



Public Law 93-410  
93rd Congress, H. R. 14920  
September 3, 1974

**An Act**

GL03696

To further the conduct of research, development, and demonstrations in geothermal energy technologies, to establish a Geothermal Energy Coordination and Management Project, to provide for the carrying out of research and development in geothermal energy technology, to carry out a program of demonstrations in technologies for the utilization of geothermal resources, to establish a loan guaranty program for the financing of geothermal energy development, and for other purposes.

*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 "Geothermal Energy Research, Development, and Demonstration Act of 1974".

FINDINGS

Geothermal  
Energy Research,  
Development,  
and Demonstra-  
tion Act of  
1974.  
30 USC 1101  
note.

30 USC 1101.

SEC. 2. The Congress hereby finds that—

- (1) the Nation is currently suffering a critical shortage of environmentally acceptable forms of energy;
- (2) the inadequate organizational structures and levels of funding for energy research have limited the Nation's current and future options for meeting energy needs;
- (3) electric energy is a clean and convenient form of energy at the location of its use and is the only practicable form of energy in some modern applications, but the demand for electric energy in every region of the United States is taxing all of the alternative energy sources presently available and is projected to increase; some of the sources available for electric power generation are already in short supply, and the development and use of other sources presently involve undesirable environmental impacts;
- (4) the Nation's critical energy problems can be solved only if a national commitment is made to dedicate the necessary financial resources, and enlist the cooperation of the private and public sectors, in developing geothermal resources and other nonconventional sources of energy;
- (5) the conventional geothermal resources which are presently being used have limited total potential; but geothermal resources which are different from those presently being used, and which have extremely large energy content, are known to exist;
- (6) some geothermal resources contain energy in forms other than heat; examples are methane and extremely high pressures available upon release as kinetic energy;
- (7) some geothermal resources contain valuable byproducts such as potable water and mineral compounds which should be processed and recovered as national resources;
- (8) technologies are not presently available for the development of most of these geothermal resources, but technologies for the generation of electric energy from geothermal resources are potentially economical and environmentally desirable, and the development of geothermal resources offers possibilities of process energy and other nonelectric applications;
- (9) much of the known geothermal resources exist on the public lands;

88 STAT. 1079  
88 STAT. 1080

**UNIVERSITY OF UTAH  
RESEARCH INSTITUTE  
EARTH SCIENCE LAB.**

(10) Federal financial assistance is necessary to encourage the extensive exploration, research, and development in geothermal resources which will bring these technologies to the point of commercial application;

(11) the advancement of technology with the cooperation of private industry for the production of useful forms of energy from geothermal resources is important with respect to 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; and

(12) the Federal Government should 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.

DEFINITIONS

30 USC 1102.

SEC. 3. For the purposes of this Act—

(1) the term "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;

(2) the term "byproduct" means any mineral or minerals which are found in solution or in association with geothermal resources and which have a value of less than 75 percent of the value of the geothermal steam and associated geothermal resources or are not, because of quantity, quality, or technical difficulties in extraction and production, of sufficient value to warrant extraction and production by themselves;

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

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

(5) the term "Project" means the Geothermal Energy Coordination and Management Project established by section 101 (a);

(6) the term "fund" means the Geothermal Resources Development Fund established by section 204 (a); and

(7) the term "Chairman" means the Chairman of the Project.

TITLE I—GEOTHERMAL ENERGY COORDINATION AND MANAGEMENT PROJECT

ESTABLISHMENT

30 USC 1121.

SEC. 101. (a) There is hereby established the Geothermal Energy Coordination and Management Project.

Membership.

89 STAT. 1080

88 STAT. 1081

(b) (1) The Project shall be composed of six members as follows:

(A) one appointed by the President;

(B) an Assistant Director of the National Science Foundation;

(C) an Assistant Secretary of the Department of the Interior;

(D) an Associate Administrator of the National Aeronautics and Space Administration;

(E) the General Manager of the Atomic Energy Commission;  
and

(F) an Assistant Administrator of the Federal Energy Administration.

(2) The President shall designate one member of the Project to serve as Chairman of the Project.

(3) If the individual appointed under paragraph (1)(A) is an officer or employee of the Federal Government, he shall receive no additional pay on account of his service as a member of the Project. If such individual is not an officer or employee of the Federal Government, he shall be entitled to receive the daily equivalent of the annual rate of basic pay in effect for level IV of the Executive Schedule (5 U.S.C. 5315) for each day (including traveltime) during which he is engaged in the actual performance of duties vested in the Project.

Compensation.

80 Stat. 461;  
83 Stat. 863.

(c) The Project shall have overall responsibility for the provision of effective management and coordination with respect to a national geothermal energy research, development, and demonstration program. Such program shall include—

- (1) the determination and evaluation of the resource base;
- (2) research and development with respect to exploration, extraction, and utilization technologies;
- (3) the demonstration of appropriate technologies; and
- (4) the loan guaranty program under title II.

(d) (1) The Project shall carry out its responsibilities under this section acting through the following Federal agencies:

(A) the Department of the Interior, the responsibilities of which shall include evaluation and assessment of the resource base, including development of exploration technologies;

(B) the National Aeronautics and Space Administration, the responsibilities of which shall include the provision of contract management capability, evaluation and assessment of the resource base, and the development of technologies pursuant to section 102(b);

(C) the Atomic Energy Commission, the responsibilities of which shall include the development of technologies; and

(D) the National Science Foundation, the responsibilities of which shall include basic and applied research.

(2) Upon request of the Project, the head of any such agency is authorized to detail or assign, on a reimbursable basis or otherwise, any of the personnel of such agency to the Project to assist it in carrying out its responsibilities under this Act.

(e) The Project shall have exclusive authority with respect to the establishment or approval of programs or projects initiated under this Act, except that the agency involved in any particular program or project shall be responsible for the operation and administration of such program or project.

PROGRAM DEFINITION

Sec. 102. (a) (1) The Chairman, acting through the Administrator of the National Aeronautics and Space Administration, is authorized and directed to prepare a comprehensive program definition of an integrated effort and commitment for effectively developing geothermal energy resources. Such Administrator, in preparing such comprehensive program definition, is authorized to consult with other Federal agencies and non-Federal entities.

30 USC 1122.

Transmittal to  
President and  
Congress.  
Interim re-  
ports.

Inventory  
schedule and  
objectives,  
transmittal to  
President and  
Congress.

(2) The Chairman shall transmit such comprehensive program definition to the President and to each House of the Congress. Interim reports shall be transmitted not later than November 30, 1974, and not later than January 31, 1975. Such comprehensive program definition shall be transmitted as soon as possible thereafter, but in any case not later than August 31, 1975.

(3) As part of the comprehensive program definition required by paragraph (1), the Chairman, acting through the Geological Survey, shall transmit to the President and to each House of the Congress a schedule and objectives for the inventorying of geothermal resources.

(b) The National Aeronautics and Space Administration is authorized to undertake and carry out those programs assigned to it by the Project.

RESOURCE INVENTORY AND ASSESSMENT PROGRAM

30 USC 1123.

SEC. 103. (a) The Chairman shall initiate a resource inventory and assessment program with the objective of making regional and national appraisals of all types of geothermal resources, including identification of promising target areas for industrial exploration and development. The specific goals shall include—

(1) the improvement of geophysical, geochemical, geological, and hydrological techniques necessary for locating and evaluating geothermal resources;

(2) the development of better methods for predicting the power potential and longevity of geothermal reservoirs;

(3) the determination and assessment of the nature and power potential of the deeper unexplored parts of high temperature geothermal convection systems; and

(4) the survey and assessment of regional and national geothermal resources of all types.

(b) The Chairman, acting through the Geological Survey and other appropriate agencies, shall—

(1) 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 Chairman to be in the national interest, of non-Federal lands;

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

(3) 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;

(4) 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 resource types, with the current state of technologies for geothermal energy development, and with current evaluations of the environmental impacts of such development; and

(5) participate with appropriate Federal agencies and non-Federal entities 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.

## RESEARCH AND DEVELOPMENT

30 USC 1124.

SEC. 104. (a) The Chairman, acting through the appropriate Federal agencies and in cooperation with non-Federal entities, shall initiate a research and development program for the purpose of resolving all major technical problems inhibiting the fullest possible commercial utilization of geothermal resources in the United States. The specific goals of such programs shall include—

(1) the development of effective and efficient drilling methods to operate at high temperatures in formations of geothermal interest;

(2) the development of reliable predictive methods and control techniques for the production of geothermal resources from reservoirs;

(3) the exploitation of new concepts for fracturing rock to permit recovery of contained heat reserves;

(4) the improvement of equipment and technology for the extraction of geothermal resources from reservoirs;

(5) the development of improved methods for converting geothermal resources and byproducts to useful forms;

(6) the development of improved methods for controlling emissions and wastes from geothermal utilization facilities, including new monitoring methods to any extent necessary;

(7) the development and evaluation of waste disposal control technologies and the evaluation of surface and subsurface environmental effects of geothermal development;

(8) the improvement of the technical capability to predict environmental impacts resulting from the development of geothermal resources, the preparation of environmental impact statements, and the assuring of compliance with applicable standards and criteria;

(9) the identification of social, legal, and economic problems associated with geothermal development (both locally and regionally) for the purpose of developing policy and providing a framework of policy alternatives for the commercial utilization of geothermal resources;

(10) the provision for an adequate supply of scientists to perform required geothermal research and development activities; and

(11) the establishment of a program to encourage States to establish and maintain geothermal resources clearinghouses, which shall serve to (A) provide geothermal resources developers with information with respect to applicable local, State, and Federal laws, rules, and regulations, (B) coordinate the processing of permit applications, impact statements, and other information which geothermal resources developers are required to provide, (C) encourage uniformity with respect to local and State laws, rules, and regulations with respect to geothermal resources development, and (D) encourage establishment of land use plans, which would include zoning for geothermal resources development and which would assure that geothermal resources developers will be able to carry out development programs to the production stage.

(b) The Chairman, acting through the appropriate Federal agencies and in cooperation with non-Federal entities, shall implement a coordinated program of research and development in order to demonstrate the technical means for the extraction and utilization of the resource base, including any byproducts of such base, and in order to

accomplish the goals established by subsection (a). Research authorized by this Act having potential applications in matters other than geothermal energy may be pursued to the extent that the findings of such research can be published in a form for utilization by others.

DEMONSTRATION

30 USC 1125.

SEC. 105. (a) The Chairman, acting through the appropriate Federal agencies and in cooperation with non-Federal entities, shall initiate a program to design and construct geothermal demonstration plants. The specific goals of such program shall include—

- (1) the development of economical geothermal resources production systems and components which meet environmental standards;
- (2) the design of plants to produce electric power and, where appropriate, the large-scale production and utilization of any useful byproducts;
- (3) the involvement of engineers, analysts, technicians, and managers from industry field and powerplant development, which shall lead to the early industrial exploitation of advanced geothermal resources;
- (4) the provision for an adequate supply of trained geothermal engineers and technicians;
- (5) the provision of experimental test beds for component testing an evaluation by laboratories operated by the Federal Government, industry, or institutions of higher education;
- (6) the construction and operation of pilot plants; and
- (7) the construction and operation of demonstration plants.

(b) In carrying out his responsibilities under this section, the Chairman, acting through the appropriate Federal agencies, and in cooperation with non-Federal entities, may provide for the establishment of one or more demonstration projects utilizing each geothermal resource base involved, which shall include, as appropriate, all of the exploration, siting, drilling, pilot plant construction and operation, demonstration plant construction and operation, and other facilities and activities which may be necessary for the generation of electric energy and the utilization of geothermal resource byproducts.

(c) The Chairman, acting through the appropriate Federal agencies, is authorized to investigate and enter into agreements for the cooperative development of facilities to demonstrate the production of energy from geothermal resources. The responsible Federal agency may consider—

- (1) cooperative agreements with utilities and non-Federal governmental entities for construction of facilities to produce energy for commercial disposition; and
- (2) cooperative agreements with other Federal agencies for the construction and operation of facilities to produce energy for direct Federal consumption.

(d) The responsible Federal agency is authorized to investigate the feasibility of, construct, and operate, demonstration projects without entering into cooperative agreements with respect to such projects, if the Chairman finds that—

- (1) the nature of the resource, the geographical location, the scale and engineering design of the facilities, the techniques of production, or any other significant factor of the proposal offers opportunities to make important contributions to the general

Cooperative agreements.

knowledge of geothermal resources, the techniques of its development, or public confidence in the technology; and

(2) there is no opportunity for cooperative agreements with any utility or non-Federal governmental entity willing and able to cooperate in the demonstration project under subsection (c) (1), and there is no opportunity for cooperative agreements with other Federal agencies under subsection (c) (2).

(e) Before favorably considering proposals under subsection (c), the responsible Federal agency 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 any other significant factor of the proposal offers opportunities to make important contributions to the general knowledge of geothermal resources, the techniques of its development, or public confidence in the technology;

(2) the development of the practical benefits as set forth in paragraph (1) 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 guaranty provisions of title II of this Act.

(f) If the estimate of the Federal investment with respect to construction and operation costs of any demonstration project proposed to be established under this section exceeds \$10,000,000, no amount may be appropriated for such project except as specifically authorized by legislation hereafter enacted by the Congress.

(g) (1) At the conclusion of the program under this section or as soon thereafter as may be practicable, the responsible Federal agencies shall, by sale, lease, or otherwise, dispose of all Federal property interests which they have acquired pursuant to this section (including mineral rights) in accordance with existing law and the terms of the cooperative agreements involved.

(2) The agency involved shall, under appropriate agreements or other arrangements, provide for the disposition of geothermal resource byproducts of the project administered by such agency.

Federal property interests, disposal.

Project by-products, disposal.

#### SCIENTIFIC AND TECHNICAL EDUCATION

SEC. 106. (a) It is the policy of the Congress to encourage the development and maintenance of programs through which there may be provided the necessary trained personnel to perform required geothermal research, development, and demonstration activities under sections 103, 104, and 105.

(b) The National Science Foundation is authorized to support programs of education in the sciences and engineering to carry out the policy of subsection (a). Such support may include fellowships, traineeships, technical training programs, technologist training programs, and summer institute programs.

(c) The National Science Foundation is authorized and directed to coordinate its actions, to the maximum extent practicable, with the Project or any permanent Federal organization or agency having jurisdiction over the energy research and development functions of the United States, in determining the optimal selection of programs of education to carry out the policy of subsection (a).

30 USC 1126.

(d) The National Science Foundation is authorized to encourage, to the maximum extent practicable international participation and cooperation in the development and maintenance of programs of education to carrying out the policy of subsection (a).

## TITLE II—LOAN GUARANTIES

### ESTABLISHMENT OF LOAN GUARANTY PROGRAM

30 USC 1141.

Sec. 201. (a) It is the policy of the Congress 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 Chairman of the Project to designate an appropriate Federal agency to guarantee loans for such purposes.

(b) In order to encourage the commercial production of energy from geothermal resources, the head of the designated agency is authorized to, in consultation with the Secretary of the Treasury, guarantee, and to enter into commitments to guarantee, lenders against loss of principal or interest on loans made by such lenders to qualified borrowers for the purposes of—

- (1) the determination and evaluation of the resource base;
- (2) research and development with respect to extraction and utilization technologies;
- (3) acquiring rights in geothermal resources; or
- (4) development, construction, and operation of facilities for the demonstration or 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 percent of the aggregate cost of the project with respect to which the loan is made.

Terms and conditions.

(d) Loan guaranties under this title shall be on such terms and conditions as the head of the designated agency determines, except that a guaranty shall be made under this title only if—

(1) the loan bears interest at a rate not to exceed such annual per centum on the principal obligation outstanding as the head of the designated agency determines to be reasonable, taking into account the range of interest rates prevailing in the private sector for similar loans and risks by the United States;

(2) the terms of such loan require full repayment over a period not to exceed thirty years, or the useful life of any physical asset to be financed by such loan, whichever is less (as determined by the head of the designated agency);

(3) in the judgment of the head of the designated agency, 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; and

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

Limitation.

(e) The amount of the guaranty for any loan for a project shall not exceed \$25,000,000, and the amount of the guaranty for any combination of loans for any single qualified borrower shall not exceed \$50,000,000.

"Qualified borrower."

(f) As used in this title, the term "qualified borrower" means any public or private agency, institution, association, partnership,



corporation, political subdivision, or other legal entity which (as determined by the head of the designated agency) has presented satisfactory evidence of an interest in geothermal resources and is capable of performing research or completing the development and production of energy in an acceptable manner.

#### PAYMENT OF INTEREST

SEC. 202. (a) With respect to any loan guaranteed pursuant to this title, the head of the designated agency 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 head of the designated agency finds—

Contract  
authority.  
30 USC 1142.

(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 Federal 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 head of the designated agency is authorized to pay shall be no greater than the amount of interest which the borrower is obligated to pay under the loan agreement.

(b) In the event of any default by a qualified borrower on a guaranteed loan, the head of the designated agency 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 (including any payment of interest under subsection (a)) from such assets of the defaulting borrower as are associated with the project, or from any other surety included in the terms of the guaranty.

#### PERIOD OF GUARANTIES AND INTEREST ASSISTANCE

SEC. 203. 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 Act.

30 USC 1143.

#### GEOHERMAL RESOURCES DEVELOPMENT FUND

SEC. 204. (a) There is established in the Treasury of the United States a Geothermal Resources Development Fund, which shall be available to the head of the designated agency 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 may, with the approval of the Secretary of the Treasury, be invested in bonds or other obligations of, or guaranteed by, the United States.

Establishment.  
30 USC 1144.

(b) There shall be paid into the fund the amounts appropriated pursuant to section 304(c) and such amounts as may be returned to the United States pursuant to section 202(b), and the amounts in the fund shall remain available until expended, except that after the expiration of the ten-year period established by section 203, such amounts in the fund which are not required to secure outstanding

88 STAT. 1088

Financial re-  
ports, sub-  
mittal to  
Congress.

guaranty obligations shall be paid into the general fund of the Treasury.

(c) Business-type financial reports covering the operations of the fund shall be submitted to the Congress by the head of the designated agency annually upon the completion of an appropriate accounting period.

TITLE III—GENERAL PROVISIONS

PROTECTION OF ENVIRONMENT

30 USC 1161.

SEC. 301. In the conduct of its activities, the Project and any participating public or private persons or agencies shall place particular emphasis upon the objective of assuring that the environment and the safety of persons or property are effectively protected; and the program under title I shall include such special research and development as may be necessary for the achievement of that objective.

REPORTING REQUIREMENTS

Reports to  
President and  
Congress.  
30 USC 1162.

SEC. 302. (a) The Chairman of the Project shall submit to the President and the Congress full and complete annual reports of the activities of the Project, including such projections and estimates as may be necessary to evaluate the progress of the national geothermal energy research, development, and demonstration program and to provide the basis for as accurate a judgment as is possible concerning the extent to which the objectives of this Act will have been achieved by June 30, 1980.

(b) No later than one year after the termination of each demonstration project under section 105, the Chairman of the Project shall submit to the President and the Congress a final report on the activities of the Project related to each project, including his recommendations with respect to any further legislative, administrative, and other actions which should be taken in support of the objectives of this Act.

TRANSFER OF FUNCTIONS

30 USC 1163.

SEC. 303. (a) Within sixty days after the effective date of the law creating a permanent Federal organization or agency having jurisdiction over the energy research and development functions of the United States (or within sixty days after the date of the enactment of this Act if the effective date of such law occurs prior to the date of the enactment of this Act), all of the research, development, and demonstration functions (including the loan guaranty program) vested in the Project under this Act, along with related records, documents, personnel, obligations, and other items to the extent necessary or appropriate, shall, in accordance with regulations prescribed by the Office of Management and Budget, be transferred to and vested in such organization or agency.

(b) Upon the establishment of a permanent Federal organization or agency having jurisdiction over the energy research and development functions of the United States, and when all research and development (and other) functions of the Project are transferred, the members of the Project may provide advice and counsel to the head of such organization or agency, in accordance with arrangements made at that time.

## AUTHORIZATIONS OF APPROPRIATIONS

Sec. 304. (a) For the fiscal years ending June 30, 1976, and September 30, 1977, 1978, 1979, and 1980, only such sums may be appropriated as the Congress may hereafter authorize by law. 30 USC 1164

(b) There are authorized to be appropriated to the National Aeronautics and Space Administration not to exceed \$2,500,000 for the fiscal year ending June 30, 1975, for the purpose of preparing the program definition under section 102(a).

(c) In addition to sums authorized to be appropriated by subsection (b), there are authorized to be appropriated to the fund not to exceed \$50,000,000 annually, such sums to carry out the provisions of the loan guaranty program by the Project under title II.

Approved September 3, 1974.

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LEGISLATIVE HISTORY:

HOUSE REPORTS: No. 93-1112 (Comm. on Science and Astronautics) and No. 93-1301 (Comm. of Conference).

SENATE REPORT No. 93-849 accompanying S. 2465 (Comm. on Interior and Insular Affairs).

CONGRESSIONAL RECORD, Vol. 120 (1974):

July 10, considered and passed House.

July 11, considered and passed Senate, amended, in lieu of S. 2465.

Aug. 20, Senate agreed to conference report.

Aug. 21, House agreed to conference report.

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