

116TH CONGRESS
1ST SESSION

S. 1901

To promote geothermal energy, and for other purposes.

IN THE SENATE OF THE UNITED STATES

JUNE 19, 2019

Ms. CORTEZ MASTO (for herself and Mr. WYDEN) introduced the following bill; which was read twice and referred to the Committee on Energy and Natural Resources

A BILL

To promote geothermal energy, 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 Energy
5 Opportunities Act” or the “GEO Act”.

6 **SEC. 2. NATIONAL GOALS FOR PRODUCTION AND SITE**
7 **IDENTIFICATION.**

8 It is the sense of Congress that, not later than 10
9 years after the date of enactment of this Act—

10 (1) the Secretary of the Interior should seek to
11 have approved more than 15,000 megawatts of new

1 geothermal energy capacity on public land across a
2 geographically diverse set of States using the full
3 range of available technologies; and

4 (2) the Director of the United States Geological
5 Survey and the Secretary of Energy should identify
6 sites capable of producing a total of 50,000
7 megawatts of geothermal power, using the full range
8 of available technologies.

9 **SEC. 3. PRIORITY AREAS FOR DEVELOPMENT ON FEDERAL**
10 **LAND.**

11 The Director of the Bureau of Land Management,
12 in consultation with other appropriate Federal officials,
13 shall—

14 (1) identify high-priority areas for new geo-
15 thermal development; and

16 (2) take any actions the Director determines
17 necessary to facilitate that development, consistent
18 with applicable laws.

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

21 Section 4(b) of the Geothermal Steam Act of 1970
22 (30 U.S.C. 1003(b)) is amended by adding at the end the
23 following:

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

25 Land under an oil and gas lease issued pursuant to

1 the Mineral Leasing Act (30 U.S.C. 181 et seq.) or
 2 the Mineral Leasing Act for Acquired Lands (30
 3 U.S.C. 351 et seq.) that is subject to an approved
 4 application for permit to drill and from which oil
 5 and gas production is occurring may be available for
 6 noncompetitive leasing under this section to the
 7 holder of the oil and gas lease—

8 “(A) on a determination that—

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

12 “(ii) national energy security will be
 13 improved by the issuance of such a lease;
 14 and

15 “(B) to provide for the coproduction of
 16 geothermal energy with oil and gas.”.

17 **SEC. 5. COST-SHARED EXPLORATION.**

18 (a) IN GENERAL.—To promote the goals described
 19 in section 2, the Secretary of Energy may conduct a feder-
 20 ally funded program of cost-shared drilling with industry
 21 partners—

22 (1) to explore and document new geothermal re-
 23 sources in the United States; and

24 (2) to develop improved tools and methods for
 25 geothermal resource identification and extraction,

1 with the goal of achieving material reductions in the
2 cost of exploration with a corresponding increase in
3 the likelihood of drilling success.

4 (b) GRANTS.—

5 (1) IN GENERAL.—To carry out the program
6 described in subsection (a), the Secretary of Energy
7 may award cost-share grants on a competitive and
8 merit basis to eligible applicants to support explo-
9 ration drilling and related activities.

10 (2) PROJECT CRITERIA.—In selecting appli-
11 cants to receive grants under paragraph (1), the
12 Secretary of Energy shall—

13 (A) give preference to applicants proposing
14 projects located in a variety of geologic and geo-
15 graphic settings with previously unexplored,
16 underexplored, or unproven geothermal re-
17 sources; and

18 (B) consider—

19 (i) the potential that the unproven
20 geothermal resources would be explored
21 and developed under the proposed project;

22 (ii) the expertise and experience of an
23 applicant in developing geothermal re-
24 sources; and

1 (iii) the contribution the proposed
2 project would make toward meeting the
3 goals described in section 2.

4 (c) DATA SHARING.—

5 (1) IN GENERAL.—Data from all exploratory
6 wells that are carried out under the program de-
7 scribed in subsection (a) shall be provided to the
8 Secretary of Energy and the Secretary of the Inte-
9 rior for—

10 (A) use in mapping national geothermal
11 resources; and

12 (B) other purposes, including—

13 (i) subsurface geologic data;

14 (ii) metadata;

15 (iii) borehole temperature data; and

16 (iv) inclusion in the National Geo-
17 thermal Data System of the Department of
18 Energy.

19 (2) SHARING OF CONFIDENTIAL DATA.—Not
20 later than 2 years after the date of enactment of
21 this Act, confidential data from all exploratory wells
22 that are carried out under the program described in
23 subsection (a) shall be provided to the Secretary of
24 Energy and the Secretary of the Interior for the
25 purposes described in subparagraphs (A) and (B) of

1 paragraph (1), to be available for a period of time
2 to be determined by the Secretary of Energy and the
3 Secretary of the Interior.

4 **SEC. 6. USE OF GEOTHERMAL LEASE REVENUES.**

5 (a) AMOUNTS DEPOSITED.—Notwithstanding any
6 other provision of law, beginning in the first full fiscal year
7 after the date of enactment of this Act, any amounts re-
8 ceived by the United States as rentals, royalties, and other
9 payments required under leases pursuant to the Geo-
10 thermal Steam Act of 1970 (30 U.S.C. 1001 et seq.) (ex-
11 cluding funds required to be paid to State and county gov-
12 ernments) and from new geothermal leases issued after
13 the date of enactment of this Act shall be deposited into
14 a separate account in the Treasury.

15 (b) USE OF DEPOSITS.—Amounts deposited under
16 subsection (a) shall be available to the Secretary of Energy
17 for expenditure, without further appropriation or fiscal
18 year limitation, to carry out section 5.

19 (c) TRANSFER OF FUNDS.—To promote the goals de-
20 scribed in section 2, the Secretary of Energy may author-
21 ize the expenditure or transfer of any funds that are nec-
22 essary to other cooperating Federal agencies.

1 **SEC. 7. NONCOMPETITIVE LEASING OF ADJOINING AREAS**
 2 **FOR DEVELOPMENT OF GEOTHERMAL RE-**
 3 **SOURCES.**

4 Section 4(b) of the Geothermal Steam Act of 1970
 5 (30 U.S.C. 1003(b)) (as amended by section 4) is amend-
 6 ed by adding at the end the following:

7 “(5) ADJOINING LAND.—

8 “(A) DEFINITIONS.—In this paragraph:

9 “(i) FAIR MARKET VALUE PER
 10 ACRE.—The term ‘fair market value per
 11 acre’ means a dollar amount per acre
 12 that—

13 “(I) except as provided in this
 14 clause, shall be equal to the market
 15 value per acre (taking into account
 16 the determination under subparagraph
 17 (B)(iii) regarding a valid discovery on
 18 the adjoining land), as determined by
 19 the Secretary under regulations issued
 20 under this paragraph;

21 “(II) shall be determined by the
 22 Secretary with respect to a lease
 23 under this paragraph, by not later
 24 than the end of the 180-day period
 25 beginning on the date the Secretary

1 receives an application for the lease;
 2 and

3 “(III) shall be not less than the
 4 greater of—

5 “(aa) 4 times the median
 6 amount paid per acre for all land
 7 leased under this Act during the
 8 preceding year; or

9 “(bb) \$50.

10 “(ii) INDUSTRY STANDARDS.—The
 11 term ‘industry standards’ means the stand-
 12 ards by which a qualified geothermal pro-
 13 fessional assesses whether downhole or
 14 flowing temperature measurements with
 15 indications of permeability are sufficient to
 16 produce energy from geothermal resources,
 17 as determined through flow or injection
 18 testing or measurement of lost circulation
 19 while drilling.

20 “(iii) QUALIFIED FEDERAL LAND.—
 21 The term ‘qualified Federal land’ means
 22 land that is otherwise available for leasing
 23 under this Act.

24 “(iv) QUALIFIED GEOTHERMAL PRO-
 25 FESSIONAL.—The term ‘qualified geo-

1 thermal professional’ means an individual
2 who is an engineer or geoscientist in good
3 professional standing with at least 5 years
4 of experience in geothermal exploration,
5 development, or project assessment.

6 “(v) QUALIFIED LESSEE.—The term
7 ‘qualified lessee’ means a person that is el-
8 igible to hold a geothermal lease under this
9 Act (including applicable regulations).

10 “(vi) VALID DISCOVERY.—The term
11 ‘valid discovery’ means a discovery of a
12 geothermal resource by a new or existing
13 slim hole or production well, that exhibits
14 downhole or flowing temperature measure-
15 ments with indications of permeability that
16 are sufficient to meet industry standards.

17 “(B) AUTHORITY.—An area of qualified
18 Federal land that adjoins other land for which
19 a qualified lessee holds a legal right to develop
20 geothermal resources may be available for a
21 noncompetitive lease under this section to the
22 qualified lessee at the fair market value per
23 acre, if—

24 “(i) the area of qualified Federal
25 land—

1 “(I) consists of not less than 1
2 acre and not more than 640 acres;
3 and

4 “(II) is not already leased under
5 this Act or nominated to be leased
6 under subsection (a);

7 “(ii) the qualified lessee has not pre-
8 viously received a noncompetitive lease
9 under this paragraph in connection with
10 the valid discovery for which data has been
11 submitted under clause (iii)(I); and

12 “(iii) sufficient geological and other
13 technical data prepared by a qualified geo-
14 thermal professional has been submitted by
15 the qualified lessee to the applicable Fed-
16 eral land management agency that would
17 lead individuals who are experienced in the
18 subject matter to believe that—

19 “(I) there is a valid discovery of
20 geothermal resources on the land for
21 which the qualified lessee holds the
22 legal right to develop geothermal re-
23 sources; and

24 “(II) that thermal feature ex-
25 tends into the adjoining areas.

1 “(C) DETERMINATION OF FAIR MARKET
2 VALUE.—

3 “(i) IN GENERAL.—The Secretary
4 shall—

5 “(I) publish a notice of any re-
6 quest to lease land under this para-
7 graph;

8 “(II) determine fair market value
9 for purposes of this paragraph in ac-
10 cordance with procedures for making
11 those determinations that are estab-
12 lished by regulations issued by the
13 Secretary;

14 “(III) provide to a qualified les-
15 see and publish, with an opportunity
16 for public comment for a period of 30
17 days, any proposed determination
18 under this subparagraph of the fair
19 market value of an area that the
20 qualified lessee seeks to lease under
21 this paragraph; and

22 “(IV) provide to the qualified les-
23 see and any adversely affected party
24 the opportunity to appeal the final de-
25 termination of fair market value in an

1 administrative proceeding before the
2 applicable Federal land management
3 agency, in accordance with applicable
4 law (including regulations).

5 “(ii) LIMITATION ON NOMINATION.—
6 After publication of a notice of request to
7 lease land under this paragraph, the Sec-
8 retary may not accept under subsection (a)
9 any nomination of the land for leasing un-
10 less the request has been denied or with-
11 drawn.

12 “(iii) ANNUAL RENTAL.—For pur-
13 poses of section 5(a)(3), a lease awarded
14 under this paragraph shall be considered a
15 lease awarded in a competitive lease sale.

16 “(D) REGULATIONS.—Not later than 270
17 days after the date of enactment of the Geo-
18 thermal Energy Opportunities Act, the Sec-
19 retary shall issue regulations to carry out this
20 paragraph.”.

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

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

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

2 “(a) FINDINGS.—Congress finds that—

3 “(1) the Geothermal Technologies Program of
4 the Office of Energy Efficiency and Renewable En-
5 ergy of the Department has included a focus on di-
6 rect use of geothermal energy in the low-temperature
7 geothermal energy subprogram (including in the de-
8 velopment of a research and development plan for
9 the program);

10 “(2) the Building Technologies Program of the
11 Office of Energy Efficiency and Renewable Energy
12 of the Department—

13 “(A) is focused on the energy demand and
14 energy efficiency of buildings; and

15 “(B) includes geothermal heat pumps as a
16 component technology in the residential and
17 commercial deployment activities of the pro-
18 gram; and

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

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

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

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

11 “(c) DEFINITIONS.—In this section:

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

18 “(A) heating to buildings; or

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

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

1 “(A) a closed loop system, which transfers
2 heat by way of buried or immersed pipes that
3 contain a mix of water and working fluid; or

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

8 “(3) LARGE-SCALE APPLICATION.—The term
9 ‘large-scale application’ means an application for
10 space or process heating or cooling for large entities
11 with a name-plate capacity, expected resource, or
12 rating of 10 or more megawatts, such as a large
13 building, commercial district, residential community,
14 or a large municipal, agricultural, or industrial
15 project.

16 “(4) SECRETARY.—The term ‘Secretary’ means
17 the Secretary of Energy, acting through the Assist-
18 ant Secretary for Energy Efficiency and Renewable
19 Energy.

20 “(d) PROGRAM.—

21 “(1) IN GENERAL.—The Secretary shall estab-
22 lish a program of research, development, and dem-
23 onstration for geothermal heat pumps and the direct
24 use of geothermal energy.

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

4 “(A) geothermal ground loop efficiency im-
5 provements through more efficient heat transfer
6 fluids;

7 “(B) geothermal ground loop efficiency im-
8 provements through more efficient thermal
9 grouts for wells and trenches;

10 “(C) geothermal ground loop installation
11 cost reduction through—

12 “(i) improved drilling methods;

13 “(ii) improvements in drilling equip-
14 ment;

15 “(iii) improvements in design method-
16 ology and energy analysis procedures; and

17 “(iv) improved methods for deter-
18 mination of ground thermal properties and
19 ground temperatures;

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

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

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

8 “(G) advanced geothermal systems using
9 variable pumping rates to increase efficiency;

10 “(H) geothermal heat pump efficiency im-
11 provements;

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

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

21 “(K) geothermal system integration with
22 solar thermal water heating or cool roofs and
23 solar-regenerated desiccants to balance loads
24 and use building hot water to store geothermal
25 energy;

1 “(L) use of hot water coproduced from oil
2 and gas recovery;

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

6 “(N) system integration of direct use with
7 geothermal electricity production; and

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

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

14 “(e) GRANTS.—

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

23 “(2) PRIORITY.—In making grants under this
24 subsection, the Secretary shall give priority to pro-
25 posals that apply to large buildings (including office,

1 retail, educational, government, institutional, and
 2 multifamily residential buildings and campuses and
 3 industrial and manufacturing facilities), commercial
 4 districts, and residential communities.

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

9 “(f) REPORTS.—

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

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

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

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

1 “(ii) any plans to address the rec-
2 ommendations under clause (i).”.

3 **SEC. 9. REPORT TO CONGRESS.**

4 Not later than 3 years after the date of enactment
5 of this Act, and not less frequently than once every 5 years
6 thereafter, the Secretary of the Interior and the Secretary
7 of Energy shall submit to the appropriate committees of
8 Congress a report describing the progress made towards
9 achieving the goals described in section 2.

10 **SEC. 10. AUTHORIZATION OF APPROPRIATIONS.**

11 There are authorized to be appropriated to carry out
12 this Act such sums as are necessary.

○