right.

(4) The reservation in the United States of the rights to the invention in any country in which the contractor does not file an application for patent within such time as the Administration shall determine.

(5) The right in the Administrator to require the granting of a nonexclusive, exclusive, or partially exclusive license to a responsible applicant or applicants, upon terms reasonable under the circumstances, (A) to the extent that the invention is required for public use by governmental regulations, or (B) as may be necessary to fulfill health, safety, or energy needs, or (C) for such other purposes as may be stipulated in the applicable agreement.

(6) The right in the Administrator to terminate such waiver or license in whole or in part unless the recipient of the waiver or license demonstrates to the satisfaction of the Administrator that he has taken effective steps, or within a reasonable time thereafter is expected to take such steps, necessary to accomplish substantial utilization of the invention.

(7) The right in the Administrator, commencing three years after the grant of a license and four years after a waiver is effective as to an invention, to require the granting of a nonexclusive or partially exclusive license to a responsible applicant or applicants, upon terms reasonable under the circumstances, and in appropriate circumstances to terminate the waiver or license in whole or in part, following a hearing upon notice thereof to the public, upon a petition by an interested person justifying such hearing—

(A) if the Administrator determines, upon review of such material as he deems relevant, and after the recipient of the waiver or license, or other interested person, has had the opportunity to provide such relevant and material information as the Administrator may require, that such waiver or license has tended substantially to lessen competition or to result in undue concentration in any section of the country in any line of commerce to which the technology relates; or

(B) unless the recipient of the waiver or license demonstrates to the satisfaction of the Administrator at such hearing that he has taken effective steps, or within a reasonable time thereafter is expected to take such steps, necessary to accomplish substantial utilization of the invention.

(i) The Administrator shall provide an annual periodic notice to the public in the Federal Register, or other appropriate publication, of the right to have a hearing as provided by subsection (h) (7) of this section, and of the availability of the records of determinations provided in this section.

(j) The Administrator shall, in granting waivers or licenses, consider the small business status of the applicant.

(k) The Administrator is authorized to take all suitable and necessary steps to protect any invention or discovery to which the United States holds title, and to require that contractors or persons who acquire rights to inventions under this section protect such inventions.

(l) The Administration shall be considered a defense agency of the United States for the purpose of chapter 17 of title 35 of the United States Code.

(m) As used in this section—

(1) the term "person" means any individual, partnership, corporation, association, institution, or other entity;

(2) the term "contract" means any contract, grant, agreement, understanding, or other arrangement, which includes research, development, or demonstration work, and includes any assignment, substitution of parties, or subcontract executed or entered into thereunder;

(3) the term "made", when used in relation to any invention, means the conception or first actual reduction to practice of such invention;

(4) the term "invention" means inventions or discoveries, whether patented or unpatented; and

(5) the term "contractor" means any person having a contract with or on behalf of the Administration.

(n) Within twelve months after the date of the enactment of this Act, the Administrator with the participation of the Attorney General, the Secretary of Commerce, and other officials as the President may designate, shall submit to the President and the appropriate congressional committees a report concerning the applicability of existing patent policies affecting the programs under this Act, along with his recommendations for amendments or additions to the statutory patent policy, including his recommendations on mandatory licensing, which he deems advisable for carrying out the purposes of this Act.

RELATIONSHIP TO ANTITRUST LAWS

SEC. 10. (a) Nothing in this Act shall be deemed to convey to any individual, corporation, or other business organization immunity from civil or criminal liability, or to create defenses to actions, under the antitrust laws.

(b) As used in this section, the term "antitrust law" means—

(1) the Act entitled "An Act to protect trade and commerce against unlawful restraints and monopolies", approved July 2, 1890 (15 U.S.C. 1 et seq.), as amended;

(2) the Act entitled "An Act to supplement existing laws against unlawful restraints and monopolies, and for other purposes", approved October 15, 1914 (15 U.S.C. 12 et seq.) as amended;

(3) the Federal Trade Commission Act (15 U.S.C. 41 et seq.), as amended;

(4) sections 73 and 74 of the Act entitled "An Act to reduce taxation, to provide revenue for the Government, and for other purposes", approved August 27, 1894 (15 U.S.C. 8 and 9), as amended; and

(5) the Act of June 19, 1936, chapter 592 (15 U.S.C. 13, 13a, 13b, and 21a).

ENVIRONMENTAL EVALUATION

SEC. 11. (a) The Council on Environmental Quality is authorized and directed to carry out a continuing analysis of the effect of application of nonnuclear energy technologies to evaluate—

(1) the adequacy of attention to energy conservation methods; and

(2) the adequacy of attention to environmental protection and the environmental consequences of the application of energy technologies.

(b) The Council on Environmental Quality, in carrying out the provisions of this section, may employ consultants or contractors and may by fund transfer employ the services of other Federal agencies for the conduct of studies and investigations.

(c) The Council on Environmental Quality shall hold annual public hearings on the conduct of energy research and development and the probable environmental consequences of trends in the development and application of energy technologies. The transcript of the hearings shall be published and made available to the public.

(d) The Council on Environmental Quality shall make such reports to the President, the Administrator, and the Congress as it deems appropriate concerning the conduct of energy research and development. The President as a part of the annual Environmental Policy Report required by section 201 of the National Environmental Policy Act of 1969 (42 U.S.C. 4341) shall set forth the findings of the Council on Environmental Quality concerning the probable environmental consequences of trends in the development and application of energy technologies.

ACQUISITION OF ESSENTIAL MATERIALS

SEC. 12. (a) The President may, by rule or order, require the allocation of, or the performance under contracts or orders (other than contracts of employment) relating to, supplies of materials and equipment if he finds that—

(1) such supplies are scarce, critical, and essential to carry out the purposes of this Act; and

(2) such supplies cannot reasonably be obtained without exercising the authority granted by this section.

(b) The President shall transmit any rule or order proposed under subsection (a) of this section (bearing an identification number) to each House of Congress on the date on which it is proposed. If such proposed rule or order is transmitted to the Congress such proposed

CORRECTED SHEET

rule or order shall take effect at the end of the first period of thirty calendar days of continuous session of Congress after the date on which such proposed rule or order is transmitted to it unless, between the date of transmittal and the end of the thirty day period, either House passes a resolution stating in substance that such House does not favor such a proposed rule or order.

WATER RESOURCE EVALUATION

SEC. 13. (a) At the request of the Administrator, the Water Resources Council shall undertake assessments of water resource requirements and water supply availability for any nonnuclear energy technology and any probable combinations of technologies which are the subject of Federal research and development efforts authorized by this Act, and the commercial development of which could have significant impacts on water resources. In the preparation of its assessment, the Council shall—

(1) utilize to the maximum extent practicable data on water supply and demand available in the files of member agencies of the Council;

(2) collect and compile any additional data it deems necessary for complete and accurate assessments;

(3) give full consideration to the constraints upon availability imposed by treaty, compact, court decree, State water laws, and water rights granted pursuant to State and Federal law;

(4) assess the effects of development of such technology on water quality;

(5) include estimates of cost associated with production and management of the required water supply, and the cost of disposal of waste water generated by the proposed facility or process;

(6) assess the environmental, social, and economic impact of any change in use of currently utilized water resource that may be required by the proposed facility or process; and

(7) consult with the Council on Environmental Quality.

(b) For any proposed demonstration project which may involve a significant impact on water resources, the Administrator shall, as a precondition of Federal assistance to that project, prepare or have prepared an assessment of the availability of adequate water resources. A report on the assessment shall be published in the Federal Register for public review thirty days prior to the expenditure of Federal funds on the demonstration.

(c) For any proposed Federal assistance for commercial application of energy technologies pursuant to this Act, the Water Resource Council shall, as a precondition of such Federal assistance, provide to the Administrator an assessment of the availability of adequate water resources for such commercial application and an evaluation of the environmental social, and economic impacts of the dedication of water to such uses.

(d) Reports of assessments and evaluations prepared by the Council pursuant to subsections (a) and (c) shall be published in the Federal Register and at least ninety days shall be provided for public review and comment. Comments received shall accompany the reports when they are submitted to the Administrator and shall be available to the public.

(e) The Council shall include a broad survey and analysis of regional and national water resource availability for energy development in the biennial assessment required by section 102(a) of the Water Resources Planning Act (42 U.S.C. 1962a–1(a)).

ENERGY-RELATED INVENTIONS

SEC. 14. The National Bureau of Standards shall give particular attention to the evaluation of all promising energy-related inventions, particularly those submitted by individual inventors and small companies for the purpose of obtaining direct grants from the Administrator. The National Bureau of Standards is authorized to promulgate regulations in the furtherance of this section.

REPORTS TO CONGRESS

SEC. 15. (a) Concurrent with the submission of the President's annual budget to the Congress, the Administrator shall submit to the Congress each year—

(1) a report detailing the activities carried out pursuant to this Act during the preceding fiscal year;

(2) a detailed description of the comprehensive plan for nuclear and nonnuclear energy research, development, and demonstration then in effect under section 6(a); and

(3) a detailed description of the comprehensive nonnuclear research, development, and demonstration program then in effect under section 6(b) including its program elements and activities, setting forth such modifications in the comprehensive plan referred to in clause (2) and the comprehensive program referred to in clause (3) as may be necessary to revise appropriately such plan and program in the light of the activities referred to in clause (1) and any changes in circumstances which may have occurred since the last previous report under this subsection.

(b) The description of the comprehensive nonnuclear research, development, and demonstration program submitted under subsection (a)(2) shall include a statement setting forth—

(1) the anticipated research, development, and application objectives to be achieved by the proposed program;

(2) the economic, environmental, and societal significance which the proposed program may have;

(3) the total estimated cost of individual program items;

(4) the estimated relative financial contributions of the Federal Government and non-Federal participants in the research and development program;

(5) the relationship of the proposed program to any Federal national energy or fuel policies; and

(6) the relationship of any short-term undertakings and expenditures to long-range goals.

(c) The reports required by subsections (a) and (b) of this section will satisfy the reporting requirements of section 307(a) of the Energy Reorganization Act of 1974 (Public Law 93–438) insofar as is concerned activities, goals, priorities, and plans of the Energy Research and Development Administration pertaining to nonnuclear energy.

APPROPRIATION AUTHORIZATION

SEC. 16. (a) There may be appropriated to the Administrator to carry out the purposes of this Act such sums as may be authorized in annual authorization Acts.

(b) Of the amounts appropriated pursuant to subsection (a) of this section—

(1) $500,000 annually shall be made available by fund transfer to the Council on Environmental Quality for the purposes authorized by section 11; and

(2) not to exceed $1,000,000 annually shall be made available by fund transfer to the Water Resources Council for the purposes authorized by section 13.

(c) There also may be appropriated to the Administrator by separate Acts such amounts as are required for demonstration projects for which the total Federal contribution to construction costs exceeds $50,000,000.

Speaker of the House of Representatives.

Vice President of the United States and
President of the Senate.

December 19, 1974

Dear Mr. Director:

The following bills were received at the White House on December 19th:

S.J. Res. 234	S. 2838	S. 3578
S. 184	S. 3341	S. 3615
S. 194	S. 3397	H.R. 3538
S. 1283	S. 3418	H.R. 14401
S. 1357	S. 3489	H.R. 15912
S. 2125	S. 3518	H.R. 16609
S. 2594	S. 3574	H.R. 16901

Please let the President have reports and recommendations as to the approval of these bills as soon as possible.

Sincerely,

Robert D. Linder
Chief Executive Clerk

The Honorable Roy L. Ash
Director
Office of Management and Budget
Washington, D. C.