

(4) report annually to the Secretary on—

- (A) the amount of funds disbursed;
- (B) the amount of photovoltaics purchased; and
- (C) the results of the monitoring under paragraph (5);

(5) provide for measurement and verification of the output of a representative sample of the photovoltaics systems demonstrated throughout the average working life of the systems, or at least 20 years; and

(6) require that applicant buildings must have received an independent energy efficiency audit during the 6-month period preceding the filing of the application.

**(g) Unexpended funds**

If a State fails to expend any funds received under this section within 3 years of receipt, such remaining funds shall be returned to the Treasury.

**(h) Reports**

The Secretary shall report to Congress 5 years after funds are first distributed to the States under this section—

- (1) the amount of photovoltaics demonstrated;
- (2) the number of projects undertaken;
- (3) the administrative costs of the program;
- (4) the results of the monitoring under subsection (f)(5); and
- (5) the total amount of funds distributed, including a breakdown by State.

**(i) Authorization of appropriations**

There are authorized to be appropriated to the Secretary for the purposes of carrying out this section—

- (1) \$15,000,000 for fiscal year 2008;
- (2) \$30,000,000 for fiscal year 2009;
- (3) \$45,000,000 for fiscal year 2010;
- (4) \$60,000,000 for fiscal year 2011; and
- (5) \$70,000,000 for fiscal year 2012.

(Pub. L. 110–140, title VI, § 607, Dec. 19, 2007, 121 Stat. 1677.)

PART B—GEOTHERMAL ENERGY

**§ 17191. Definitions**

For purposes of this part:

**(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) Geopressed resources**

The term “geopressed 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 geopressed 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, including electricity, from geopressed 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