Union Calendar No. 122

110TH CONGRESS
1ST SESSION

H. R. 2304

[Report No. 110–203]

To direct the Secretary of Energy to conduct a program of research, development, demonstration, and commercial application for geothermal energy, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

MAY 14, 2007

Mr. MCNERNEY (for himself, Mr. GORDON of Tennessee, and Mr. LAMPSON) introduced the following bill; which was referred to the Committee on Science and Technology

JUNE 21, 2007

Additional sponsors: Mr. HONDA, Mr. INSLEE, Mr. HALL of New York, Ms. MATSUI, Ms. WOOLSEY, Mr. MATHESON, Mr. MILLER of North Carolina, Ms. JACKSON-LEE of Texas, Ms. BERKLEY, Mr. MARSHALL, Mr. SCHIFF, and Mr. WALDEN of Oregon

JUNE 21, 2007

Reported with an amendment, committed to the Committee of the Whole House on the State of the Union, and ordered to be printed

[Strike out all after the enacting clause and insert the part printed in italic]

[For text of introduced bill, see copy of bill as introduced on May 14, 2007]

A BILL

To direct the Secretary of Energy to conduct a program of research, development, demonstration, and commercial

application for geothermal energy, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the "Advanced Geothermal Energy Research and Development Act of 2007".

SEC. 2. FINDINGS.

The Congress finds the following:

(1) The United States has a critical national interest in developing clean, domestic, renewable sources of energy in order to mitigate the causes of climate change, reduce other environmental impacts of energy production, increase national security, improve public health, and bolster economic stability.

(2) Geothermal energy is a renewable energy resource.

(3) Geothermal energy is unusual among renewable energy sources because of its ability to provide an uninterrupted supply of baseload electricity.

(4) Recently published assessments by reputable experts, including the Massachusetts Institute of Technology, the Western Governors Association, and the National Renewable Energy Laboratory, indicate that the Nation's geothermal resources are widely distributed, vast in size, and barely tapped.

(5) Sustained and expanded research, development, demonstration, and commercial application programs are needed to locate and characterize geothermal resources, and to develop the technologies that will enable their widespread commercial development.

(6) Federal support is critical to reduce the financial risk associated with developing new geothermal technologies, thereby encouraging the private sector investment necessary to make geothermal resources commercially viable as a source of electric power and for other applications.

SEC. 3. DEFINITIONS.

For purposes of this Act:

(1) ENGINEERED.—When referring to enhanced geothermal systems, the term ''engineered'' means subjected to intervention, including intervention to address one or more of the following issues:

(A) Lack of effective permeability or porosity or open fracture connectivity within the reservoir.

(B) Insufficient contained geofluid in the reservoir.

(C) A low average geothermal gradient, which necessitates deeper drilling.

(2) ENHANCED GEOTHERMAL SYSTEMS.—The term "enhanced geothermal systems" means geothermal reservoir systems that are engineered, as opposed to occurring naturally.

(3) GEOFLUID.—The term "geofluid" means any fluid used to extract thermal energy from the Earth which is transported to the surface for direct use or electric power generation, except that such term shall not include oil or natural gas.

(4) GEOPRESSURED RESOURCES.—The term "geopressured resources" mean geothermal deposits found in sedimentary rocks under higher than normal pressure and saturated with gas or methane.

(5) GEOTHERMAL.—The term "geothermal" refers to heat energy stored in the Earth's crust that can be accessed for direct use or electric power generation.

(6) HYDROTHERMAL.—The term "hydrothermal" refers to naturally occurring subsurface reservoirs of hot water or steam.

(7) SECRETARY.—The term "Secretary" means the Secretary of Energy.

(8) SYSTEMS APPROACH.—The term "systems approach" means an approach to solving problems or designing systems that attempts to optimize the per-

formance of the overall system, rather than a particular component of the system.

SEC. 4. HYDROTHERMAL RESEARCH AND DEVELOPMENT.

(a) IN GENERAL.—The Secretary shall support programs of research, development, demonstration, and commercial application to expand the use of geothermal energy production from hydrothermal systems, including the programs described in subsection (b).

(b) PROGRAMS.—

(1) ADVANCED HYDROTHERMAL RESOURCE TOOLS.—The Secretary, in consultation with other appropriate agencies, shall support a program to develop advanced geophysical, geochemical, and geologic tools to assist in locating hidden hydrothermal resources, and to increase the reliability of site characterization before, during, and after initial drilling. The program shall develop new prospecting techniques to assist in prioritization of targets for characterization. The program shall include a field component.

(2) INDUSTRY COUPLED EXPLORATORY DRILLING.—The Secretary shall support a program of cost-shared field demonstration programs, to be pursued, simultaneously and independently, in collaboration with industry partners, for the demonstration of technologies and techniques of siting and exploratory

drilling for undiscovered resources in a variety of geologic settings. The program shall include incentives to encourage the use of advanced technologies and techniques.

SEC. 5. GENERAL GEOTHERMAL SYSTEMS RESEARCH AND DEVELOPMENT.

(a) SUBSURFACE COMPONENTS AND SYSTEMS.—The Secretary shall support a program of research, development, demonstration, and commercial application of components and systems capable of withstanding extreme geothermal environments and necessary to cost-effectively develop, produce, and monitor geothermal reservoirs and produce geothermal energy. These components and systems shall include advanced casing systems (expandable tubular casing, low-clearance casing designs, and others), high-temperature cements, high-temperature submersible pumps, and high-temperature packers, as well as technologies for under-reaming, multilateral completions, high-temperature logging, and logging while drilling.

(b) RESERVOIR PERFORMANCE MODELING.—The Secretary shall support a program of research, development, demonstration, and commercial application of models of geothermal reservoir performance, with an emphasis on accurately modeling performance over time. Models shall be developed to assist both in the development of geothermal

reservoirs and to more accurately account for stress-related effects in stimulated hydrothermal and enhanced geothermal systems production environments.

(c) ENVIRONMENTAL IMPACTS.—The Secretary shall—

(1) support a program of research, development, demonstration, and commercial application of technologies and practices designed to mitigate or preclude potential adverse environmental impacts of geothermal energy development, production or use, and seek to ensure that geothermal energy development is consistent with the highest practicable standards of environmental stewardship; and

(2) in conjunction with the Assistant Administrator for Research and Development at the Environmental Protection Agency, support a research program to identify potential environmental impacts of geothermal energy development, production, and use, and ensure that the program described in paragraph (1) addresses such impacts, including effects on groundwater and local hydrology.

Any potential environmental impacts identified as part of the development, production, and use of geothermal energy shall be measured and examined against the potential emissions offsets of greenhouses gases gained by geothermal energy development, production, and use.

SEC. 6. ENHANCED GEOTHERMAL SYSTEMS RESEARCH AND DEVELOPMENT.

(a) IN GENERAL.—The Secretary shall support a program of research, development, demonstration, and commercial application for enhanced geothermal systems, including the programs described in subsection (b).

(b) PROGRAMS.—

(1) ENHANCED GEOTHERMAL SYSTEMS TECHNOLOGIES.—The Secretary shall support a program of research, development, demonstration, and commercial application of the technologies and knowledge necessary for enhanced geothermal systems to advance to a state of commercial readiness, including advances in—

(A) reservoir stimulation;

(B) reservoir characterization, monitoring, and modeling;

(C) stress mapping;

(D) tracer development;

(E) three-dimensional tomography;

(F) understanding seismic effects of reservoir engineering and stimulation; and

(G) laser-based drilling technology.

(2) ENHANCED GEOTHERMAL SYSTEMS RESERVOIR STIMULATION.—

(A) PROGRAM.—In collaboration with industry partners, the Secretary shall support a program of research, development, and demonstration of enhanced geothermal systems reservoir stimulation technologies and techniques. A minimum of 5 sites shall be selected in locations that show particular promise for enhanced geothermal systems development. Each site shall—

(i) represent a different class of subsurface geologic environments; and

(ii) take advantage of an existing site where subsurface characterization has been conducted or existing drill holes can be utilized, if possible.

(B) CONSIDERATION OF EXISTING SITES.—The following 2 sites, where Department of Energy and industry cooperative enhanced geothermal systems projects are already underway, may be considered for inclusion among the sites selected under subparagraph (A):

(i) Desert Peak, Nevada.

(ii) Coso, California.

SEC. 7. GEOTHERMAL ENERGY PRODUCTION FROM OIL AND GAS FIELDS AND RECOVERY AND PRODUCTION OF GEOPRESSURED GAS RESOURCES.

(a) IN GENERAL.—The Secretary shall establish a program of research, development, demonstration, and commercial application to support development of geothermal energy production from oil and gas fields and production and recovery of energy from geopressured resources. In addition, the Secretary shall conduct such supporting activities including research, resource characterization, and technology development as necessary.

(b) GEOTHERMAL ENERGY PRODUCTION FROM OIL AND GAS FIELDS.—The Secretary shall implement a grant program in support of geothermal energy production from oil and gas fields. The program shall include grants for a total of not less than three demonstration projects of the use of geothermal techniques such as organic rankine cycle systems at marginal, unproductive, and productive oil and gas wells. The Secretary shall, to the extent practicable and in the public interest, make awards that—

(1) include not less than five oil or gas well sites per project award;

(2) use a range of oil or gas well hot water source temperatures from 150 degrees Fahrenheit to 300 degrees Fahrenheit;

(3) cover a range of sizes up to one megawatt;

(4) are located at a range of sites;

(5) can be replicated at a wide range of sites;

(6) facilitate identification of optimum techniques among competing alternatives;

(7) include business commercialization plans that have the potential for production of equipment at high volumes and operation and support at a large number of sites; and

(8) satisfy other criteria that the Secretary determines are necessary to carry out the program and collect necessary data and information.

The Secretary shall give preference to assessments that address multiple elements contained in paragraphs (1) through (8).

(c) GRANT AWARDS.—Each grant award for demonstration of geothermal technology such as organic rankine cycle systems at oil and gas wells made by the Secretary under subsection (b) shall include—

(1) necessary and appropriate site engineering study;

(2) detailed economic assessment of site specific conditions;

(3) appropriate feasibility studies to determine whether the demonstration can be replicated;

(4) design or adaptation of existing technology for site specific circumstances or conditions;

(5) installation of equipment, service, and support;

(6) operation for a minimum of one year and monitoring for the duration of the demonstration; and

(7) validation of technical and economic assumptions and documentation of lessons learned.

(d) GEOPRESSURED GAS RESOURCE RECOVERY AND PRODUCTION.—(1) The Secretary shall implement a program to support the research, development, demonstration, and commercial application of cost-effective techniques to produce energy from geopressured resources situated in and near the Gulf of Mexico.

(2) The Secretary shall solicit preliminary engineering designs for geopressured resources production and recovery facilities.

(3) Based upon a review of the preliminary designs, the Secretary shall award grants, which may be cost-shared, to support the detailed development and completion of engineering, architectural and technical plans needed to support construction of new designs.

(4) Based upon a review of the final design plans above, the Secretary shall award cost-shared development and construction grants for demonstration geopressured

production facilities that show potential for economic recovery of the heat, kinetic energy and gas resources from geopressured resources.

(e) COMPETITIVE GRANT SELECTION.—Not less than 90 days after the date of the enactment of this Act, the Secretary shall conduct a national solicitation for applications for grants under the programs outlined in subsections (b) and (d). Grant recipients shall be selected on a competitive basis based on criteria in the respective subsection.

(f) WELL DRILLING.—No funds may be used under this section for the purpose of drilling new wells.

SEC. 8. COST SHARING AND PROPOSAL EVALUATION.

(a) FEDERAL SHARE.—(1) The Federal share of costs of projects funded under this Act shall be in accordance with section 988 of the Energy Policy Act of 2005.

(2) The Secretary may waive the Federal cost share requirement for grants awarded to universities, national laboratories, or similar noncommercial entities awarded grants under this Act.

(3) The Secretary shall allow for a competitive bidding process to play a role in determining the final cost-share ratio.

(b) ORGANIZATION AND ADMINISTRATION OF PROGRAMS.—Programs under this Act shall incorporate the following organizational and administrative elements:

(1) Non-Federal participants shall be chosen through a competitive selection process.

(2) The request for proposals for each program shall stipulate, at a minimum, the following:

(A) The non-Federal funding requirements for projects.

(B) The funding mechanism to be used (i.e. grants, contracts, or cooperative agreements).

(C) Milestones and a schedule for completion.

(D) Criteria for evaluating proposals.

(3) In evaluating proposals, the Secretary shall give priority to proposals that draw on relevant expertise from industry, academia, and the national laboratories, as appropriate.

(4) The Secretary shall coordinate with, and where appropriate may provide funds in furtherance of the purposes of this Act to, other Department of Energy research and development programs focused on drilling, subsurface characterization, and other related technologies.

(5) In evaluating proposals, the Secretary shall consult with relevant experts from industry, academia, and the national laboratories, as appropriate.

(6) In evaluating proposals, the Secretary shall give priority to proposals that demonstrate clear evidence of employing a systems approach.

(7) In evaluating proposals for projects with a field component, the Secretary shall, where appropriate, give priority consideration to proposals that contain provisions to study local environmental impacts of the technologies developed or the operations undertaken.

(8) Data collected by the Secretary as a result of any project supported with funds provided under this Act shall be made available to the public, except to the extent that they contain information that is protected from disclosure under section 552(b) of title 5, United States Code.

SEC. 9. CENTERS FOR GEOTHERMAL TECHNOLOGY TRANSFER.

(a) IN GENERAL.—The Secretary shall award grants to institutions of higher education (or consortia thereof) to establish 2 Centers for Geothermal Technology Transfer.

(b) CENTERS.—

(1) HYDROTHERMAL CENTER.—The purpose of one Technology Transfer Center shall be to serve as an information clearinghouse for the geothermal industry, collecting and disseminating information on best

practices in all areas related to developing and managing hydrothermal resources, including data available for disclosure as provided under section 8(b)(8). This Center shall be based at the institution west of the Mississippi River that the Secretary considers to be best suited to the purpose. The Center shall collect and disseminate information on all subjects germane to the development and user of hydrothermal systems, including—

(A) resource location;

(B) reservoir characterization, monitoring, and modeling;

(C) drilling techniques;

(D) reservoir management techniques; and

(E) technologies for electric power conversion or direct use of geothermal energy.

(2) ENHANCED GEOTHERMAL SYSTEMS CENTER.—The purpose of a second Technology Transfer Center shall be to serve as an information clearinghouse for the geothermal industry, collecting and disseminating information on best practices in all areas related to developing and managing enhanced geothermal systems resources, including data available for disclosure as provided under section 8(b)(8). This Center is encouraged to seek opportunities to coordi-

nate efforts and share information with international partners engaged in research and development of enhanced geothermal systems or engaged in collection of data related to enhanced geothermal systems development. This Center shall be based at an academic institution east of the Rocky Mountains which, in the opinion of the Secretary, is best suited to provide national leadership on enhanced geothermal systems-related issues. The Center shall collect and disseminate information on all subjects germane to the development and use of enhanced geothermal systems.

(c) AWARD DURATION.—An award made by the Secretary under this section shall be for an initial period of 5 years, and may be renewed for additional 5-year periods on the basis of—

(1) satisfactory performance in meeting the goals of the research plan proposed by the Center; and

(2) other requirements as specified by the Secretary.

SEC. 10. GEOPOWERING AMERICA.

The Secretary shall expand the Department of Energy's GeoPowering the West program to extend its geothermal technology transfer activities throughout the entire United States. The program shall be renamed "GeoPowering America". The program shall continue to be

based in the Department of Energy office in Golden, Colorado.

SEC. 11. REPORTS.

(a) REPORTS ON ADVANCED USES OF GEOTHERMAL ENERGY.—Not later than 1 year, 3 years, and 5 years, after the date of enactment of this Act, the Secretary shall report to the Committee on Science and Technology of the House of Representatives and the Committee on Energy and Natural Resources of the Senate on advanced concepts and technologies to maximize the geothermal resource potential of the United States. The reports shall include—

(1) the use of carbon dioxide as an alternative geofluid with potential carbon sequestration benefits;

(2) mineral recovery from geofluids;

(3) use of geothermal energy to produce hydrogen;

(4) use of geothermal energy to produce biofuels;

(5) use of geothermal heat for oil recovery from oil shales and tar sands; and

(6) other advanced geothermal technologies, including advanced drilling technologies and advanced power conversion technologies.

(b) PROGRESS REPORTS.—(1) Not later than 36 months after the date of enactment of this Act, the Secretary shall submit to the Committee on Science and Technology

of the House of Representatives and the Committee on Energy and Natural Resources of the Senate an interim report describing the progress made under this Act. At the end of 60 months, the Secretary shall submit to Congress a report on the results of projects undertaken under this Act and other such information the Secretary considers appropriate.

(2) As necessary, the Secretary shall report to the Congress on any legal, regulatory, or other barriers encountered that hinder economic development of these resources, and provide recommendations on legislative or other actions needed to address such impediments.

SEC. 12. APPLICABILITY OF OTHER LAWS.

Nothing in this Act shall be construed as waiving the applicability of any requirement under any environmental or other Federal or State law.

SEC. 13. AUTHORIZATION OF APPROPRIATIONS.

There are authorized to be appropriated to the Secretary to carry out this Act $90,000,000 for each of the fiscal years 2008 through 2012, of which $10,000,000 for each fiscal year shall be for carrying out section 7.

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