

Calendar No. 314112TH CONGRESS
2^D SESSION**S. 1142****[Report No. 112-145]**

To promote the mapping and development of United States geothermal resources by establishing a direct loan program for high risk geothermal exploration wells, to amend the Energy Independence and Security Act of 2007 to improve geothermal energy technology and demonstrate the use of geothermal energy in large scale thermal applications, and for other purposes.

IN THE SENATE OF THE UNITED STATES

MAY 26, 2011

Mr. TESTER (for himself, Ms. MURKOWSKI, Mr. REID, and Mr. BEGICH) introduced the following bill; which was read twice and referred to the Committee on Energy and Natural Resources

FEBRUARY 7, 2012

Reported by Mr. BINGAMAN, with amendments

[Omit the part struck through and insert the part printed in *italic*]

A BILL

To promote the mapping and development of United States geothermal resources by establishing a direct loan program for high risk geothermal exploration wells, to amend the Energy Independence and Security Act of 2007 to improve geothermal energy technology and demonstrate the use of geothermal energy in large scale thermal applications, and for other purposes.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*

3 **SECTION 1. SHORT TITLE.**

4 This Act may be cited as the “Geothermal Explo-
5 ration and Technology Act of 2011”.

6 **SEC. 2. GEOTHERMAL EXPLORATORY DRILLING LOAN PRO-**
7 **GRAM.**

8 (a) DEFINITIONS.—In this section:

9 (1) FUND.—The term “Fund” means the Geo-
10 thermal Investment Fund established under sub-
11 section (h).

12 (2) PROGRAM.—The term “program” means
13 the direct loan program for high risk geothermal ex-
14 ploration wells established under this section.

15 (3) SECRETARY.—The term “Secretary” means
16 the Secretary of Energy.

17 (b) ESTABLISHMENT.—The Secretary shall establish
18 a direct loan program for high risk geothermal exploration
19 wells.

20 (c) APPLICATIONS.—An applicant that seeks to re-
21 ceive a loan under the program may submit to the Sec-
22 retary an application for the loan at such time, in such
23 form, and containing such information as the Secretary
24 may prescribe.

25 (d) PROJECT CRITERIA.—

1 (1) IN GENERAL.—In selecting applicants for
2 loans under this section to carry out projects under
3 the program, the Secretary shall consider—

4 (A) the potential for unproven geothermal
5 resources that would be explored and developed
6 under a project;

7 (B) the expertise and experience of an ap-
8 plicant in developing geothermal resources; and

9 (C) the importance of the project in meet-
10 ing the goals of the Department of Energy.

11 (2) PREFERENCE.—In selecting applicants for
12 loans under this section to carry out projects under
13 the program, the Secretary shall provide a pref-
14 erence for ~~previously unexplored, underexplored, or~~
15 ~~unproven geothermal resources in a variety of geo-~~
16 ~~logic and geographic settings~~ *projects likely to lead*
17 *to successful new geothermal development leading to*
18 *electricity production.*

19 (e) DATA SHARING.—Data from all exploratory wells
20 that are carried out under the program shall be provided
21 to the Secretary and the Secretary of the Interior for use
22 in mapping national geothermal resources and other uses,
23 including—

24 (1) subsurface geologic data;

25 (2) metadata;

1 (3) borehole temperature data; and

2 (4) inclusion in the National Geothermal Data
3 System of the Department of Energy.

4 (f) ADMINISTRATION.—

5 (1) COST SHARE.—

6 (A) IN GENERAL.—The Secretary shall de-
7 termine the cost share for a loan made under
8 this section.

9 (B) HIGHER RISKS.—The Secretary may
10 base the cost share percentage for loans made
11 under this section on a sliding scale, with high-
12 er Federal shares awarded to projects with
13 higher risks.

14 (2) NUMBER OF WELLS.—The Secretary shall
15 determine the number of wells for each selected geo-
16 thermal project for which a loan may be made under
17 this section.

18 (3) UNPRODUCTIVE PROJECTS.—The Secretary
19 may grant further delays or dispense with the repay-
20 ment obligation on a demonstration that a selected
21 geothermal project is unproductive.

22 (g) LOAN REPAYMENT.—

23 (1) COMMENCEMENT.—The recipient of a loan
24 made under this section for a geothermal facility

1 shall commence repayment of the loan beginning on
2 the earlier of—

3 (A) the date that is 4 years after the date
4 the loan is made; or

5 (B) the date on which the geothermal facil-
6 ity enters into commercial production.

7 (2) TERM.—

8 (A) IN GENERAL.—Except as provided in
9 subparagraph (B), the term of a loan made
10 under this section shall be 4 years beginning on
11 the applicable loan repayment commencement
12 date under paragraph (1).

13 (B) EXTENSION.—The Secretary may ex-
14 tend the term of a loan under this section for
15 not more than 4 years.

16 (3) USE OF LOAN REPAYMENTS.—Amounts re-
17 paid on loans made under this section shall be de-
18 posited in the Fund.

19 (h) GEOTHERMAL INVESTMENT FUND.—

20 (1) ESTABLISHMENT OF FUND.—There is es-
21 tablished in the Treasury of the United States a
22 fund to be known as the “Geothermal Investment
23 Fund”, to be administered by the Secretary, to be
24 available without fiscal year limitation and not sub-
25 ject to appropriation, to carry out this section.

1 (2) ~~TRANSFERS TO FUND.~~—The Fund shall
 2 consist of such amounts as are appropriated to the
 3 Fund under subsection (j).

4 (2) *TRANSFERS TO FUND.*—*The Fund shall con-*
 5 *sist of—*

6 (A) *such amounts as are appropriated to*
 7 *the Fund under subsection (j); and*

8 (B) *amounts repaid on loans under sub-*
 9 *section (g)(3).*

10 (3) PROHIBITION.—Amounts in the Fund may
 11 not be made available for any purpose other than a
 12 purpose described in paragraph (1).

13 (4) ANNUAL REPORTS.—

14 (A) IN GENERAL.—Not later than 60 days
 15 after the end of each fiscal year beginning with
 16 fiscal year 2012, the Secretary of Energy shall
 17 submit to the the Committee on Energy and
 18 Natural Resources of the Senate and the Com-
 19 mittee on Energy and Commerce of the House
 20 of Representatives a report on the operation of
 21 the Fund during the fiscal year.

22 (B) CONTENTS.—Each report shall in-
 23 clude, for the fiscal year covered by the report,
 24 the following:

1 (i) A statement of the amounts depos-
2 ited into the Fund.

3 (ii) A description of the expenditures
4 made from the Fund for the fiscal year, in-
5 cluding the purpose of the expenditures.

6 (iii) Recommendations for additional
7 authorities to fulfill the purpose of the
8 Fund.

9 (iv) A statement of the balance re-
10 maining in the Fund at the end of the fis-
11 cal year.

12 (i) GUIDELINES.—~~Not later~~

13 (1) *IN GENERAL.*—*Not later* than 180 days after
14 the date of enactment of this Act, the Secretary
15 shall ~~develop~~ *issue* guidelines for the implementation
16 of the program.

17 (2) *ADMINISTRATION.*—*The guidelines shall—*

18 (A) *specify—*

19 (i) *the terms and conditions that*
20 *would require a higher or lower level of cost*
21 *sharing under this section;*

22 (ii) *the conditions under which the*
23 *Secretary will allow loan modifications or*
24 *forgiveness in cases in which a well cannot*
25 *be used for production or injection; and*

1 *(iii) the information necessary to pro-*
 2 *vide a loan applicant with certainty about*
 3 *application of subsection (f), including the*
 4 *level of cost and risk that the applicant and*
 5 *the Secretary will assume; and*

6 *(B) require that—*

7 *(i) loans be provided under this section*
 8 *only after the developer has committed the*
 9 *share of the developer for expenditures for*
 10 *drilling costs; and*

11 *(ii) loans for successful wells shall to be*
 12 *repaid by the developer within a 10-year*
 13 *period.*

14 (j) AUTHORIZATION OF APPROPRIATIONS.—There
 15 are authorized to be appropriated to carry out this section
 16 such sums as are necessary for each of fiscal years 2012
 17 through 2021.

18 **SEC. 3. LARGE-SCALE GEOTHERMAL ENERGY.**

19 Title VI of the Energy Independence and Security
 20 Act of 2007 is amended by inserting after section 616 (42
 21 U.S.C. 17195) the following:

22 **“SEC. 616A. LARGE-SCALE GEOTHERMAL ENERGY.**

23 “(a) FINDINGS.—Congress finds that—

24 “(1) the Geothermal Technologies Program of
 25 the Office of Energy Efficiency and Renewable En-

1 energy of the Department has included a focus on di-
2 rect use of geothermal energy in the low-temperature
3 geothermal energy subprogram (including in the de-
4 velopment of a research and development plan for
5 the program);

6 “(2) the Building Technologies Program of the
7 Office of Energy Efficiency and Renewable Energy
8 of the Department—

9 “(A) is focused on the energy demand and
10 energy efficiency of buildings; and

11 “(B) includes geothermal heat pumps as a
12 component technology in the residential and
13 commercial deployment activities of the pro-
14 gram; and

15 “(3) geothermal heat pumps and direct use of
16 geothermal energy, especially in large-scale applica-
17 tions, can make a significant contribution to the use
18 of renewable energy but are underrepresented in re-
19 search, development, demonstration, and commer-
20 cialization.

21 “(b) PURPOSES.—The purposes of this section are—

22 “(1) to improve the components, processes, and
23 systems used for geothermal heat pumps and the di-
24 rect use of geothermal energy; and

1 “(2) to increase the energy efficiency, lower the
 2 cost, increase the use, and improve and demonstrate
 3 the applicability of geothermal heat pumps to, and
 4 the direct use of geothermal energy in, large build-
 5 ings, commercial districts, residential communities,
 6 and large municipal, agricultural, or industrial
 7 projects.

8 “(c) DEFINITIONS.—In this section:

9 “(1) DIRECT USE OF GEOTHERMAL ENERGY.—
 10 The term ‘direct use of geothermal energy’ means
 11 systems that use water that is at a temperature be-
 12 tween approximately 38 degrees Celsius and 149 de-
 13 grees Celsius directly or through a heat exchanger to
 14 provide—

15 “(A) heating to buildings; or

16 “(B) heat required for industrial processes,
 17 agriculture, aquaculture, and other facilities.

18 “(2) GEOTHERMAL HEAT PUMP.—The term
 19 ‘geothermal heat pump’ means a system that pro-
 20 vides heating and cooling by exchanging heat from
 21 shallow ground or surface water using—

22 “(A) a closed loop system, which transfers
 23 heat ~~via~~ *by way of* buried or immersed pipes
 24 that contain a mix of water and antifreeze; or

1 “(B) an open loop system, which circulates
2 ground or surface water directly into the build-
3 ing and returns the water to the same aquifer
4 or surface water source.

5 “(3) LARGE-SCALE APPLICATION.—The term
6 ‘large-scale application’ means an application for
7 space or process heating or cooling for large entities
8 *with a name-plate capacity, expected resource, or rat-*
9 *ing of 10 or more megawatts*, such as a large build-
10 ing, commercial district, residential community, or a
11 large municipal, agricultural, or industrial project.

12 “(4) SECRETARY.—The term ‘Secretary’ means
13 Secretary of Energy, acting through the Assistant
14 Secretary for Energy Efficiency and Renewable En-
15 ergy.

16 “(d) PROGRAM.—

17 “(1) IN GENERAL.—The Secretary shall estab-
18 lish a program of research, development, demonstra-
19 tion, and commercial application for geothermal heat
20 pumps and the direct use of geothermal energy.

21 “(2) AREAS.—The program may include re-
22 search, development, demonstration, and commercial
23 application of—

1 “(A) geothermal ground loop efficiency im-
2 provements through more efficient heat transfer
3 fluids;

4 “(B) geothermal ground loop efficiency im-
5 provements through more efficient thermal
6 grouts for wells and trenches;

7 “(C) geothermal ground loop installation
8 cost reduction through—

9 “(i) improved drilling methods; ~~and~~

10 “(ii) improvements in drilling equip-
11 ment;

12 “(iii) *improvements in design method-*
13 *ology and energy analysis procedures; and*

14 “(iv) *improved methods for determina-*
15 *tion of ground thermal properties and*
16 *ground temperatures;*

17 “(D) installing geothermal ground loops
18 near the foundation walls of new construction
19 to take advantage of existing structures;

20 “(E) using gray or black wastewater as a
21 method of heat exchange;

22 “(F) improving geothermal heat pump sys-
23 tem economics through integration of geo-
24 thermal systems with other building systems,
25 including providing hot and cold water and re-

1 jecting or circulating industrial process heat
2 through refrigeration heat rejection and waste
3 heat recovery;

4 “(G) advanced geothermal systems using
5 variable pumping rates to increase efficiency;

6 “(H) geothermal heat pump efficiency im-
7 provements;

8 “(I) use of hot water found in mines and
9 mine shafts and other surface waters as the
10 heat exchange medium;

11 “(J) heating of districts, neighborhoods,
12 communities, large commercial or public build-
13 ings (including office, retail, educational, gov-
14 ernment, and institutional buildings and multi-
15 family residential buildings and campuses), and
16 industrial and manufacturing facilities;

17 “(K) geothermal system integration with
18 solar thermal water heating or cool roofs and
19 solar-regenerated desiccants to balance loads
20 and use building hot water to store geothermal
21 energy;

22 “(L) use of hot water coproduced from oil
23 and gas recovery;

1 “(M) use of water sources at a tempera-
2 ture of less than 150 degrees Celsius for direct
3 use;

4 “(N) system integration of direct use with
5 geothermal electricity production; and

6 “(O) coproduction of heat and power, in-
7 cluding on-site use.

8 “(3) ENVIRONMENTAL IMPACTS.—In carrying
9 out the program, the Secretary shall identify and
10 mitigate potential environmental impacts in accord-
11 ance with section 614(e).

12 “(e) GRANTS.—

13 “(1) IN GENERAL.—The Secretary shall make
14 grants available to State and local governments, in-
15 stitutions of higher education, nonprofit entities,
16 utilities, and for-profit companies (including manu-
17 facturers of heat-pump and direct-use components
18 and systems) to promote the development of geo-
19 thermal heat pumps and the direct use of geo-
20 thermal energy.

21 “(2) PRIORITY.—In making grants under this
22 subsection, the Secretary shall give priority to pro-
23 posals that apply to large buildings (including office,
24 retail, educational, government, institutional, and
25 multifamily residential buildings and campuses and

1 industrial and manufacturing facilities), commercial
2 districts, and residential communities.

3 “(3) NATIONAL SOLICITATION.—Not later than
4 180 days after the date of enactment of this section,
5 the Secretary shall conduct a national solicitation for
6 applications for grants under this section.

7 “(f) REPORTS.—

8 “(1) IN GENERAL.—Not later than 2 years
9 after the date of enactment of this section and annu-
10 ally thereafter, the Secretary shall submit to the
11 Committee on Energy and Natural Resources of the
12 Senate and the Committee on Science and Tech-
13 nology of the House of Representatives a report on
14 progress made and results obtained under this sec-
15 tion to develop geothermal heat pumps and direct
16 use of geothermal energy.

17 “(2) AREAS.—Each of the reports required
18 under this subsection shall include—

19 “(A) an analysis of progress made in each
20 of the areas described in subsection (d)(2); and

21 “(B)(i) a description of any relevant rec-
22 ommendations made during a review of the pro-
23 gram; and

24 “(ii) any plans to address the rec-
25 ommendations under clause (i).

1 “(g) AUTHORIZATION OF APPROPRIATIONS.—There
 2 are authorized to be appropriated to the Secretary to carry
 3 out this section such sums as are necessary for each of
 4 fiscal years 2012 through 2016.”.

5 **SEC. 4. FACILITATION OF COPRODUCTION OF GEO-**
 6 **THERMAL ENERGY ON OIL AND GAS LEASES.**

7 Section 4(b) of the Geothermal Steam Act of 1970
 8 (30 U.S.C. 1003(b)) is amended by adding at the end the
 9 following:

10 “(4) LAND SUBJECT TO OIL AND GAS LEASE.—

11 Land under an oil and gas lease issued pursuant to
 12 the Mineral Leasing Act (30 U.S.C. 181 et seq.) or
 13 the Mineral Leasing Act for Acquired Lands (30
 14 U.S.C. 351 et seq.) that is subject to an approved
 15 application for permit to drill and from which oil
 16 and gas production is occurring may be available for
 17 leasing under subsection (c) by the holder of the oil
 18 and gas lease—

19 “(A) on a determination that—

20 “(i) geothermal energy will be pro-
 21 duced from a well producing or capable of
 22 producing oil and gas; and

23 “(ii) the public interest will be served
 24 by the issuance of such a lease; and

1 “(B) in order to provide for the coproduc-
2 tion of geothermal energy with oil and gas.”.

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