

114TH CONGRESS  
1ST SESSION

# S. 1155

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.

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IN THE SENATE OF THE UNITED STATES

APRIL 30, 2015

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

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## 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 2015”.

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 projects likely to lead to successful new  
12 geothermal development leading to electricity pro-  
13 duction.

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—

22 (A) such amounts as are appropriated to  
23 the Fund under subsection (j); and

24 (B) amounts repaid on loans under sub-  
25 section (g)(3).

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

4           (4) ANNUAL REPORTS.—

5           (A) IN GENERAL.—Not later than 60 days  
6 after the end of each fiscal year beginning with  
7 fiscal year 2016, the Secretary of Energy shall  
8 submit to the the Committee on Energy and  
9 Natural Resources of the Senate and the Com-  
10 mittee on Energy and Commerce of the House  
11 of Representatives a report on the operation of  
12 the Fund during the fiscal year.

13           (B) CONTENTS.—Each report shall in-  
14 clude, for the fiscal year covered by the report,  
15 the following:

16           (i) A statement of the amounts depos-  
17 ited into the Fund.

18           (ii) A description of the expenditures  
19 made from the Fund for the fiscal year, in-  
20 cluding the purpose of the expenditures.

21           (iii) Recommendations for additional  
22 authorities to fulfill the purpose of the  
23 Fund.

1                   (iv) A statement of the balance re-  
2                   maining in the Fund at the end of the fis-  
3                   cal year.

4           (i) GUIDELINES.—

5                   (1) IN GENERAL.—Not later than 180 days  
6                   after the date of enactment of this Act, the Sec-  
7                   retary shall issue guidelines for the implementation  
8                   of the program.

9                   (2) ADMINISTRATION.—The guidelines shall—

10                   (A) specify—

11                           (i) the terms and conditions that  
12                           would require a higher or lower level of  
13                           cost sharing under this section;

14                           (ii) the conditions under which the  
15                           Secretary will allow loan modifications or  
16                           forgiveness in cases in which a well cannot  
17                           be used for production or injection; and

18                           (iii) the information necessary to pro-  
19                           vide a loan applicant with certainty about  
20                           application of subsection (f), including the  
21                           level of cost and risk that the applicant  
22                           and the Secretary will assume; and

23                   (B) require that—

24                           (i) loans be provided under this sec-  
25                           tion only after the developer has committed

1 the share of the developer for expenditures  
2 for drilling costs; and

3 (ii) loans for successful wells shall be  
4 repaid by the developer within a 10-year  
5 period.

6 (j) AUTHORIZATION OF APPROPRIATIONS.—There  
7 are authorized to be appropriated to carry out this section  
8 such sums as are necessary for each of fiscal years 2016  
9 through 2025.

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

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

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

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

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

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



1           “(A) is focused on the energy demand and  
2           energy efficiency of buildings; and

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

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

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

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

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

24          “(c) DEFINITIONS.—In this section:

1           “(1) DIRECT USE OF GEOTHERMAL ENERGY.—

2           The term ‘direct use of geothermal energy’ means  
3           systems that use water that is at a temperature be-  
4           tween approximately 38 degrees Celsius and 149 de-  
5           grees Celsius directly or through a heat exchanger to  
6           provide—

7                       “(A) heating to buildings; or

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

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

14                       “(A) a closed loop system, which transfers  
15                       heat by way of buried or immersed pipes that  
16                       contain a mix of water and antifreeze; or

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

21           “(3) LARGE-SCALE APPLICATION.—The term  
22           ‘large-scale application’ means an application for  
23           space or process heating or cooling for large entities  
24           with a name-plate capacity, expected resource, or  
25           rating of 10 or more megawatts, such as a large

1 building, commercial district, residential community,  
2 or a large municipal, agricultural, or industrial  
3 project.

4 “(4) SECRETARY.—The term ‘Secretary’ means  
5 Secretary of Energy, acting through the Assistant  
6 Secretary for Energy Efficiency and Renewable En-  
7 ergy.

8 “(d) PROGRAM.—

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

13 “(2) AREAS.—The program may include re-  
14 search, development, demonstration, and commercial  
15 application of—

16 “(A) geothermal ground loop efficiency im-  
17 provements through more efficient heat transfer  
18 fluids;

19 “(B) geothermal ground loop efficiency im-  
20 provements through more efficient thermal  
21 grouts for wells and trenches;

22 “(C) geothermal ground loop installation  
23 cost reduction through—

24 “(i) improved drilling methods;

1                   “(ii) improvements in drilling equip-  
2                   ment;

3                   “(iii) improvements in design method-  
4                   ology and energy analysis procedures; and

5                   “(iv) improved methods for deter-  
6                   mination of ground thermal properties and  
7                   ground temperatures;

8                   “(D) installing geothermal ground loops  
9                   near the foundation walls of new construction  
10                  to take advantage of existing structures;

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

13                  “(F) improving geothermal heat pump sys-  
14                  tem economics through integration of geo-  
15                  thermal systems with other building systems,  
16                  including providing hot and cold water and re-  
17                  jecting or circulating industrial process heat  
18                  through refrigeration heat rejection and waste  
19                  heat recovery;

20                  “(G) advanced geothermal systems using  
21                  variable pumping rates to increase efficiency;

22                  “(H) geothermal heat pump efficiency im-  
23                  provements;

1           “(I) use of hot water found in mines and  
2 mine shafts and other surface waters as the  
3 heat exchange medium;

4           “(J) heating of districts, neighborhoods,  
5 communities, large commercial or public build-  
6 ings (including office, retail, educational, gov-  
7 ernment, and institutional buildings and multi-  
8 family residential buildings and campuses), and  
9 industrial and manufacturing facilities;

10           “(K) geothermal system integration with  
11 solar thermal water heating or cool roofs and  
12 solar-regenerated desiccants to balance loads  
13 and use building hot water to store geothermal  
14 energy;

15           “(L) use of hot water coproduced from oil  
16 and gas recovery;

17           “(M) use of water sources at a tempera-  
18 ture of less than 150 degrees Celsius for direct  
19 use;

20           “(N) system integration of direct use with  
21 geothermal electricity production; and

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

24           “(3) ENVIRONMENTAL IMPACTS.—In carrying  
25 out the program, the Secretary shall identify and

1 mitigate potential environmental impacts in accord-  
2 ance with section 614(e).

3 “(e) GRANTS.—

4 “(1) IN GENERAL.—The Secretary shall make  
5 grants available to State and local governments, in-  
6 stitutions of higher education, nonprofit entities,  
7 utilities, and for-profit companies (including manu-  
8 facturers of heat-pump and direct-use components  
9 and systems) to promote the development of geo-  
10 thermal heat pumps and the direct use of geo-  
11 thermal energy.

12 “(2) PRIORITY.—In making grants under this  
13 subsection, the Secretary shall give priority to pro-  
14 posals that apply to large buildings (including office,  
15 retail, educational, government, institutional, and  
16 multifamily residential buildings and campuses and  
17 industrial and manufacturing facilities), commercial  
18 districts, and residential communities.

19 “(3) NATIONAL SOLICITATION.—Not later than  
20 180 days after the date of enactment of this section,  
21 the Secretary shall conduct a national solicitation for  
22 applications for grants under this section.

23 “(f) REPORTS.—

24 “(1) IN GENERAL.—Not later than 2 years  
25 after the date of enactment of this section and annu-

1 ally thereafter, the Secretary shall submit to the  
 2 Committee on Energy and Natural Resources of the  
 3 Senate and the Committee on Science and Tech-  
 4 nology of the House of Representatives a report on  
 5 progress made and results obtained under this sec-  
 6 tion to develop geothermal heat pumps and direct  
 7 use of geothermal energy.

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

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

12 “(B)(i) a description of any relevant rec-  
 13 ommendations made during a review of the pro-  
 14 gram; and

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

17 “(g) AUTHORIZATION OF APPROPRIATIONS.—There  
 18 are authorized to be appropriated to the Secretary to carry  
 19 out this section such sums as are necessary for each of  
 20 fiscal years 2016 through 2020.”.

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

23 Section 4(b) of the Geothermal Steam Act of 1970  
 24 (30 U.S.C. 1003(b)) is amended by adding at the end the  
 25 following:

1           “(4) LAND SUBJECT TO OIL AND GAS LEASE.—  
2           Land under an oil and gas lease issued pursuant to  
3           the Mineral Leasing Act (30 U.S.C. 181 et seq.) or  
4           the Mineral Leasing Act for Acquired Lands (30  
5           U.S.C. 351 et seq.) that is subject to an approved  
6           application for permit to drill and from which oil  
7           and gas production is occurring may be available for  
8           leasing under subsection (c) by the holder of the oil  
9           and gas lease—

10                   “(A) on a determination that—

11                           “(i) geothermal energy will be pro-  
12                           duced from a well producing or capable of  
13                           producing oil and gas; and

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

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

○