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(Original Signature of Member)

119TH CONGRESS
2D SESSION

H. R.

To amend the Energy Independence and Security Act of 2007 to direct research, development, demonstration, and commercial application activities in support of next-generation geothermal and closed-loop geothermal systems in various conditions, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

M____ introduced the following bill; which was referred to the
Committee on _____

A BILL

To amend the Energy Independence and Security Act of 2007 to direct research, development, demonstration, and commercial application activities in support of next-generation geothermal and closed-loop geothermal systems in various conditions, 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 “Next-Generation Geo-
5 thermal Research and Development Act”.

1 **SEC. 2. GEOTHERMAL ENERGY.**

2 (a) IN GENERAL.—The Energy Independence and
3 Security Act of 2007 (Public Law 110–140) is amended—

4 (1) in section 612 (42 U.S.C. 17191; relating
5 to definitions)—

6 (A) by redesignating paragraphs (1), (2),
7 (3), (4), (5), (6), (7), and (8) as paragraphs
8 (2), (3), (4), (5), (6), (7), (8), and (10), respec-
9 tively;

10 (B) by inserting before paragraph (2), as
11 so redesignated, the following new paragraph:

12 “(1) CLOSED-LOOP GEOTHERMAL SYSTEMS.—
13 The term ‘closed-loop geothermal systems’ means a
14 wellbore or subsurface circuit of wellbores containing
15 a fluid heated through contact with the borehole
16 wall.”;

17 (C) by inserting after paragraph (8), as so
18 redesignated, the following new paragraph:

19 “(9) NEXT-GENERATION GEOTHERMAL SYS-
20 TEMS.—The term ‘next-generation geothermal sys-
21 tems’ means—

22 “(A) enhanced geothermal systems;

23 “(B) closed-loop geothermal systems;

24 “(C) in supercritical conditions—

25 “(i) enhanced geothermal systems; or

1 “(ii) closed-loop geothermal systems;

2 and

3 “(D) other innovative energy tech-
4 nologies.”; and

5 (D) by adding at the end the following new
6 paragraph:

7 “(11) SUPERCRITICAL GEOTHERMAL.—The
8 term ‘supercritical geothermal’ means energy derived
9 from a subsurface rock resource in-situ existing at
10 or above the supercritical conditions, whether relat-
11 ing to temperature or pressure, of the primary fluid
12 present.”;

13 (2) in section 613(b)(1) (42 U.S.C.
14 17192(b)(1); relating to hydrothermal research and
15 development), by striking “advanced geologic tools to
16 assist” and inserting “advanced tools, including ma-
17 chine learning algorithms, to assist”;

18 (3) in section 614 (42 U.S.C. 17193; relating
19 to general geothermal systems research and develop-
20 ment)—

21 (A) in subsection (d)(1), by striking
22 “among the Office of Fossil Energy, the Office
23 of Energy Efficiency and Renewable Energy,”
24 and inserting “across the Department”; and

25 (B) in subsection (h)—

1 (i) in paragraph (1), by inserting
2 “and publicly available subsurface data, in-
3 cluding data reported as part of fossil fuel
4 and mining operations,” after “geothermal
5 drilling information”; and

6 (ii) in paragraph (2), by adding at the
7 end the following new subparagraphs:

8 “(C) UPDATES.—The repository estab-
9 lished under paragraph (1) shall be periodically
10 updated in order to carry out the following:

11 “(i) Standardize data in a uniform
12 manner to the maximum extent practicable
13 and enable analysis across different
14 projects.

15 “(ii) Enhance the accessibility and
16 usability of data to increase analysis of
17 geothermal energy and next-generation
18 geothermal systems on regional, local, and
19 site-specific scales.

20 “(iii) Increase uses of data, including
21 data viewable by map and organization by
22 common attributes, such as region.

23 “(iv) Make other improvements in
24 functionality and usability, as determined
25 by the Secretary.

1 “(D) MEMORANDUM OF UNDER-
2 STANDING.—

3 “(i) IN GENERAL.—The Secretary
4 shall enter into a memorandum of under-
5 standing with the Secretary of the Interior,
6 and with the heads of other relevant Fed-
7 eral departments, for notifying, sharing,
8 and providing opportunities for additional
9 data collection regarding shared geo-
10 thermal development data from projects
11 funded by the Department of the Interior
12 and each such other relevant department,
13 including data from mining, critical min-
14 erals, and energy projects, such as sub-
15 surface heat data, seismic data, lithology
16 data, boundaries of State and federally
17 protected areas, and existing transmission
18 capacity.

19 “(ii) PRIORITIZATION.—To the max-
20 imum extent practicable, activities con-
21 ducted pursuant to a memorandum of un-
22 derstanding under clause (i) shall prioritize
23 heat, lithology, and strain profiles through
24 deep exploration boreholes and control

1 points for deep heat mapping and geo-
2 thermal development.

3 “(E) REGIONAL DATA PROBES.—The Sec-
4 retary of the Interior may, in consultation with
5 the Secretary, commission the drilling of super-
6 critical geothermal exploration boreholes in rep-
7 resentative geological provinces in the United
8 States to provide control points for deep heat
9 mapping and geothermal development. The re-
10 sulting data shall include an exploration of
11 heat, lithology, and strain profiles, and shall be
12 shared publicly on the repository established
13 under paragraph (1).

14 “(F) STUDY ON SITE SELECTION CHARAC-
15 TERISTICS FOR SUPERCRITICAL GEO-
16 THERMAL.—The Secretary of the Interior shall,
17 in consultation with the Secretary, conduct a
18 study on site selection characteristics in rep-
19 resentative geological provinces in the United
20 States, including the United States territories
21 of American Samoa, Guam, Northern Mariana
22 Islands, Puerto Rico, and the U.S. Virgin Is-
23 lands, for supercritical geothermal.”;

1 (4) in section 615 (42 U.S.C. 17194; relating
2 to enhanced geothermal systems research and devel-
3 opment)—

4 (A) in the section heading, by striking
5 “**ENHANCED**” and inserting “**NEXT-GENERA-**
6 **TION**”;

7 (B) in subsection (a), by striking “en-
8 hanced” and inserting “next-generation”;

9 (C) in subsection (b)—

10 (i) in the heading, by inserting “AND
11 CLOSED-LOOP” after “ENHANCED”;

12 (ii) in the matter preceding paragraph
13 (1), by inserting “and closed-loop” after
14 “enhanced”;

15 (iii) in paragraph (11), by striking
16 “and” after the semicolon;

17 (iv) in paragraph (12), by striking the
18 period and inserting “; and”; and

19 (v) by adding at the end the following
20 new paragraph:

21 “(13) the research topics specified in subpara-
22 graphs (1) through (12) in supercritical condi-
23 tions.”;

24 (D) in subsection (c)—

1 (i) by redesignating paragraph (7) as
2 paragraph (8); and

3 (ii) by inserting after paragraph (6)
4 the following new paragraph:

5 “(7) NEXT-GENERATION GEOTHERMAL TEST-
6 ING.—Not later than one year after the date of the
7 enactment of this paragraph, the Secretary shall
8 take such actions as may be necessary to ensure that
9 at least one FORGE site has the capabilities to in-
10 clude next-generation geothermal testing, including,
11 if practicable and technically feasible, closed-loop
12 geothermal systems in supercritical conditions.”; and

13 (E) by adding at the end the following new
14 subsections:

15 “(e) NEXT-GENERATION GEOTHERMAL RESEARCH
16 AND DEVELOPMENT PROGRAM.—

17 “(1) IN GENERAL.—Within the Geothermal
18 Technologies Office of the Department, the Sec-
19 retary shall support a program of next-generation
20 geothermal research, development, demonstration,
21 and commercial application activities, including, if
22 practicable and technically feasible, closed-loop geo-
23 thermal systems in supercritical conditions.

24 “(2) FOCUS AREAS.—

1 “(A) IN GENERAL.—The program de-
2 scribed in paragraph (1) shall focus on the fol-
3 lowing topics:

4 “(i) Well completion.

5 “(ii) Permeability creation and man-
6 agement, including proppants and packers.

7 “(iii) Materials development and
8 equipment design, including power produc-
9 tion, specific to supercritical geothermal
10 systems.

11 “(iv) Sensor development.

12 “(v) Water-rock geochemistry.

13 “(vi) Rock properties.

14 “(vii) Hard rock and deep drilling.

15 “(viii) Any other topics the Secretary
16 determines necessary.

17 “(B) PRIORITIZATION.—In carrying out
18 next-generation geothermal research under the
19 program described in paragraph (1), the Sec-
20 retary shall prioritize projects best able to
21 produce iterative data for deep drilling projects
22 in unique geodynamic settings on the following
23 topics:

24 “(i) Characterization and crustal
25 stress.

1 “(ii) Lab work.

2 “(iii) Drilling.

3 “(iv) Stimulation.

4 “(v) Power production.

5 “(C) ADMINISTRATION.—The Secretary
6 may administer grants to institutions of higher
7 education and private sector entities to carry
8 out activities on the topics specified in subpara-
9 graph (A) and, to the maximum extent prac-
10 ticable, share data, results, and information
11 publicly.

12 “(3) REPORT ON WATER USE.—Not later than
13 five years after the date of the enactment of this
14 subsection, the Secretary shall submit to the Com-
15 mittee on Natural Resources and the Committee on
16 Science, Space, and Technology of the House of
17 Representatives and the Committee on Energy and
18 Natural Resources of the Senate a report on the fol-
19 lowing:

20 “(A) Water use and estimated needs of en-
21 hanced geothermal systems.

22 “(B) Water use and estimated needs for
23 closed-loop, and next-generation geothermal en-
24 ergy production.

1 “(C) The ability of next-generation geo-
2 thermal systems to use brackish and nonpotable
3 water.

4 “(D) The withdrawal and consumption of
5 water per megawatt hour of next-generation
6 geothermal systems, as compared to other
7 power-generation technologies.

8 “(E) Technological and operational im-
9 provements that could lead to decreases in
10 water withdrawal and consumption of next-gen-
11 eration geothermal systems.

12 “(4) NEXT-GENERATION GEOTHERMAL CENTER
13 OF EXCELLENCE.—

14 “(A) ESTABLISHMENT.—The Secretary
15 shall award grants through a competitive,
16 merit-reviewed process, to National Labora-
17 tories (as such term is defined in section 2 of
18 the Energy Policy Act of 2005 (42 U.S.C.
19 15801)), multi-institutional collaborations, pub-
20 lic-private partnerships, or institutes of higher
21 education (or consortia thereof) for the fol-
22 lowing:

23 “(i) The continuation and expansion
24 of research, development, demonstration,
25 testing, and commercial application activi-

1 ties applicable to FORGE sites, including
2 activities in supercritical conditions.

3 “(ii) The establishment of a next-gen-
4 eration geothermal systems center of excel-
5 lence.

6 “(B) LOCATION.—In selecting National
7 Laboratories, multi-institutional collaborations,
8 public-private partnerships, or institutions of
9 higher education (or a consortia thereof) for a
10 center of excellence referred to in subparagraph
11 (A), the Secretary shall consider the following
12 criteria:

13 “(i) Whether the entity hosts an exist-
14 ing geothermal energy research and devel-
15 opment program.

16 “(ii) Whether the entity has proven
17 technical expertise to support geothermal
18 energy research.

19 “(iii) Whether the entity has access to
20 geothermal resources.

21 “(C) PURPOSE.—The center of excellence
22 referred to in subparagraph (A) shall coordinate
23 among existing FORGE sites, the Department,
24 and National Laboratories to carry out the fol-
25 lowing:

1 “(i) Advance research, development,
2 demonstration, and commercial application
3 of next-generation geothermal energy tech-
4 nologies, including supercritical geothermal
5 technologies, in response to industry and
6 commercial needs, including by partnering
7 with other academic or research institu-
8 tions, industry, non-governmental organi-
9 zations, and State, local, or Tribal govern-
10 ments.

11 “(ii) Foster collaboration for edu-
12 cation, research, and partnership initiatives
13 in order to support the technology, deploy-
14 ment, and workforce needs of the United
15 States geothermal energy industry, includ-
16 ing a focus on next-generation geothermal
17 systems.

18 “(iii) Support workforce development
19 across the next-generation geothermal sys-
20 tems energy development lifecycle.

21 “(iv) Provide educational, technical,
22 and analytical assistance on next-genera-
23 tion geothermal systems to Federal agen-
24 cies, industry, and State, local, and Tribal
25 governments.

1 “(v) Collect and disseminate informa-
2 tion on best practices in all areas relating
3 to developing and managing geothermal
4 energy resources and energy systems, in-
5 cluding next-generation geothermal sys-
6 tems.

7 “(5) COMMERCIAL-READINESS INNOVATION
8 GRANTS.—

9 “(A) IN GENERAL.—The Secretary shall
10 award grants to accelerate the development,
11 testing, and implementation of innovative tech-
12 nologies identified as areas for improving the
13 performance of commercial geothermal energy
14 projects using next-generation geothermal sys-
15 tems.

16 “(B) FOCUS AREAS.—Grants may be
17 awarded under this paragraph for innovative
18 technologies, including the following:

19 “(i) Hardrock drilling equipment,
20 components, and systems, including bit de-
21 sign and vibration control.

22 “(ii) Reservoir characterization, well
23 design and spacing, and completions.

1 “(iii) Data acquisition and analysis,
2 including fiber optic sensing tools and
3 methodologies.

4 “(C) APPLICATIONS.—

5 “(i) IN GENERAL.—An entity seeking
6 a grant under this paragraph shall submit
7 to the Secretary an application at such
8 time, in such manner, and containing such
9 information as the Secretary may require.

10 “(ii) PRIORITIZATION.—In awarding
11 grants under this paragraph, the Secretary
12 shall give priority to the following:

13 “(I) Applicants, including for-
14 profit entities and public-private part-
15 nerships, with demonstrated expertise
16 relating to in-field development and
17 commercial operations for geothermal
18 energy projects.

19 “(II) Projects with the greatest
20 ability to advance near-term commer-
21 cial deployment of enhanced geo-
22 thermal systems and closed-loop geo-
23 thermal systems.

24 “(III) Projects that advance the
25 commercialization of geothermal en-

1 energy projects in diverse geological con-
2 ditions or supercritical conditions.

3 “(D) COST SHARING.—The Federal share
4 of the cost of a project carried out with a grant
5 under this paragraph shall be not more than 80
6 percent.

7 “(f) AUTHORIZATION OF APPROPRIATIONS.—There
8 is authorized to be appropriated to the Secretary to carry
9 out this section \$150,000,000 for each of fiscal years 2027
10 through 2031. Such amounts shall be derived from
11 amounts otherwise authorized to be appropriated to the
12 Office of Energy Efficiency and Renewable Energy of the
13 Department.”; and

14 (5) in section 617 (42 U.S.C. 17196; relating
15 to organization and administration of programs)—

16 (A) in subsection (e), by striking “Com-
17 mittee on Science and Technology” and insert-
18 ing “Committee on Science, Space, and Tech-
19 nology”; and

20 (B) by amending subsection (f) to read as
21 follows:

22 “(f) PROGRESS REPORTS.—Not later than one year
23 after the date of the enactment of this subsection and
24 every two years thereafter, the Secretary shall submit to
25 the Committee on Science, Space, and Technology of the

1 House of Representatives and the Committee on Energy
2 and Natural Resources of the Senate a report that con-
3 tains the following:

4 “(1) A description of the maximum potential of
5 geothermal resources in the United States, including
6 a consideration of next-generation geothermal sys-
7 tems.

8 “(2) Information relating to the results of
9 projects undertaken under this section.

10 “(3) An assessment of the barriers to commer-
11 cialization of next-generation geothermal tech-
12 nologies.

13 “(4) Such other information as the Secretary
14 considers appropriate.”.

15 (b) UPDATE TO GEOTHERMAL RESOURCE ASSESS-
16 MENT.—

17 (1) IN GENERAL.—Section 2501 of the Energy
18 Policy Act of 1992 (30 U.S.C. 1028) is amended—

19 (A) in subsection (c)—

20 (i) in the matter preceding paragraph
21 (1), by inserting “quadrennially” before
22 “update”;

23 (ii) in paragraph (1)(D)(ii), by strik-
24 ing “and” at the end;

1 (iii) in paragraph (2), by striking the
2 period at the end and inserting “; and”;
3 and

4 (iv) by adding at the end the following
5 new paragraph:

6 “(3) to the maximum extent practicable, by as-
7 sessing regions of the United States, including the
8 United States territories of American Samoa, Guam,
9 Northern Mariana Islands, Puerto Rico, and the
10 U.S. Virgin Islands, with significant potential for
11 supercritical geothermal (as such term is defined in
12 section 612 of the Energy Independence and Secu-
13 rity Act of 2007 (42 U.S.C. 17191)).”; and

14 (B) by striking subsection (d).

15 (2) FIRST UPDATE.—The first quadrennial up-
16 date to the geothermal resource assessment carried
17 out by the United States Geological Survey under
18 subsection (c) of section 2501 of the Energy Policy
19 Act of 1992, as amended by paragraph (1), shall be
20 completed by not later than two years after the date
21 of the enactment of this Act.

22 (c) CLERICAL AMENDMENT.—The table of contents
23 in section 1(b) of the Energy Independence and Security
24 Act of 2007 is amended by amending the item relating
25 to section 615 to read as follows:

“Sec. 615. Next-generation geothermal systems research and development.”.