

112TH CONGRESS
1ST SESSION

S. 1142

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, and Mr. REID) introduced the following bill; which was read twice and referred to the Committee on Energy and Natural Resources

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,*

1 **SECTION 1. SHORT TITLE.**

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

4 **SEC. 2. GEOTHERMAL EXPLORATORY DRILLING LOAN PRO-**
5 **GRAM.**

6 (a) DEFINITIONS.—In this section:

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

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

13 (3) SECRETARY.—The term “Secretary” means
14 the Secretary of Energy.

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

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

23 (d) PROJECT CRITERIA.—

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

1 (A) the potential for unproven geothermal
2 resources that would be explored and developed
3 under a project;

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

6 (C) the importance of the project in meet-
7 ing the goals of the Department of Energy.

8 (2) PREFERENCE.—In selecting applicants for
9 loans under this section to carry out projects under
10 the program, the Secretary shall provide a pref-
11 erence for previously unexplored, underexplored, or
12 unproven geothermal resources in a variety of geo-
13 logic and geographic settings.

14 (e) DATA SHARING.—Data from all exploratory wells
15 that are carried out under the program shall be provided
16 to the Secretary and the Secretary of the Interior for use
17 in mapping national geothermal resources and other uses,
18 including—

19 (1) subsurface geologic data;

20 (2) metadata;

21 (3) borehole temperature data; and

22 (4) inclusion in the National Geothermal Data
23 System of the Department of Energy.

24 (f) ADMINISTRATION.—

25 (1) COST SHARE.—

1 (A) IN GENERAL.—The Secretary shall de-
2 termine the cost share for a loan made under
3 this section.

4 (B) HIGHER RISKS.—The Secretary may
5 base the cost share percentage for loans made
6 under this section on a sliding scale, with high-
7 er Federal shares awarded to projects with
8 higher risks.

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

13 (3) UNPRODUCTIVE PROJECTS.—The Secretary
14 may grant further delays or dispense with the repay-
15 ment obligation on a demonstration that a selected
16 geothermal project is unproductive.

17 (g) LOAN REPAYMENT.—

18 (1) COMMENCEMENT.—The recipient of a loan
19 made under this section for a geothermal facility
20 shall commence repayment of the loan beginning on
21 the earlier of—

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

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

1 (2) TERM.—

2 (A) IN GENERAL.—Except as provided in
3 subparagraph (B), the term of a loan made
4 under this section shall be 4 years beginning on
5 the applicable loan repayment commencement
6 date under paragraph (1).

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

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

13 (h) GEOTHERMAL INVESTMENT FUND.—

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

20 (2) TRANSFERS TO FUND.—The Fund shall
21 consist of such amounts as are appropriated to the
22 Fund under subsection (j).

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

1 (4) ANNUAL REPORTS.—

2 (A) IN GENERAL.—Not later than 60 days
3 after the end of each fiscal year beginning with
4 fiscal year 2012, the Secretary of Energy shall
5 submit to the the Committee on Energy and
6 Natural Resources of the Senate and the Com-
7 mittee on Energy and Commerce of the House
8 of Representatives a report on the operation of
9 the Fund during the fiscal year.

10 (B) CONTENTS.—Each report shall in-
11 clude, for the fiscal year covered by the report,
12 the following:

13 (i) A statement of the amounts depos-
14 ited into the Fund.

15 (ii) A description of the expenditures
16 made from the Fund for the fiscal year, in-
17 cluding the purpose of the expenditures.

18 (iii) Recommendations for additional
19 authorities to fulfill the purpose of the
20 Fund.

21 (iv) A statement of the balance re-
22 maining in the Fund at the end of the fis-
23 cal year.

1 (i) GUIDELINES.—Not later than 180 days after the
2 date of enactment of this Act, the Secretary shall develop
3 guidelines for the implementation of the program.

4 (j) AUTHORIZATION OF APPROPRIATIONS.—There
5 are authorized to be appropriated to carry out this section
6 such sums as are necessary for each of fiscal years 2012
7 through 2021.

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

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

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

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

14 “(1) the Geothermal Technologies Program of
15 the Office of Energy Efficiency and Renewable En-
16 ergy of the Department has included a focus on di-
17 rect use of geothermal energy in the low-temperature
18 geothermal energy subprogram (including in the de-
19 velopment of a research and development plan for
20 the program);

21 “(2) the Building Technologies Program of the
22 Office of Energy Efficiency and Renewable Energy
23 of the Department—

24 “(A) is focused on the energy demand and
25 energy efficiency of buildings; and

1 “(B) includes geothermal heat pumps as a
2 component technology in the residential and
3 commercial deployment activities of the pro-
4 gram; and

5 “(3) geothermal heat pumps and direct use of
6 geothermal energy, especially in large-scale applica-
7 tions, can make a significant contribution to the use
8 of renewable energy but are underrepresented in re-
9 search, development, demonstration, and commer-
10 cialization.

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

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

15 “(2) to increase the energy efficiency, lower the
16 cost, increase the use, and improve and demonstrate
17 the applicability of geothermal heat pumps to, and
18 the direct use of geothermal energy in, large build-
19 ings, commercial districts, residential communities,
20 and large municipal, agricultural, or industrial
21 projects.

22 “(c) DEFINITIONS.—In this section:

23 “(1) DIRECT USE OF GEOTHERMAL ENERGY.—
24 The term ‘direct use of geothermal energy’ means
25 systems that use water that is at a temperature be-

1 tween approximately 38 degrees Celsius and 149 de-
2 grees Celsius directly or through a heat exchanger to
3 provide—

4 “(A) heating to buildings; or

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

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

11 “(A) a closed loop system, which transfers
12 heat via buried or immersed pipes that contain
13 a mix of water and antifreeze; or

14 “(B) an open loop system, which circulates
15 ground or surface water directly into the build-
16 ing and returns the water to the same aquifer
17 or surface water source.

18 “(3) LARGE-SCALE APPLICATION.—The term
19 ‘large-scale application’ means an application for
20 space or process heating or cooling for large entities,
21 such as a large building, commercial district, resi-
22 dential community, or a large municipal, agricul-
23 tural, or industrial project.

24 “(4) SECRETARY.—The term ‘Secretary’ means
25 Secretary of Energy, acting through the Assistant

1 Secretary for Energy Efficiency and Renewable En-
2 ergy.

3 “(d) PROGRAM.—

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

8 “(2) AREAS.—The program may include re-
9 search, development, demonstration, and commercial
10 application of—

11 “(A) geothermal ground loop efficiency im-
12 provements through more efficient heat transfer
13 fluids;

14 “(B) geothermal ground loop efficiency im-
15 provements through more efficient thermal
16 grouts for wells and trenches;

17 “(C) geothermal ground loop installation
18 cost reduction through—

19 “(i) improved drilling methods; and

20 “(ii) improvements in drilling equip-
21 ment;

22 “(D) installing geothermal ground loops
23 near the foundation walls of new construction
24 to take advantage of existing structures;

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

3 “(F) improving geothermal heat pump sys-
4 tem economics through integration of geo-
5 thermal systems with other building systems,
6 including providing hot and cold water and re-
7 jecting or circulating industrial process heat
8 through refrigeration heat rejection and waste
9 heat recovery;

10 “(G) advanced geothermal systems using
11 variable pumping rates to increase efficiency;

12 “(H) geothermal heat pump efficiency im-
13 provements;

14 “(I) use of hot water found in mines and
15 mine shafts and other surface waters as the
16 heat exchange medium;

17 “(J) heating of districts, neighborhoods,
18 communities, large commercial or public build-
19 ings (including office, retail, educational, gov-
20 ernment, and institutional buildings and multi-
21 family residential buildings and campuses), and
22 industrial and manufacturing facilities;

23 “(K) geothermal system integration with
24 solar thermal water heating or cool roofs and
25 solar-regenerated desiccants to balance loads

1 and use building hot water to store geothermal
2 energy;

3 “(L) use of hot water coproduced from oil
4 and gas recovery;

5 “(M) use of water sources at a tempera-
6 ture of less than 150 degrees Celsius for direct
7 use;

8 “(N) system integration of direct use with
9 geothermal electricity production; and

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

12 “(3) ENVIRONMENTAL IMPACTS.—In carrying
13 out the program, the Secretary shall identify and
14 mitigate potential environmental impacts in accord-
15 ance with section 614(c).

16 “(e) GRANTS.—

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

1 “(2) PRIORITY.—In making grants under this
2 subsection, the Secretary shall give priority to pro-
3 posals that apply to large buildings (including office,
4 retail, educational, government, institutional, and
5 multifamily residential buildings and campuses and
6 industrial and manufacturing facilities), commercial
7 districts, and residential communities.

8 “(3) NATIONAL SOLICITATION.—Not later than
9 180 days after the date of enactment of this section,
10 the Secretary shall conduct a national solicitation for
11 applications for grants under this section.

12 “(f) REPORTS.—

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

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

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

1 “(B)(i) a description of any relevant rec-
2 ommendations made during a review of the pro-
3 gram; and

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

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

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

12 Section 4(b) of the Geothermal Steam Act of 1970
13 (30 U.S.C. 1003(b)) is amended by adding at the end the
14 following:

15 “(4) LAND SUBJECT TO OIL AND GAS LEASE.—
16 Land under an oil and gas lease issued pursuant to
17 the Mineral Leasing Act (30 U.S.C. 181 et seq.) or
18 the Mineral Leasing Act for Acquired Lands (30
19 U.S.C. 351 et seq.) that is subject to an approved
20 application for permit to drill and from which oil
21 and gas production is occurring may be available for
22 leasing under subsection (c) by the holder of the oil
23 and gas lease—

24 “(A) on a determination that—

1 “(i) geothermal energy will be pro-
2 duced from a well producing or capable of
3 producing oil and gas; and

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

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

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