

.....
(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; and

24 “(C) in supercritical conditions—

25 “(i) enhanced geothermal systems; or

1 “(ii) closed-loop geothermal systems.”;

2 and

3 (D) by adding at the end the following new
4 paragraph:

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

11 (2) in section 613(b)(1) (42 U.S.C.
12 17192(b)(1); relating to hydrothermal research and
13 development), by striking “advanced geologic tools to
14 assist” and inserting “advanced tools, including ma-
15 chine learning algorithms, to assist”;

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

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

23 (B) in subsection (h)—

24 (i) in paragraph (1), by inserting
25 “and publicly available subsurface data, in-

1 including data reported as part of fossil fuel
2 and mining operations,” after “geothermal
3 drilling information”; and

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

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

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

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

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

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

24 “(D) MEMORANDUM OF UNDER-
25 STANDING.—

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

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

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

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

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

1 (A) in the section heading, by inserting
2 “**AND CLOSED-LOOP**” after “**ENHANCED**”;

3 (B) in subsection (a), by inserting “and
4 closed-loop” after “enhanced”;

5 (C) in subsection (b)—

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

8 (ii) in the matter preceding paragraph
9 (1), by inserting “and closed-loop” after
10 “enhanced”;

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

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

15 (v) by adding at the end the following
16 new paragraph:

17 “(13) the research topics specified in subpara-
18 graphs (1) through (12) in supercritical condi-
19 tions.”;

20 (D) in subsection (c)—

21 (i) by redesignating paragraph (7) as
22 paragraph (8); and

23 (ii) by inserting after paragraph (6)
24 the following new paragraph:

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

9 (E) by adding at the end the following new
10 subsections:

11 “(e) NEXT-GENERATION GEOTHERMAL RESEARCH
12 AND DEVELOPMENT PROGRAM.—

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

20 “(2) FOCUS AREAS.—

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

24 “(i) Well completion.

1 “(ii) Permeability creation and man-
2 agement, including proppants and packers.

3 “(iii) Materials development and
4 equipment design, including power produc-
5 tion, specific to supercritical geothermal
6 systems.

7 “(iv) Sensor development.

8 “(v) Water-rock geochemistry.

9 “(vi) Rock properties.

10 “(vii) Hard rock and deep drilling.

11 “(viii) Any other topics the Secretary
12 determines necessary.

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

20 “(i) Characterization and crustal
21 stress.

22 “(ii) Lab work.

23 “(iii) Drilling.

24 “(iv) Stimulation.

25 “(v) Power production.

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

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

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

18 “(B) Water use and estimated needs for
19 closed-loop, and next-generation geothermal en-
20 ergy production.

21 “(C) The ability of next-generation geo-
22 thermal systems to use brackish and nonpotable
23 water.

24 “(D) The withdrawal and consumption of
25 water per megawatt hour of next-generation

1 geothermal systems, as compared to other
2 power-generation technologies.

3 “(E) Technological and operational im-
4 provements that could lead to decreases in
5 water withdrawal and consumption of next-gen-
6 eration geothermal systems.

7 “(4) NEXT-GENERATION GEOTHERMAL CENTER
8 OF EXCELLENCE.—

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

18 “(i) The continuation and expansion
19 of research, development, demonstration,
20 testing, and commercial application activi-
21 ties applicable to FORGE sites, including
22 activities in supercritical conditions.

23 “(ii) The establishment of a next-gen-
24 eration geothermal systems center of excel-
25 lence.

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

8 “(i) Whether the entity hosts an exist-
9 ing geothermal energy research and devel-
10 opment program.

11 “(ii) Whether the entity has proven
12 technical expertise to support geothermal
13 energy research.

14 “(iii) Whether the entity has access to
15 geothermal resources.

16 “(C) PURPOSE.—The center of excellence
17 referred to in subparagraph (A) shall coordinate
18 among existing FORGE sites, the Department,
19 and National Laboratories to carry out the fol-
20 lowing:

21 “(i) Advance research, development,
22 demonstration, and commercial application
23 of next-generation geothermal energy tech-
24 nologies, including supercritical geothermal
25 technologies, in response to industry and

1 commercial needs, including by partnering
2 with other academic or research institu-
3 tions, industry, non-governmental organi-
4 zations, and State, local, or Tribal govern-
5 ments.

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

13 “(iii) Support workforce development
14 across the next-generation geothermal sys-
15 tems energy development lifecycle.

16 “(iv) Provide educational, technical,
17 and analytical assistance on next-genera-
18 tion geothermal systems to Federal agen-
19 cies, industry, and State, local, and Tribal
20 governments.

21 “(v) Collect and disseminate informa-
22 tion on best practices in all areas relating
23 to developing and managing geothermal
24 energy resources and energy systems, in-

1 cluding next-generation geothermal sys-
2 tems.

3 “(5) COMMERCIAL-READINESS INNOVATION
4 GRANTS.—

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

12 “(B) FOCUS AREAS.—Grants may be
13 awarded under this paragraph for innovative
14 technologies, including the following:

15 “(i) Hardrock drilling equipment,
16 components, and systems, including bit de-
17 sign and vibration control.

18 “(ii) Reservoir characterization, well
19 design and spacing, and completions.

20 “(iii) Data acquisition and analysis,
21 including fiber optic sensing tools and
22 methodologies.

23 “(C) APPLICATIONS.—

24 “(i) IN GENERAL.—An entity seeking
25 a grant under this paragraph shall submit

1 to the Secretary an application at such
2 time, in such manner, and containing such
3 information as the Secretary may require.

4 “(ii) PRIORITIZATION.—In awarding
5 grants under this paragraph, the Secretary
6 shall give priority to the following:

7 “(I) Applicants, including for-
8 profit entities and public-private part-
9 nerships, with demonstrated expertise
10 relating to in-field development and
11 commercial operations for geothermal
12 energy projects.

13 “(II) Projects with the greatest
14 ability to advance near-term commer-
15 cial deployment of enhanced geo-
16 thermal systems and closed-loop geo-
17 thermal systems.

18 “(III) Projects that advance the
19 commercialization of geothermal en-
20 ergy projects in diverse geological con-
21 ditions or supercritical conditions.

22 “(D) COST SHARING.—The Federal share
23 of the cost of a project carried out with a grant
24 under this paragraph shall be not more than 80
25 percent.

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

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

10 (A) in subsection (e), by striking “Com-
11 mittee on Science and Technology” and insert-
12 ing “Committee on Science, Space, and Tech-
13 nology”; and

14 (B) by amending subsection (f) to read as
15 follows:

16 “(f) PROGRESS REPORTS.—Not later than one year
17 after the date of the enactment of this subsection and
18 every two years thereafter, the Secretary shall submit to
19 the Committee on Science, Space, and Technology of the
20 House of Representatives and the Committee on Energy
21 and Natural Resources of the Senate a report that con-
22 tains the following:

23 “(1) A description of the maximum potential of
24 geothermal resources in the United States, including

1 a consideration of next-generation geothermal sys-
2 tems.

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

5 “(3) An assessment of the barriers to commer-
6 cialization of next-generation geothermal tech-
7 nologies.

8 “(4) Such other information as the Secretary
9 considers appropriate.”.

10 (b) UPDATE TO GEOHERMAL RESOURCE ASSESS-
11 MENT.—

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

14 (A) in subsection (c)—

15 (i) in the matter preceding paragraph
16 (1), by inserting “quadrennially” before
17 “update”;

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

20 (iii) in paragraph (2), by striking the
21 period at the end and inserting “; and”;
22 and

23 (iv) by adding at the end the following
24 new paragraph:

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

9 (B) by striking subsection (d).

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

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

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