HOUSE COMMITTEE ON

NATURAL RESOURCES

CHAIRMAN BRUCE WESTERMAN

To:	House Committee on Natural Resources Republican Members
From:	Energy and Mineral Resources Subcommittee Staff, Rob MacGregor – (Robert.MacGregor@mail.house.gov), & Ray Phillips – (Ray.Phillips@mail.house.gov), x5-9297
Date:	Friday May 9, 2025
Subject:	Oversight Field Hearing titled *"Letting Off Steam: Unleashing Geothermal Energy Development on Federal Land"*

The Subcommittee on Energy and Mineral Resources will hold an oversight hearing entitled *"Letting Off Steam: Unleashing Geothermal Energy Development on Federal Land"* on **Monday, May 12, 2025, at 2:00 p.m. (MDT)** at the Sterling R. Church Auditorium in the Sharwan Smith Student Center, at Southern Utah University, in Cedar City, Utah**.**

Member offices are requested to notify Jacob Greenberg (Jacob.Greenberg@mail.house.gov) by 4:30 p.m. on Thursday, May 8, 2025, if their Member intends to participate in the hearing.

I. KEY MESSAGES

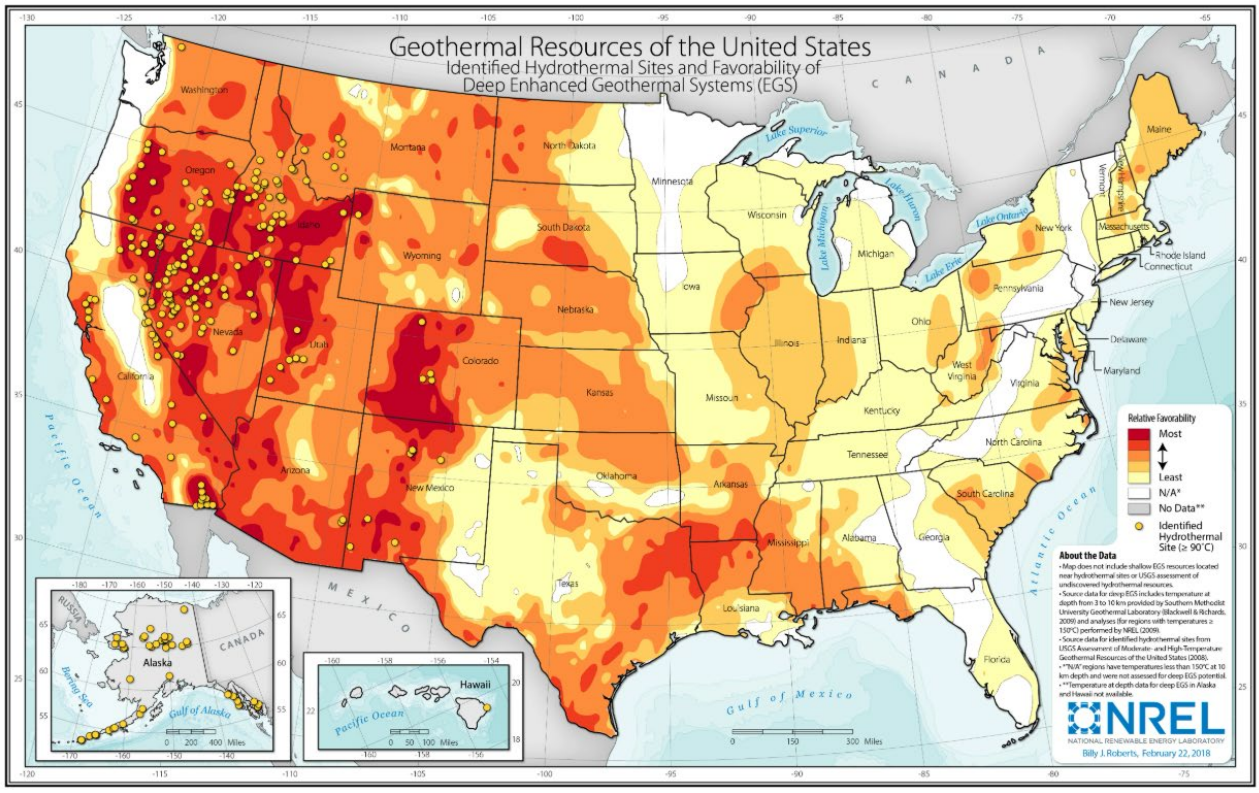
- Geothermal energy is abundant on federal lands, and development of these resources is crucial to an all-of-the-above energy strategy.
- Geothermal energy has high growth potential due to developing technologies like enhanced geothermal systems (EGS). However, cumbersome federal leasing and permitting processes pose significant challenges to greater geothermal deployment.
- Rapidly evolving innovation technologies and removing unnecessary red tape will allow developers to harness greater amounts of geothermal energy and ensure we meet America's domestic energy demand.

II. WITNESSES

- **Mr. Tim Latimer,** Co-Founder and CEO, Fervo Energy, Houston, TX
- **Mr. Paul Thomsen,** Vice President of Business Development, Ormat Technologies, Inc., Reno, NV
- **Mr. Jake Garfield,** Deputy Director, Utah Office of Energy Development, Salt Lake City, UT
- **Dr. Joseph Moore,** Research Professor, Energy & Geoscience Institute, Salt Lake City, Utah [*Minority Witness*]

III. BACKGROUND

Geothermal power is a renewable energy resource that is derived by capturing heat from an underground water reservoir or naturally generated steam under high pressure.[1] Geothermal energy can be used for both electricity generation and heating applications. It is abundant in the Western U.S., where the Bureau of Land Management (BLM) has authority over geothermal leasing on approximately 245 million acres of public lands, including 104 million acres of U.S. Forest Service lands.[2]



Source: National Renewable Energy Laboratory, 2018. [3]

In 2023, geothermal power plants across seven states produced about 17 billion kilowatt hours (kWh) of electricity, equal to 0.4% of total U.S. utility-scale electricity generation.[4] Most of the geothermal power plants in the United States are in western states and Hawaii, where geothermal energy resources are closer to the earth's surface. California generates more electricity from geothermal power than any other state in the nation, while Nevada has the highest proportion of electricity generation attributed to geothermal.[5]

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[1] Congressional Research Service, Enhanced Geothermal Systems: Introduction and Issues for Congress, September 29, 2022, https://crsreports.congress.gov/product/pdf/R/R47256.

[2] Bureau of Land Management, Geothermal Energy, https://www.blm.gov/programs/energy-and-minerals/renewable-energy/geothermal-energy.

[3] National Renewable Energy Laboratory, Geothermal Resource Data, Tools, and Maps, 2018, https://www.nrel.gov/gis/geothermal

[4] EIA, Geothermal basics, https://www.eia.gov/energyexplained/geothermal/use-of-geothermal-energy.php.

[5] Energy Information Administration, Geothermal explained, February 15, 2022, https://www.eia.gov/energyexplained/geothermal/where-geothermal-energy-is-found.php.

States with geothermal power plants in 2023 [1]

	State share of total U.S. geothermal electricity generation	Geothermal share of total state electricity generation
California	66.6%	5.1%
Nevada	26.1%	10.1%
Utah	3.2%	1.5%
Hawaii	2.1%	3.7%
Oregon	1.3%	0.4%
Idaho	0.5%	0.6%
New Mexico	0.2%	0.1%

Source: U.S. Energy Information Administration, 2024 [6]

Geothermal Energy on Federal Lands

Geothermal was the first type of renewable energy that the BLM approved for production on public lands, with the first project approved in 1978.[7] Today, 51 operating power plants produce geothermal energy from BLM-managed lands, with a combined installed capacity of more than 2.6 gigawatts.[8]

The United States Geological Survey (USGS) currently operates several programs that support research and development of geothermal energy resources. The Geothermal Steam Act of 1970 directs USGS to conduct national-scale assessments of geothermal resources, the most recent of which was published in 2008.[9] Additionally, the agency's Earth Mapping Resources Initiative (Earth MRI) coordinates priorities with the Department of Energy (DOE) Geothermal Technologies Office (GTO) to collect useful data for both critical mineral and geothermal resources.[10]

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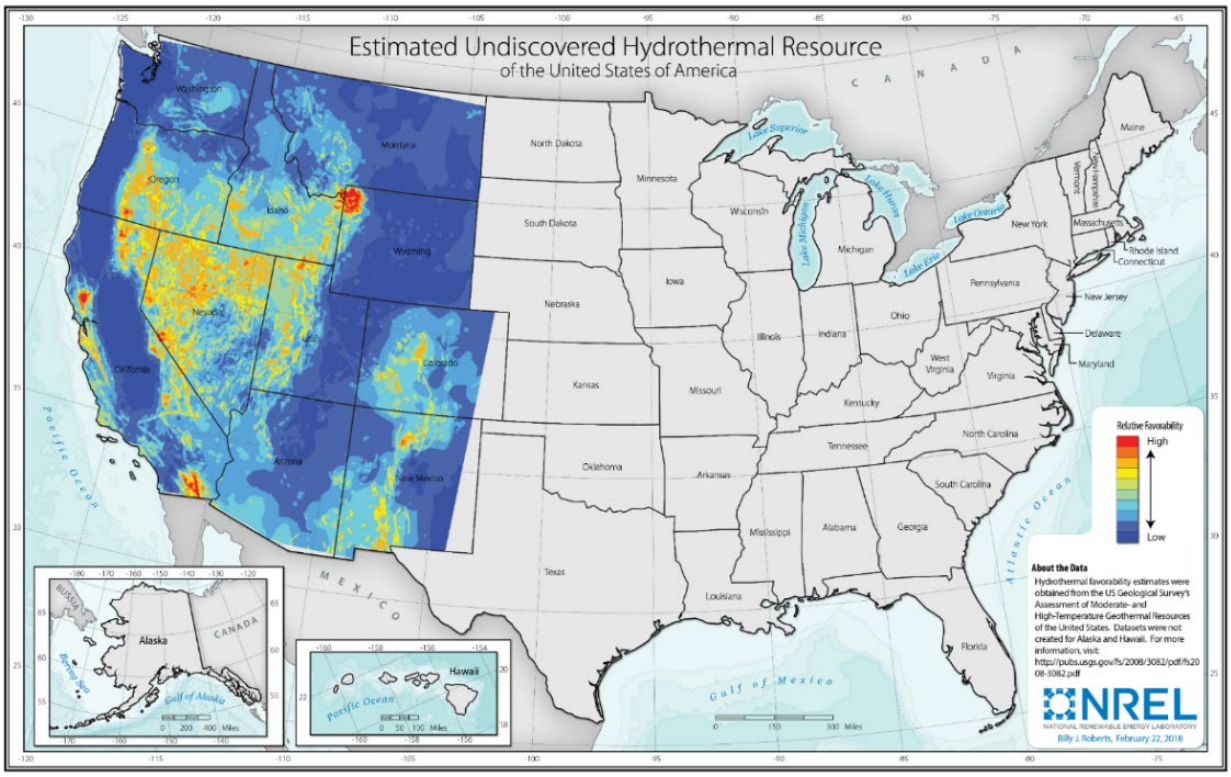
[6] U.S. Energy Information Administration, *Electric Power Monthly*, Tables 1.3.B and 1.16.B, February 2024, preliminary data, https://www.eia.gov/energyexplained/geothermal/use-of-geothermal-energy.php

[7] Bureau of Land Management, Geothermal Energy, https://www.blm.gov/programs/energy-and-minerals/renewable-energy/geothermal-energy.

[8] *Id.*

[9] USGS, Geothermal Resource Investigations Project, https://www.usgs.gov/centers/gmeg/science/geothermal-resource-investigations-project

[10] Department of the Interior, USGS, Implementation of the Bipartisan Infrastructure Law Initial Spend Plan, https://d9-wret.s3.us-west-2.amazonaws.com/assets/palladium/production/s3fs-public/media/files/USGS%20BIL%20Spend%20Plan_FINAL.pdf



Source: National Renewable Energy Laboratory, 2018 [11]

Different Geothermal Technologies

Conventional Hydrothermal

Conventional hydrothermal technologies access geothermal heat resources from underground hot water and steam for either direct use (from just above ambient temperature up to about 150°C/300°F) or to generate electricity (above 150°C to 375°C/300°F to 700°F). [12] These resources are generally geographically limited to areas with the right geological conditions, including sufficient subsurface water, gaps in the rock for fluid flow, and subsurface temperature. Favorable hydrothermal conditions are mostly limited to locations in the western United States, including Alaska and Hawaii.[13]

[11] National Renewable Energy Laboratory, Geothermal Resource Data, Tools, and Maps, 2018, https://www.nrel.gov/gis/geothermal
[12] Congressional Research Service, *Enhanced Geothermal Systems: Introduction and Issues for Congress,* September 29, 2022, https://crsreports.congress.gov/product/pdf/R/R47256
[13] *Id.*

Enhanced Geothermal Systems

EGS are man-made reservoirs in which fluid is injected into the subsurface in areas with hot rock, increasing the permeability of preexisting fractures.[14] Increased permeability allows fluid to circulate throughout the fractured rock and to transport heat to the surface.[15]

EGS technology leverages technical and practical expertise from the oil and gas industry in geothermal applications. Similar to hydraulic fracturing, EGS uses advanced drilling equipment and fluid injection into the subsurface to access geothermal resources that are not naturally located in reservoirs with characteristics sufficient for conventional hydrothermal energy production. EGS has the potential to greatly expand geothermal energy's domestic footprint, enabling development in shallow-depth, hot, dry rock regions across the U.S.[16] The DOE projects that EGS could provide 90 gigawatts (GW) of electricity by 2050 (8.5% of U.S. generation capacity). [17]

Supercritical Geothermal

Supercritical geothermal is an experimental technology that requires deep drilling to access dry rocks at temperatures around 400°C or greater (752°F). Water or other liquids are then injected at depths of 4 kilometers (two and a half miles) or deeper and, utilizing natural heat deep within the Earth's crust, returned to the surface at supercritical conditions to power a turbine and generate energy.[18] If commercialized, supercritical geothermal has the potential to produce significantly higher amounts of energy compared to conventional geothermal systems and could greatly expand the areas for economically viable development, including on the East Coast.[19]

Geothermal Leasing and Permitting

The BLM manages leasing, exploration, and development of geothermal resources on federal lands. The Geothermal Steam Act of 1970[20] requires the Secretary of the Interior to hold "a competitive lease sale at least once every 2 years for land in a State that has nominations pending."[21] However, some states, like California, with significant geothermal potential, have not held a competitive geothermal lease sale since 2016.[22]

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[14] U.S. Department of Energy Geothermal Technologies Office, What is an Enhanced Geothermal System (EGS), https://www1.eere.energy.gov/geothermal/pdfs/egs_basics.pdf.
[15] *Id*.
[16] Congressional Research Service, *Enhanced Geothermal Systems: Introduction and Issues for Congress,* September 29, 2022, https://crsreports.congress.gov/product/pdf/R/R47256.
[17] U.S. Department of Energy, Pathways to Commercial Liftoff: Next-Generation Geothermal Power, https://liftoff.energy.gov/wp-content/uploads/2024/03/Liftoff_DOE_NextGen_Geothermal.pdf
[18] Committee on Science, Space, and Technology, Background on H.R. 8665, the Supercritical Geothermal Research & Development Act, https://science.house.gov/_cache/files/e/e/eebed5c7-3784-4b3b-b0c5-04c5456dfa77/8600498DE7130020CA43490E64B3ACBA.h.r.-8665-one-page-summary.pdf
[19] *Id.*
[20] PUBLIC LAW 91-581.
[21] *Id*.
[22] U.S. Bureau of Land Management, California Geothermal Energy, https://www.blm.gov/programs/energy-and-minerals/renewable-energy/geothermal-energy/regional-information/california.

The federal permitting and leasing processes are largely similar for both oil and gas (O&G) and geothermal projects.[23] The BLM first identifies lands suitable for geothermal development through a Resource Management Plan (RMP) and then identifies high- and low-preference parcels. The BLM will then announce competitive lease sales and solicit parcel nominations from interested parties. While operators often nominate federal lands for competitive sales, a large portion of these parcels are not offered by BLM, further minimizing geothermal energy's potential on federal lands.

After obtaining a lease, operators are responsible for obtaining specific permits at similar points in the development process for O&G and geothermal projects. For example, operators submit an Application for Permit to Drill (APD) before receiving a drilling permit for O&G projects. Similarly, geothermal operators obtain a Geothermal Drilling Permit (GDP) before commencing drilling for geothermal projects. Both APDs and GDPs contain plans for drill pad location, surface reclamation, and other surface uses.[24] Unlike O&G, noncompetitive lease sales are available for geothermal parcels, and operator responsibilities for exploration and drilling differ due to differences inherent in the resources.

The BLM conducts reviews under the National Environmental Policy Act (NEPA) at different stages during the development process. Earlier this year, the BLM utilized authorities under the Fiscal Responsibility Act to obtain two categorical exclusions to confirm the existence of a geothermal resource on public lands.[25] Prior to this action, geothermal developers were required to conduct two separate environmental reviews for exploration: one for initial exploration drilling and another to fully test the geothermal resource, even if the initial exploration drilling would cause negligible or minimal environmental effects.[26] While these categorical exclusions could be helpful, multiple environmental reviews, their time and costs, and the overall leasing and permitting processes continue to result in development timelines longer than those of many other power production projects on federal land.[27]

The four stages of geothermal resource development within a lease are exploration, resource drilling, production, and reclamation. Each stage under the lease requires separate authorizations and compliance with NEPA when ground-disturbing activities are proposed.[28] Prior to becoming operational, federal geothermal projects must complete up to six rounds of environmental review.[29] Each of these reviews is subject to administrative delays and legal challenges.

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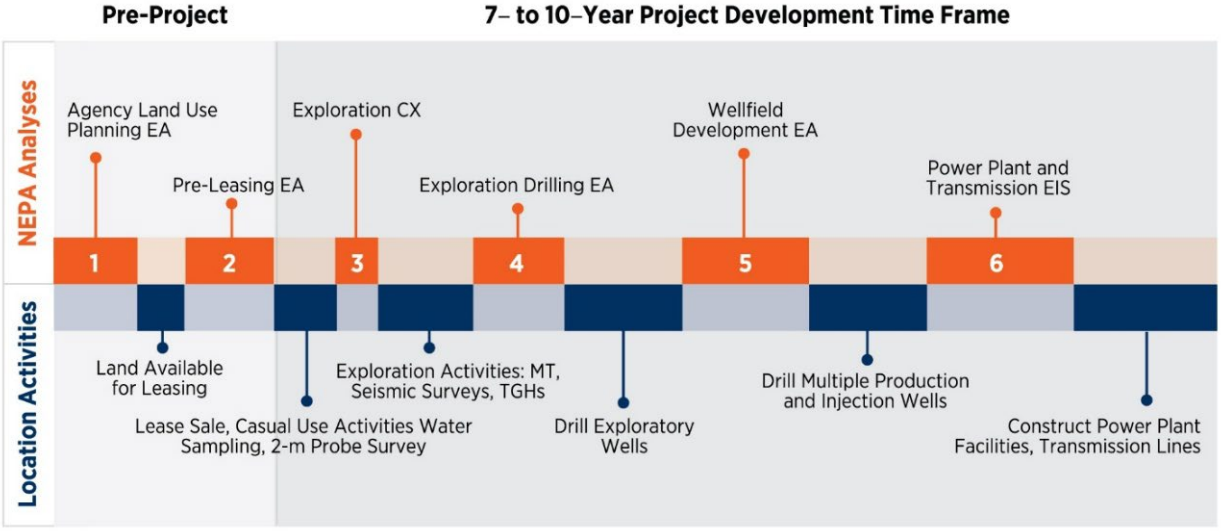
[23] Congressional Research Service, Considerations for Federal Leasing of Onshore Energy: Oil and Gas and Geothermal Power, May 10, 2024, https://crs.gov/Reports/R48064?source=search.
[24] *Id*
[25] U.S. Bureau of Land Management, BLM takes steps to accelerate geothermal energy development, January 16, 2025, https://www.blm.gov/announcement/blm-takes-steps-accelerate-geothermal-energy-development.
[26] *Id.*
[27] Congressional Research Service, *Enhanced Geothermal Systems: Introduction and Issues for Congress,* September 29, 2022, https://crsreports.congress.gov/product/pdf/R/R47256.
[28] *Id.*
[29] Dr Bryant Jones, Testimony before the House Subcommittee on Energy and Mineral Resources, March 6, 2024 https://docs.house.gov/meetings/II/II06/20240306/116882/HHRG-118-II06-Transcript-20240306.pdf



Source: U.S. Department of Energy, Geothermal Permitting Timeline[30]

Geothermal development on federal lands also faces several permitting barriers outside of the NEPA process. Projects are often required to conduct additional Endangered Species Act (ESA) Section 7[31] and National Historic Preservation Act (NHPA) [32] consultations during development, both creating lengthy regulatory delays and opening new avenues to frivolous litigation. For example, following the listing of the Dixie Valley toad under the ESA in 2021, Dixie Meadows Geothermal Project engaged in Section 7 consultation, reduced its footprint, and was subsequently granted a new record of decision by BLM.[33] Despite these actions, BLM under the Biden administration refused to issue notices to proceed, drilling permits, and other actions simply because of litigation threats against the project.[34]

As conventional and next-generation geothermal technologies seek to drive down development costs and help to meet skyrocketing domestic energy demands, reforming cumbersome leasing and permitting processes on federal lands is essential. To achieve this, Republican members of the House Committee on Natural Resources have championed legislation that limits NEPA reviews for low-impact geothermal activities,[35] forces the BLM to process geothermal permits in a timely manner,[36] and ensures that geothermal wells on non-federal lands are not subject to

[30] U.S. Department of Energy, Permitting for Geothermal Power Development Projects, https://www.energy.gov/eere/geothermal/permitting-geothermal-power-development-projects#:~:text=These%20studies%20identified%20numerous%20state,issues%20at%20a%20project%20site.
[31] 16 U.S.C. 1536(a)–(d).
[32] 54 U.S.C. §306108.
[33] United States Department of the Interior, Bureau of Land Management, Decision Record: Dixie Meadows 12MW Geothermal Utilization Project, 11/16/22, https://eplanning.blm.gov/public_projects/75996/200167265/20071516/250077698/signed%2012mw%20DR_508%20%20with%20correct%20address%20appeal%20form.pdf.
[34] US to reopen review of Nevada geothermal plant near endangered toad while legal battle is on hold, Scott Sonner, Associated Press, 7/14/23, https://www.newsnationnow.com/us-news/ap-us-news/ap-us-to-reopen-review-of-nevada-geothermal-plant-near-endangered-toad-while-legal-battle-is-on-hold/.
[35] House Natural Resources Committee Memorandum, EMR Legislative Hearing on 6 bills, 03/06/24 https://naturalresources.house.gov/uploadedfiles/hearing_memo_--_sub_on_emr_leg_hrg_on_6_bills_03.06.24.pdf
[36] *Id.*

federal regulatory delays.[37] If enacted, these provisions would provide geothermal developers the greater regulatory certainty needed to spur investment in research, development, exploration, and production.

[37] *Id.*