

118TH CONGRESS  
2D SESSION

# S. 5288

To require the Secretary of Energy to establish a program to provide grants to States to award grants for the establishment of networked geothermal heating and cooling systems, and for other purposes.

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## IN THE SENATE OF THE UNITED STATES

SEPTEMBER 25, 2024

Ms. KLOBUCHAR (for herself and Ms. SMITH) 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 require the Secretary of Energy to establish a program to provide grants to States to award grants for the establishment of networked geothermal heating and cooling systems, 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 “Grants Enabling Opti-  
5 mized Thermal Handling from Energy Recovered from  
6 Mediums that are Aquatic or Land-based Act of 2024”  
7 or “GEOHERMAL Act of 2024”.

1 **SEC. 2. DEFINITIONS.**

2 In this Act:

3 (1) **BASELINE ENERGY USAGE INTENSITY.**—

4 The term “baseline energy usage intensity” means—

5 (A) the annual site energy usage intensity

6 (as measured in British thermal units per year

7 per square foot) for a 12-month period ending

8 as of any date during the 24-month period im-

9 mediately preceding the installation of a

10 networked geothermal heating and cooling sys-

11 tem at the site; and

12 (B) in the case of new construction, the

13 modeled site energy usage intensity of the new

14 construction, subject to the condition that the

15 project shall be minimally code compliant.

16 (2) **ELIGIBLE RECIPIENT.**—The term “eligible

17 recipient” means—

18 (A) a nonprofit entity that owns—

19 (i) a building that may be connected

20 to a networked geothermal heating and

21 cooling system; or

22 (ii) multiple buildings that may be

23 connected by and to a networked geo-

24 thermal heating and cooling system;

25 (B) an institution of higher education;

1 (C) a municipality or neighborhood asso-  
2 ciation;

3 (D) an owner of a multifamily housing de-  
4 velopment or mixed-use community development  
5 with at least 50-percent low-income or mod-  
6 erate-income households;

7 (E) a wastewater treatment authority seek-  
8 ing to install a networked geothermal heating  
9 and cooling system that would utilize waste  
10 heat from greywater, sewage, or treated sewage  
11 effluent;

12 (F) an electric utility (as defined in section  
13 3 of the Federal Power Act (16 U.S.C. 796)),  
14 an electric cooperative (as defined in that sec-  
15 tion), or a natural gas utility seeking to install  
16 a networked geothermal heating and cooling  
17 system as a thermal distribution demonstration  
18 project;

19 (G) a third-party developer seeking to in-  
20 stall a networked geothermal heating and cool-  
21 ing system on behalf of any entity described in  
22 subparagraphs (A) through (F); and

23 (H) a consortium of 2 or more entities de-  
24 scribed in subparagraphs (A) through (G).

1           (3) GEOTHERMAL HEAT PUMP.—The term  
2           “geothermal heat pump” means a heat pump that  
3           uses the thermal energy of the ground or water to  
4           provide space heating, space cooling, water heating,  
5           or a combination of those functions.

6           (4) INDIAN TRIBE.—The term “Indian Tribe”  
7           has the meaning given the term in section 4 of the  
8           Indian Self-Determination and Education Assistance  
9           Act (25 U.S.C. 5304).

10          (5) NETWORKED GEOTHERMAL HEATING AND  
11          COOLING SYSTEM.—The term “networked geo-  
12          thermal heating and cooling system” means a sys-  
13          tem—

14                 (A) that provides space heating, space  
15                 cooling, water heating, or a combination of  
16                 those functions to a set of buildings;

17                 (B) that utilizes—

18                         (i) heat pumps that use, as a heat  
19                         source or sink, the ground, groundwater,  
20                         surface water, industrial process or com-  
21                         mercial building waste heat, greywater,  
22                         sewage, or treated sewage effluent;

23                         (ii) direct use of geothermal heat; or

24                         (iii) a combination of the systems de-  
25                         scribed in clauses (i) and (ii);

1 (C) that is a stand-alone system or is cou-  
2 pled with another energy system;

3 (D) the ground-source or waste heat com-  
4 ponent of which is designed to provide at least  
5 90 percent of the combined annual heating and  
6 cooling energy (as measured in British thermal  
7 units per year); and

8 (E) that may use—

9 (i) subsurface or surface thermal stor-  
10 age in the form of borehole thermal energy  
11 storage, aquifer thermal energy storage,  
12 reservoir thermal energy storage, thermal  
13 storage tanks, or other thermal storage;  
14 and

15 (ii) waste heat or other thermal dis-  
16 charge from commercial, institutional, or  
17 public buildings or industrial facilities as  
18 an additional heat source.

19 (6) PROGRAM.—The term “program” means  
20 the program established under section 3(a).

21 (7) REGISTERED APPRENTICESHIP PROGRAM.—  
22 The term “registered apprenticeship program”  
23 means an apprenticeship program registered under  
24 the Act of August 16, 1937 (50 Stat. 664, chapter  
25 663; 29 U.S.C. 50 et seq.) (commonly known as the

1 “National Apprenticeship Act”), that meets the  
2 standards of part 29 and part 30 of title 29, Code  
3 of Federal Regulations (or successor regulations).

4 (8) SECRETARY.—The term “Secretary” means  
5 the Secretary of Energy.

6 (9) SITE ENERGY USAGE INTENSITY.—The  
7 term “site energy usage intensity” means a site en-  
8 ergy usage intensity (as measured in British thermal  
9 units per year per square foot) determined for a  
10 building or set of buildings in accordance with such  
11 regulations or other guidance as the Secretary may  
12 provide.

13 (10) STATE.—The term “State” means—

14 (A) a State;

15 (B) an Indian Tribe;

16 (C) the District of Columbia;

17 (D) the Commonwealth of Puerto Rico;

18 and

19 (E) any other territory or possession of the  
20 United States.

21 (11) STATE ENERGY PROGRAM.—The term  
22 “State Energy Program” means the State Energy  
23 Program established under part D of title III of the  
24 Energy Policy and Conservation Act (42 U.S.C.  
25 6321 et seq.).

1 **SEC. 3. NETWORKED GEOTHERMAL HEATING AND COOL-**  
2 **ING GRANT PROGRAM.**

3 (a) IN GENERAL.—Not later than 1 year after the  
4 date of enactment of this Act, under the State Energy  
5 Program, the Secretary shall establish a program under  
6 which the Secretary shall provide grants to States—

7 (1) that are eligible for funding under the State  
8 Energy Program;

9 (2) in accordance with the allocation formula  
10 established under section 420.11 of title 10, Code of  
11 Federal Regulations (or successor regulations); and

12 (3) that the States shall use to provide grants  
13 to eligible recipients in accordance with this section.

14 (b) APPLICATIONS FOR GRANTS.—A State seeking a  
15 grant under the program shall submit to the Secretary an  
16 application at such time, in such manner, and containing  
17 such information as the Secretary may require, includ-  
18 ing—

19 (1) a description of the expected benefits that  
20 networked geothermal heating and cooling systems  
21 will have on communities in the State; and

22 (2) a plan for the use of the grant to assist the  
23 State in achieving those benefits.

24 (c) USE OF STATE GRANT.—

25 (1) IN GENERAL.—A State that receives a  
26 grant under the program shall award grants to eligi-

1 ble recipients in accordance with paragraphs (2) and  
 2 (3).

3 (2) PROJECT DEPLOYMENT GRANTS.—

4 (A) IN GENERAL.—A State that receives a  
 5 grant under the program may provide a grant  
 6 to an eligible recipient to finance the deploy-  
 7 ment of a networked geothermal heating and  
 8 cooling system that meets the requirements de-  
 9 scribed in subparagraph (B), including the in-  
 10 stallation of in-building or behind-the-meter  
 11 equipment.

12 (B) SYSTEM REQUIREMENTS.—A  
 13 networked geothermal heating and cooling sys-  
 14 tem deployed pursuant to subparagraph (A)  
 15 shall—

16 (i) use—

17 (I) geothermal heat pumps to  
 18 provide heating, cooling, or heating  
 19 and cooling of space, water, or space  
 20 and water from—

21 (aa) the ground through 1  
 22 or more closed-loop geo-exchange  
 23 boreholes in which water pumped  
 24 through pipes that exchange heat



1 with the surrounding rock or soil  
2 returns to the surface;

3 (bb) groundwater using 1 or  
4 more open-loop well doublets that  
5 pump groundwater from an aqui-  
6 fer and inject the water into a  
7 second well following heat ex-  
8 change in a heat pump or water-  
9 to-water heat exchanger;

10 (cc) surface water through  
11 heat exchange in a heat pump or  
12 water-to-water heat exchanger,  
13 with the water returned to the  
14 surface water body; or

15 (dd) greywater, sewage, or  
16 treated sewage effluent through a  
17 heat exchanger installed in a sew-  
18 age pipe, treated sewage effluent  
19 pipe, or above-ground plant con-  
20 sisting of a water-to-water heat  
21 exchanger or heat pump;

22 (II) hot water obtained from geo-  
23 thermal wells to produce hot water  
24 through a water-to-water heat ex-

1 changer for direct use in building  
2 heating;

3 (III) hot water produced by deep  
4 geothermal wells in which water is  
5 pumped through pipes containing a  
6 fluid that exchanges heat with the  
7 surrounding rock or soil and returns  
8 to the surface for direct use for build-  
9 ing heating;

10 (IV) industrial process waste  
11 heat; or

12 (V) a combination of the systems  
13 described in subclauses (I) through  
14 (IV);

15 (ii) reduce the greenhouse gas emis-  
16 sions associated with heating and cooling  
17 the building, set of buildings, or facility of  
18 the eligible recipient; and

19 (iii)(I) reduce the site energy intensity  
20 of the building, set of buildings, or facility  
21 of the eligible recipient in comparison to  
22 the baseline energy usage intensity of the  
23 building, set of buildings, or facility, as ap-  
24 plicable;

1 (II) improve the control and manage-  
2 ment of energy usage of the building, set  
3 of buildings, or facility to reduce demand  
4 during peak times;

5 (III) substantially reduce the amount  
6 of water used to provide heating and cool-  
7 ing to the building, set of buildings, or fa-  
8 cility; or

9 (IV) improve, with respect to the  
10 building, set of buildings, or facility of the  
11 eligible recipient—

12 (aa) the physical comfort of the  
13 building, set of buildings, or facility  
14 occupants;

15 (bb) the energy efficiency of the  
16 building, set of buildings, or facility;  
17 or

18 (cc) the quality of the air in the  
19 building, set of buildings, or facility.

20 (C) PRIORITY.—Each State providing  
21 grants under this paragraph shall give pri-  
22 ority—

23 (i) to the maximum extent practicable,  
24 to eligible recipients that do not have ac-  
25 cess to private capital;

1 (ii) to larger block-scale projects com-  
 2 prising at least 100,000 square feet of  
 3 building space for which the networked  
 4 geothermal heating and cooling system will  
 5 be used;

6 (iii) to projects that may be extended  
 7 to multiple blocks or wider scales, includ-  
 8 ing systems featuring decentralized heat  
 9 pumps interconnected by a single under-  
 10 ground shared loop pipe of ambient-tem-  
 11 perature water; or

12 (iv) to projects located in an energy  
 13 community (as defined in section  
 14 45(b)(11)(B) of the Internal Revenue Code  
 15 of 1986), a low-income community, or a  
 16 disadvantaged community.

17 (D) WAGE RATE AND APPRENTICESHIP  
 18 REQUIREMENTS.—

19 (i) DAVIS-BACON.—All laborers and  
 20 mechanics employed by contractors or sub-  
 21 contractors in the performance of construc-  
 22 tion, alteration, or repair work on a project  
 23 assisted in whole or in part by a grant  
 24 awarded by a State under this paragraph  
 25 shall be paid wages at rates not less than

1 those prevailing on similar projects in the  
2 locality, as determined by the Secretary of  
3 Labor in accordance with subchapter IV of  
4 chapter 31 of title 40, United States Code  
5 (commonly referred to as the “Davis-  
6 Bacon Act”).

7 (ii) AUTHORITY.—With respect to the  
8 labor standards specified in clause (i), the  
9 Secretary of Labor shall have the authority  
10 and functions set forth in Reorganization  
11 Plan Numbered 14 of 1950 (64 Stat.  
12 1267; 5 U.S.C. App.) and section 3145 of  
13 title 40, United States Code.

14 (iii) APPRENTICESHIP.—

15 (I) IN GENERAL.—All laborers  
16 and mechanics employed by contrac-  
17 tors or subcontractors in the perform-  
18 ance of construction, alteration, or re-  
19 pair work on a project assisted in  
20 whole or in part by a grant awarded  
21 by a State under this paragraph shall  
22 participate in, and all such contrac-  
23 tors or subcontractors shall sponsor, a  
24 registered apprenticeship program for

1 each crafts or trade employed on the  
2 project.

3 (II) ANNUAL CERTIFICATION.—

4 In order to remain eligible for funding  
5 under a grant awarded by a State  
6 under this paragraph, each contractor  
7 and subcontractor described in sub-  
8 clause (I) shall annually submit to the  
9 Secretary of Labor a certification  
10 verifying that—

11 (aa) the contractor or sub-  
12 contractor sponsors a registered  
13 apprenticeship program for each  
14 applicable craft or trade; and

15 (bb) the sponsored reg-  
16 istered apprenticeship program  
17 has graduated apprentices for at  
18 least 3 of the preceding 5 years.

19 (3) GRANTS FOR STUDIES AND TECHNICAL AS-  
20 SISTANCE.—

21 (A) IN GENERAL.—A State that receives a  
22 grant under the program may use not more  
23 than 50 percent of the grant funds—

24 (i) to award grants or provide tech-  
25 nical assistance to eligible recipients to

1 carry out the activities described in sub-  
2 paragraph (B); and

3 (ii) to conduct broad surveys to ascer-  
4 tain the localities or projects in the State  
5 that are best suited to receive grants under  
6 paragraph (2).

7 (B) USE OF GRANTS.—Grant funds re-  
8 ceived by eligible recipients under subparagraph  
9 (A)(i) may be used to partially or fully fund—

10 (i) community thermal opportunity as-  
11 sessments—

12 (I) to identify potential thermal  
13 resources, including heat sources or  
14 sinks, including the geological nature  
15 or other characteristics of the local  
16 ground, groundwater, surface water,  
17 greywater, sewage or sewage effluent  
18 thermal, waste heat from commercial  
19 or industrial sources, or deep earth  
20 geological heat potential; and

21 (II) to assess proximity of ther-  
22 mal sources, sinks, or storage, as ap-  
23 plicable, to existing or potential con-  
24 centrations of thermal loads;

1 (ii) studies to demonstrate the relative  
2 potential of different locations for deploy-  
3 ment of networked geothermal heating and  
4 cooling systems;

5 (iii) feasibility studies and designs for  
6 networked geothermal heating and cooling  
7 systems;

8 (iv) geoscientific investigation, includ-  
9 ing test bores, thermal response tests, and  
10 thermal conductivity tests, to determine  
11 underground thermal and hydraulic char-  
12 acteristics; and

13 (v) activities, studies, or research to  
14 assess and overcome barriers to the imple-  
15 mentation of networked geothermal heat-  
16 ing and cooling systems, including finan-  
17 cial, contracting, siting, permitting, tech-  
18 nical, and technology barriers.

19 (4) MULTIPLE GRANTS.—A State may provide  
20 more than 1 grant under this subsection to the same  
21 eligible recipient to facilitate multiple steps in the  
22 planning and deployment of a networked geothermal  
23 heating and cooling system.

24 (5) ADMINISTRATIVE EXPENSES.—A State that  
25 receives a grant under the program may use not



1 more than 5 percent of the grant funds for adminis-  
2 trative expenses.

3 (d) COORDINATION WITH EXISTING PROGRAMS.—A  
4 State receiving a grant under the program is encouraged  
5 to utilize and build on existing programs and infrastruc-  
6 ture, including physical infrastructure such as pipes or  
7 wells, existing rights-of-way, and land leases, within the  
8 State that may aid the State in awarding grants under  
9 subsection (c).

10 (e) OUTREACH.—The Secretary shall engage in out-  
11 reach to inform States of the availability of grants under  
12 the program.

13 (f) STATE ENERGY PROGRAM EXCLUSIONS.—

14 (1) NO MATCHING.—A State receiving a grant  
15 under the program shall not be subject, for that  
16 grant, to the matching requirement under the item  
17 relating to “ENERGY CONSERVATION” under the  
18 heading “DEPARTMENT OF ENERGY” in title II  
19 of the Department of the Interior and Related Agen-  
20 cies Appropriations Act, 1985 (42 U.S.C. 6323a; 98  
21 Stat. 1861).

22 (2) EXPENDITURE PROHIBITIONS AND LIMITA-  
23 TIONS.—Nothing in section 420.18 of title 10, Code  
24 of Federal Regulations (or successor regulations),

1 shall prohibit projects carried out using grants pro-  
2 vided by States under this section.

3 (g) REPORT.—Each State that receives a grant under  
4 the program shall, not later than 18 months after a grant  
5 is received, and annually thereafter, submit to the Sec-  
6 retary a report that describes—

7 (1) for each grant awarded to an eligible recipi-  
8 ent under subsection (c)(2), data on the projects to  
9 be carried out using the grant, organized in a for-  
10 mat to be determined by the Secretary;

11 (2) for each grant awarded or any technical as-  
12 sistance provided under subsection (c)(3), any out-  
13 put in the form of feasibility studies, geoscientific in-  
14 vestigation, thermal mapping of heat sources or sink  
15 or waste heat sources in an area, or other study re-  
16 sults; and

17 (3) any statutory or regulatory changes under-  
18 taken by the State or other local regulatory body to  
19 facilitate projects carried out using a grant awarded  
20 or technical assistance provided by the State under  
21 subsection (c).

22 (h) AUTHORIZATION OF APPROPRIATIONS.—

23 (1) IN GENERAL.—There are authorized to be  
24 appropriated to the Secretary to carry out this sec-  
25 tion, to remain available until expended—

1 (A) \$150,000,000 for fiscal year 2025; and

2 (B) \$120,000,000 for each of fiscal years

3 2026 through 2029.

4 (2) INDIAN TRIBES.—Of the amounts made  
5 available under paragraph (1) for a fiscal year, not  
6 less than 2 percent shall be used to award grants  
7 under the program to Indian Tribes.

8 **SEC. 4. REPORTS ON NETWORKED GEOTHERMAL HEATING**  
9 **AND COOLING SYSTEMS.**

10 (a) ANALYSIS AND REPORT.—Not later than 2 years  
11 after the date of enactment of this Act, the Secretary  
12 shall—

13 (1) perform an analysis of air source and geo-  
14 thermal heat pump system performance, including  
15 determining the full-year, 8,760-hour coefficient of  
16 performance curves or seasonal performance factor,  
17 from a range of building types, in a variety of rep-  
18 resentative regional climate zones, and from a rep-  
19 resentative sample of heat pump models; and

20 (2) submit to Congress and make publicly avail-  
21 able on the website of the Department of Energy a  
22 report, to be entitled “Real world considerations on  
23 the deployment of heat pump technologies”, that de-  
24 scribes—

1 (A) factors that the Secretary is able to  
2 analyze that may impact the decision to pursue  
3 a networked geothermal heating and cooling  
4 system, such as the seasonal performance data  
5 and peak summer and winter power draw pro-  
6 files for air source and geothermal heat pumps  
7 for each building type and climate region ana-  
8 lyzed under paragraph (1); and

9 (B) information that the Secretary is able  
10 to ascertain regarding capital or operating cost,  
11 regulatory hurdles, site considerations, or other  
12 factors.

13 (b) SURVEY AND REPORT.—Not later than 2 years  
14 after the date of enactment of this Act, and annually  
15 thereafter, the Secretary shall submit to Congress and  
16 make publicly available on the website of the Department  
17 of Energy—

18 (1) a compendium of available heat mapping,  
19 feasibility, or other studies undertaken by a State or  
20 the Department of Energy that serves to support de-  
21 cisions relating to locations, layouts, and designs for  
22 networked geothermal heating and cooling systems;

23 (2) a repository of formatted data on the  
24 projects funded under grants awarded by States  
25 under section 3(e); and

1           (3) a report summarizing the statutory or regu-  
 2           latory changes undertaken by States or localities to  
 3           support or facilitate those projects.

4 **SEC. 5. MODEL GUIDANCE FOR WASTE HEAT TO DIRECT**  
 5 **USE SYSTEMS.**

6           Section 40556 of the Infrastructure Investment and  
 7 Jobs Act (42 U.S.C. 18842) is amended—

8           (1) in subsection (a)—

9                   (A) by redesignating paragraphs (2) and  
 10                  (3) as paragraphs (3) and (4), respectively; and

11                  (B) by inserting after paragraph (1) the  
 12                  following:

13                  “(2) WASTE HEAT TO DIRECT USE SYSTEM.—

14                  The term ‘waste heat to direct use system’ means a  
 15                  system that directly heats a building or directly uti-  
 16                  lizes heat for other commercial or industrial applica-  
 17                  tions through the recovery of waste energy.”;

18                  (2) in subsection (b)(1), by striking “and waste  
 19                  heat to power systems” and inserting “, waste heat  
 20                  to power systems, and waste heat to direct use sys-  
 21                  tems”; and

22                  (3) in subsection (c)—

23                   (A) in paragraph (2), in the matter pre-  
 24                  ceding subparagraph (A), by striking “and  
 25                  waste heat to power systems” and inserting “,

1 waste heat to power systems, and waste heat to  
2 direct use systems”; and

3 (B) in paragraph (3)(G), by striking “and  
4 waste heat to power systems” and inserting “,  
5 waste heat to power systems, and waste heat to  
6 direct use systems”.

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