

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) Systems approach

The term “systems approach” means an approach to solving problems or designing systems that attempts to optimize the performance of the overall system, rather than a particular component of the system.

(Pub. L. 110-140, title VI, §612, Dec. 19, 2007, 121 Stat. 1679.)

SHORT TITLE

This part known as the “Advanced Geothermal Energy Research and Development Act of 2007”, see Short Title note set out under section 17001 of this title.

§ 17192. 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 advanced 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.

(Pub. L. 110-140, title VI, §613, Dec. 19, 2007, 121 Stat. 1679.)

§ 17193. 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 and high-pressure logging, logging while drilling, deep fracture stimulation, and reservoir system diagnostics.

(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;

(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; and

(3) support a program of research to compare the potential environmental impacts identified as part of the development, production, and use of geothermal energy with the potential emission reductions of greenhouse gases gained by geothermal energy development, production, and use.

(Pub. L. 110-140, title VI, §614, Dec. 19, 2007, 121 Stat. 1680.)

§ 17194. 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; and
- (F) understanding seismic effects of reservoir engineering and stimulation.

(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 4 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 site

The Desert Peak, Nevada, site, where a Department of Energy and industry cooperative enhanced geothermal systems project is already underway, may be considered for inclusion among the sites selected under subparagraph (A).

(Pub. L. 110-140, title VI, §615, Dec. 19, 2007, 121 Stat. 1680.)

§ 17195. 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 com-

mercial application to support development of geothermal energy production from oil and gas fields and production and recovery of energy, including electricity, 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 advanced 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 advanced 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 1 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, dem-