LETTING OFF STEAM: UNLEASHING GEOTHERMAL ENERGY DEVELOPMENT ON FEDERAL LAND

OVERSIGHT FIELD HEARING

BEFORE THE

SUBCOMMITTEE ON ENERGY AND MINERAL RESOURCES

OF THE

COMMITTEE ON NATURAL RESOURCES
U.S. HOUSE OF REPRESENTATIVES

ONE HUNDRED NINETEENTH CONGRESS

FIRST SESSION

Monday, May 12, 2025, in Cedar City, Utah

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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 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.

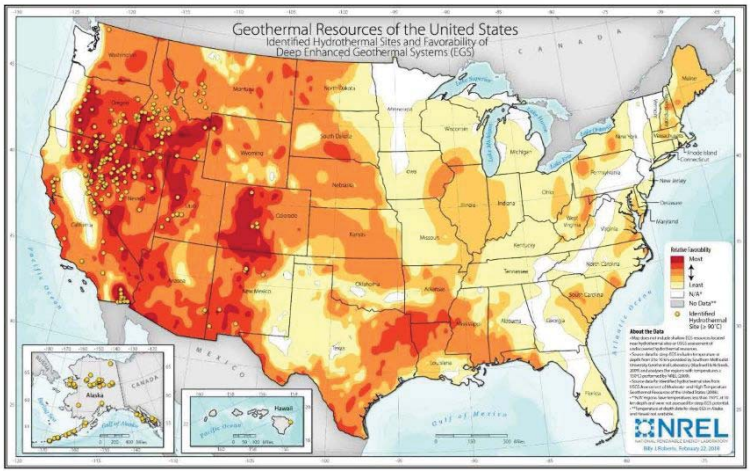
II. WITNESSES

- **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]

States with geothermal power plants in 2023 [1]

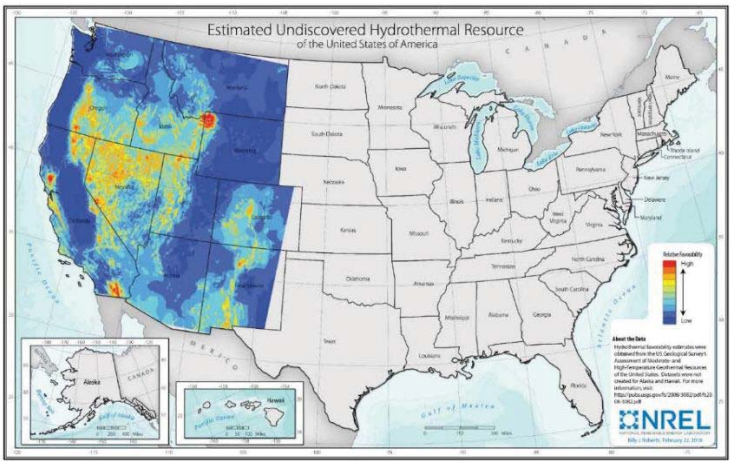
	State share of total U.S. geothermal electricity generation	Geothermal share of total state electricity generation
California	66.6%	5.1%
Nevada	26.1%	10.1%
Utah	3.2%	1.5%
Hawaii	2.1%	3.7%
Oregon	1.3%	0.4%
Idaho	0.5%	0.6%
New Mexico	0.2%	0.1%

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]



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 °/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]

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]

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.

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 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.

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OVERSIGHT FIELD HEARING ON LETTING OFF STEAM: UNLEASHING GEOTHERMAL ENERGY DEVELOPMENT ON FEDERAL LAND

Monday, May 12, 2025
U.S. House of Representatives
Subcommittee on Energy and Mineral Resources
Committee on Natural Resources
Cedar City, Utah

The Subcommittee met, pursuant to notice, at 2 p.m., MST, in the Sterling R. Church Auditorium, Sharwan Smith Student Center, Southern Utah University, 351 W. University Blvd., Cedar City, Utah, Hon. Pete Stauber [Chairman of the Subcommittee] presiding.

Present: Representatives Stauber and Begich.

Also present: Representative Maloy.

Mr. STAUBER. Well, good afternoon. Before we begin, I would like to remind everybody about the rules of decorum for official congressional proceedings.

I ask that there not be any kind of disruption regarding the testimony given here today. It is important that we respect the rules of the Committee and of the House and to allow the members and the public to hear our proceedings.

The Subcommittee on Energy and Mineral Resources will come to order.

Good afternoon, everyone. I want to welcome our witnesses, members, and our guests in the audience today for today's hearing. And I also want to thank Representative Maloy for hosting us here in Cedar City.

I would now like to recognize Southern Utah University Student President Landon Lee, who will begin this hearing with an opening prayer, followed by the Pledge of Allegiance.

Landon, come on up.

Mr. LEE. Everybody, if you will, can you please bow your heads?

Dear Heavenly Father, we thank you for this day. We thank you for the amazing people that have come out here to represent us and Utah. Please bless us and give us guidance as we go through this meeting and give us the strength to power forward through this.

We thank you again, Heavenly Father, for everything you have given us and the opportunities that we can take as a person. We say these things in the name of Jesus Christ. Amen.

Please arise with me as I say the Pledge of Allegiance.

I pledge allegiance to the Flag of the United States of America, and to the Republic for which it stands, one Nation, under God, indivisible, with liberty and justice for all.

Thank you all.

Mr. STAUBER. Thank you, Landon.

Today we are at Southern Utah University for a House Committee on Natural Resources oversight hearing, entitled, "Letting Off Steam: Unleashing Geothermal Energy Development on Federal Land."

Without objection, the Chair is authorized to declare a recess of the Committee at any time.

By way of introduction, I am Pete Stauber, Chairman of the House Natural Resources Committee Subcommittee on Energy and Mineral Resources. I also represent Minnesota's Eighth Congressional District covering northeastern Minnesota.

I am grateful to be joined today by two of my colleagues.

I ask unanimous consent that the gentlelady from Utah, Ms. Maloy, be allowed to participate in today's hearing. Without objection, so ordered.

I also ask unanimous consent that all other members' opening statements be made part of the hearing record if they are submitted in accordance with Rule 3(0). Without objection, so ordered.

I will now recognize myself for an opening statement.

STATEMENT OF THE HON. PETE STAUBER, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF MINNESOTA

Mr. STAUBER. I would like to begin by thanking all the witnesses for being here to discuss this important topic before us today.

I would also like to thank Fervo Energy for leading an exciting and informative field tour of the cutting-edge Cape Station Project just this morning.

In the coming years, the United States will face unprecedented growth in energy demand as we race to win the AI war against China and bring gigawatts of new data center capacity online. An all-of-the-above approach for energy development is the only option we have to move forward.

As we saw today, reliable, clean, baseload geothermal power has incredible potential to help meet our growing needs. Geothermal plants already supply power across seven States and Hawaii, and that is just the beginning. For example, the Department of Energy estimates that next-generation geothermal technologies like the enhanced geothermal system, or EGS, that we toured this morning could provide up to 90 gigawatts of electricity by 2050, enough to power, millions of homes and businesses across this great Nation. Unfortunately, cumbersome leasing and permitting practices on Federal lands have prolonged project timelines and increased costs for geothermal developers. I am proud to say that House Republicans are leading the charge to end these inefficiencies and unleash geothermal energy on Federal lands.

Just last week, the House Natural Resources Committee advanced its historic reconciliation title which will generate $18.5 billion in new revenue and savings for the American people. This package includes mandates for annual geothermal lease sales, which will contribute $23 million in revenue for the Federal Government and increase certainty for geothermal energy producers.

While these changes are a vital step in the right direction, there is much more work to be done to allow geothermal power to scale up and reach its full potential.

The Bureau of Land Management, or BLM, oversees geothermal development on Federal lands. In fact, geothermal energy was the first type of renewable energy that the BLM approved for production on Federal lands dating back to 1978. However, as we have seen from other forms of energy operating on public lands, the permitting process for geothermal is mired by duplicative requirements and lengthy regulatory delays.

Federal geothermal projects must complete up to six stages of National Environmental Policy Act, or NEPA review throughout the development process. This can take up to 10 years and does not include endless cycles of frivolous litigation.

We can and must do better. To address these barriers, Republican members of the House Natural Resources Committee have championed legislation that limits NEPA reviews for low-impact geothermal activities in previously studied areas, forces the BLM to process geothermal permits in a timely manner, and ensures that the geothermal wells on non-Federal lands are not subject to delays in our broken Federal regulatory process.

If enacted, these provisions would provide geothermal developers greater certainty needed to spur investment in research, development, exploration, and production.

While these pieces of legislation are a great start, I look forward to hearing from our witnesses to identify further reforms and ideas to responsibly expedite the geothermal permitting process.

As we know, America has a wealth of resources right here at home that can satisfy our growing energy needs and produce reliable baseload power. We must work together to responsibly develop these resources to put America back on a path of strength.

I again want to thank the witnesses for joining us today, and I look forward to hearing your testimony.

I now want to recognize Representative Maloy for her opening statement.

STATEMENT OF THE HON. CELESTE MALOY, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF UTAH

Ms. MALOY. Thank you, Mr. Chairman. Welcome to Utah. Welcome to the Second District. I want to thank everyone who is here to participate and especially SUU for hosting. It is good to be back here.

For far too long, the promise of geothermal energy has gone underappreciated and underutilized in our national energy conversation. Despite its incredible potential, geothermal faces regulatory delays, permitting hurdles, and a lack of investment that doesn't match the scale of the opportunity.

Let me be clear. Geothermal is reliable and affordable. Unlike intermittent sources, geothermal delivers steady, 24/7 baseload power. It doesn't depend on weather or foreign supply chains. It is a home-grown resource sitting right under our feet.

At a time when our electric grid is under stress and global energy markets are incredibly unstable, we need dependable,

domestic energy sources. Geothermal offers exactly that resilient American energy that we can count on day and night.

Utah is leading the way in showing what is possible. Earlier today, we had the chance to look at the groundbreaking work being done by Fervo Energy in Beaver County and their pioneering enhanced geothermal systems, EGS, here in Utah's Second District. These innovations are putting our State on the map as a model for innovative and dispatchable energy solutions.

EGS represents a game-changing opportunity. It can unlock geothermal energy in places where conventional geothermal just hasn't been feasible, vastly expanding the resource space. With the right regulatory framework, we can make EGS a major part of our National Energy Strategy.

Geothermal also means good jobs here in Utah, especially in rural communities like those in the west desert. From drilling crews to high-tech engineers, these are careers that can support families and strengthen local economies. That is why there is growing bipartisan support for removing barriers and letting geothermal compete on a level playing field with other energy sources.

Despite this progress, geothermal still faces significant challenges. Complex and outdated permitting processes slow down projects and create uncertainty for developers. Even when the geology is ideal, it can take years to get a green light to drill.

In States like Utah where so much promising geothermal potential lies beneath federally managed lands, the permitting backlog is especially problematic. Developers are forced to navigate the maze of duplicative reviews, unclear timelines, and inconsistent agency coordination.

This bureaucratic tangle discourages investment and leaves too many high-potential projects stuck in limbo. That is why I introduced the GEO Act to modernize geothermal permitting by ensuring Federal agencies act promptly even when projects face delays from ongoing court proceedings, and also the Streamlining Thermal Energy through Advanced Mechanics, or STEAM, Act, to ensure that geothermal development isn't hindered by unnecessary regulatory delays. It gives geothermal projects the same flexibility oil and gas has had for almost two decades.

Today's hearing is an opportunity to identify real, actionable steps Congress can take to unleash geothermal development. From permitting reform to interagency coordination, we need a system that works for innovators, not against them. And we need to be able to produce power here in this country and here in this State, and I am excited to see us having a hearing about how to do that better.

Thank you for being here, and I yield back.

Mr. STAUBER. I thank the gentlelady for her statement. We will now move to introduce our witnesses.

Let me remind the witnesses that, under Committee rules, they must limit their oral statements to 5 minutes, but their entire statement will appear in the hearing record.

We use timing lights. When you begin, the light will turn green. When you have 1 minute remaining, the light will turn yellow. And

at the end of your testimony, the 5 minutes, the light will turn red, and I will ask you to please complete your statement.

I will also allow all witnesses to testify before member questioning.

Our first witness this afternoon is Mr. Tim Latimer, and he is the Chief Executive Officer at Fervo Energy, and he is stationed in Houston, Texas.

Mr. Latimer, you are now recognized for 5 minutes.

STATEMENT OF MR. TIM LATIMER, CO-FOUNDER AND CEO, FERVO ENERGY, HOUSTON, TEXAS

Mr. LATIMER. Chairman Stauber, Representative Maloy, Representative Begich, and members of the Committee, thank you for the opportunity to appear before you. I am Tim Latimer, the Co-Founder and CEO of Fervo Energy, and it is an honor to be with you here today in Cedar City and at the SUU campus, again, to discuss the progress that Fervo Energy has made, specifically at Project Cape Station, which is located just an hour north of here, which we got to visit today.

Cape Station is the world's largest next-generation geothermal facility. It is the result of over a decade of collaboration between Fervo, the people of Utah, the Federal Government, this Committee, and a broad coalition of investors, researchers, and commercial partners. But more importantly, Cape Station represents the start of something bigger, a new era of American energy, built with American innovation, American technology, and American workers.

When we founded Fervo 8 years ago, we asked a simple question: If America could unlock the shale revolution through breakthrough technologies in oil and gas, why couldn't we do the same for geothermal? The answer, it turns out, is that we can, and now we have.

By adapting technologies such as directional drilling, fiber optic sensing, and hydraulic fracturing techniques from the oil and gas sector, we have unlocked geothermal energy in places where it was previously impossible.

In 2023, we demonstrated this with Project Red in Nevada, a commercial pilot that validated enhanced geothermal systems as a true technological breakthrough, and, again, generating electricity for the first time in October of that year. It set new records for an individual enhanced geothermal wells flow and power output, and it laid the foundation for what we are now building at the Cape Station.

Cape Station will provide 500 megawatts of firm, reliable, carbon-free, round-the-clock power, enough to serve hundreds of thousands of homes. And construction is well under way. We have already drilled more than half the wells needed for the phase 1, and partnered with Mitsubishi Heavy Industries to start construction of three onsite power plants.

This isn't a concept or a pilot. Cape Station is a full-scale energy project in motion. What makes Cape special isn't just the technology. It is the community. We are not just developing energy here; we are building a future with and for southwestern Utah. We are creating good-paying jobs that don't disappear when

construction ends, jobs that last for decades and jobs that people can build a life around. Families in Beaver County and Millard County will see real, lasting benefits because of this project.

President Trump has spoken about the need for energy projects that don't just power homes but power prosperity, support American workers, and strengthen the fabric of local communities. Cape Station is exactly that. It is not just an energy solution; it is a commitment to this place and to the people who make it strong.

Of course, innovation alone is not enough. To unlock geothermal's full potential we need smart Federal policy. Today, 90 percent of geothermal resources lie beneath federally managed land, but permitting can take up to a decade, much longer than equivalent wind, solar, oil, or gas projects.

That needs to change. And bipartisan bills, like Congressman Fulcher's CLEAN Act and Senator Curtis' Geothermal Energy Opportunity Act, are strong steps in the right direction.

We also need Federal investment in geothermal R&D and demonstration. The shale revolution was made possible through decades of public-private partnership. Let's apply that same model to next-generation geothermal, especially tackling drilling risks, which remains a key barrier to national deployment.

We are encouraged by the initial 2026 budget request focused on firm baseload power, and we look forward to working with you to ensure geothermal is part of the strategy.

In 2019, the Department of Energy's GeoVision report projected geothermal could grow 15 fold by 2050. Thanks to recent advances, even those numbers now appear conservative.

Studies now estimate we can unlock over 230 gigawatts of geothermal power in the United States alone. That is more than enough to power half the country. At Cape Station, we are taking the first steps to make those projections a reality.

Thank you for being here. We are proud to show you what we built and excited to work with you to build America's geothermal future. I look forward to your questions.

[The prepared statement of Mr. Latimer follows:]

PREPARED STATEMENT OF TIM LATIMER, CHIEF EXECUTIVE OFFICER, FERVO ENERGY

Chairman Stauber, Ranking Member Ansari, distinguished Members of this Committee and Subcommittee, thank you for the opportunity to appear before you today. My name is Tim Latimer, and I am Co-founder and Chief Executive Officer of Fervo Energy. This company was born during my time working as a drilling engineer in the Texas oil fields, where I saw firsthand the innovation, grit, and expertise that define America's leading energy workforce. At Fervo, we are building on that legacy, harnessing the same technologies, talent, and spirit that powered the shale revolution to tap an inexhaustible domestic resource, heat from the earth's core.

Fervo's mission is simple: deliver reliable, around-the-clock baseload power from geothermal heat. It is my privilege to be here with you all in Cedar City and to introduce you to Fervo's Cape Station Project. We proudly call Cape Station a prime example of the energy addition; we are not replacing jobs or resources, we're expanding our toolbox to meet America's unprecedented electricity demand growth. Today, we are putting steel in the ground that will generate 500 megawatts by 2028. None of this would be possible without the men and women of the oil and gas industry, a workforce I'm proud to have been a part of, who are now writing the next chapter of American energy dominance.

Cape Station is the world's largest next-generation geothermal project and a shining example of what is possible through Enhanced Geothermal Systems (EGS). Cape Station is the result of a dedicated partnership between Fervo, the people of

Utah, the federal government, this Committee, our many investors, commercial partners, and academic collaborators, and the oil and gas industry.

We at Fervo also see Cape Station as something much bigger than an individual project. It is the start of a new era of American energy, built on American innovation, with American technology, by American workers. And as electricity demand surges, the development and commercialization of next-generation geothermal has arrived at exactly the right time.

We are working to realize that vision in collaboration with the federal government, this Committee, the people of Utah and others across the country. And, we look forward to building this future together.

Unleashing American Geothermal Energy

A decade ago, the concept of harnessing unconventional geothermal resources and transforming them into baseload power was just starting to emerge. At that time, we founded Fervo Energy to answer a basic question: if the oil and gas industry had made radical progress to unleash American production of unconventional oil and gas, could we use some of those same American innovations to unlock the potential of American geothermal?

We had many reasons to be confident. Geothermal is not new. Subsurface thermal resources have been a source of electricity in the United States for decades, and a source of heating and cooling for even longer. And, there has always been significant crossover between the technologies and techniques of our sector and the oil and gas industry.

By 2015, the oil and gas sector—in close partnership with the federal government and many others—had already developed breakthrough innovations that unlocked production of unconventional hydrocarbons, unleashing the shale revolution. Those included many critical American technologies that changed the world, including reservoir engineering and well stimulation techniques, polycrystalline diamond compact drill bits, microseismic imaging, and horizontal drilling. All of these were developed through close collaboration between the private and public sectors, a robust set of evolving policy support, including tax incentives, and shared investment in research and development. All of these tools could be applied now to geothermal with similarly gamechanging results.

Over several years, we adapted these technologies to geothermal. We have applied proven oil and gas technologies—such as horizontal drilling, multi-stage stimulation, and distributed fiber optic sensing—to geothermal reservoir development, unlocking geothermal power in previously uneconomic locations and dramatically increasing the geothermal resource potential.

We have also gotten results. In 2023, Fervo completed a full-scale commercial pilot, Project Red, in northern Nevada. In a partnership with Google, we brought Project Red online in 2023 to generate 3.5 Megawatts enough electricity to power over 700 homes. This project represented a true technical breakthrough: it set new records for both flow and power output from an enhanced geothermal system, and confirmed the viability of our subsurface engineering approach. The technical success of Project Red set the groundwork for taking EGS to scale at Cape Station.

Today, we are proud to say that Cape Station is making next-generation geothermal a reality. Phase 1 of the project, with a capacity of 100 megawatts, is on track to commence commercial operations in 2026. Together with Phase 2, the project will generate 500 megawatts by 2028. This is EGS at scale, producing affordable, always-on baseload power for families and businesses across the west. We have already drilled 20 wells at Cape Station—80% of the wells required for Phase 1 of the project—representing a massive milestone in the de-risking of commercial-scale EGS production. And, we have also partnered with Mitsubishi Heavy Industries to construct three Organic Rankine Cycle power plants adjacent to our drilling pads, directly linking our subsurface activities to surface power production.

In other words, we are already well underway in building America's geothermal future.

Unleashing American Geothermal Jobs

One of the Cape Station's greatest advantages has nothing to do with drill bits or fiber optic cables. That is our location and the people here in Southwestern Utah. We are fortunate to be a part of this community and look forward to being a key contributor to its thriving success long into the future.

President Trump has spoken about the importance of new energy development and how these projects will create jobs and economic prosperity for people across

America, particularly in rural communities.[1] Cape Station is exactly this type of project. The construction of Phase 1 is currently employing over 250 workers on site, and with stable and predictable drilling and development for years to come, we're just getting started. Geothermal is a long term investment and with Fervo's commitment to Beaver County, we're building a partnership for decades to come.

Beyond the project itself, Fervo is an active part of this community. Our team regularly attends city council and county commission meetings. I have personally held townhalls in Beaver City and Milford, creating a platform for open dialogue on topics including jobs, housing, groundwater sources and seismicity. We have proudly sponsored the Beaver County Rodeo and the Milford City Sesquicentennial Celebration. In all of partnerships we exemplify a core Fervo value: *do what you say you're going to do*. That means being straightforward about our plans, open in our collaboration, and always looking for ways to bring good jobs and sustainable growth to this area.

Public-Private Partnership to Unleash American Geothermal Leadership

At his inauguration in January 2025, President Trump declared that the United States is in a national energy emergency.[2] Demand for energy—the foundation of modern life and economic growth—is increasing to unprecedented levels, reflecting growing demand from advanced computing, industrial growth, heating and cooling and more.

As President Trump rightly said, the United States needs a "reliable, diversified and affordable supply of energy" to meet surging demand, bolster the resiliency and reliability of our power grid and critical infrastructure, and power American prosperity. At Fervo, we believe that foundation is being built here, at Cape Station. This site isn't just a milestone, it's a living model for the future of a reliable grid. With scalability unmatched by any other firm, baseload resources, Cape Station represents the future of American energy, made possible by the same technology, workforce, and expertise that made the United States the world's leading producer of oil and gas.

As with the development of the American technologies that unlocked the shale revolution, the federal government and this Committee are indispensable partners in our efforts to build the energy supply that President Trump has called for. In particular, the federal government can help unleash geothermal dominance by taking key steps in in two areas:

1. **Implementing Sound Federal Land Management Policies; and**
2. **Focusing Federal Research, Development and Demonstration Investments on Next-Generation Geothermal projects.**

Implementing Sound Federal Land Management Policies

Accelerating geothermal development means taking steps to simplify and expedite the permitting of energy projects on federal lands. This is particularly important for geothermal: 90% of American geothermal resources exist underneath federally managed land, and federal permitting processes create significant bottlenecks to geothermal development.

The repetitive analyses and redundant approvals required to develop a geothermal project on public land under the National Environmental Policy Act of 1969 (NEPA) can take up to 10 years or more. Historically, this process has also taken longer and been more prone to delay for geothermal than for other renewables or for oil and gas projects. This means that geothermal developers must put significant capital at risk before there is certainty that the power plant can be built. Permitting uncertainty constrains project development, extends development timelines, limits access to capital and slows technological progress.

Over the past year, thanks in large part to leadership from this Committee, Congress has advanced several important proposals to reduce the red tape associated with federal permitting processes and accelerate American geothermal development.

In the 118th Congress, the House of Representatives passed five geothermal leasing and permitting bills on a bipartisan basis, including Representative Fulcher's CLEAN Act and now-Senator Curtis's Geothermal Energy Opportunity

[1] Trump, D. J. (2025, January 20). Executive Order 14156: Declaring a national energy emergency. The White House. https://www.whitehouse.gov/presidential-actions/2025/01/declaring-a-national-energy-emergency/.

[2] 2 Trump, D. J. (2025, January 20). Executive Order 14156: Declaring a national energy emergency. The White House. https://www.whitehouse.gov/presidential-actions/2025/01/declaring-a-national-energy-emergency/.

(GEO) Act. The momentum has continued into the 119th Congress. Already this session, Mr. Fulcher has reintroduced the CLEAN Act and Representative Celeste Maloy, from here in Utah's 2nd District, has picked up on Sen. Curtis's leadership in sponsoring both the GEO Act and the STEAM Act. In the Senate, the Energy Permitting Reform Act of 2024 included a geothermal title that included important bipartisan reforms to create parity between geothermal and oil and gas development, provide certainty in permitting timelines, increased leasing frequency and more.

We strongly support enactment of these important reforms and we look forward to working with President Trump, with the 119th Congress, and with this Committee to achieve these goals.

Focusing Federal Research, Development and Demonstration Investments on Next-Generation Geothermal Projects

The federal government has been a key partner in our work to make America the world leader in geothermal technologies. Like the natural gas industry a decade ago, development of next generation geothermal technologies is at a critical inflection point. Fervo has now demonstrated the effectiveness of EGS technology, but unlocking private capital and spurring widespread market adoption of these technologies requires them to be further deployed at scale.

To unleash the potential of American geothermal, we should continue to follow the playbook that unleashed the shale revolution in the United States. That includes continued federal investments into subsurface research and development, which is necessary to improve and optimize the tools, techniques and technologies used to harness unconventional geothermal resources. And it also means investment to further de-risk the application of these technologies through repeated EGS demonstration and deployments across different geologies.

In particular, the federal government can help address one of the key barriers to geothermal deployment: exploration drilling risk. In the early stages of commercialization, the private sector's perception of geothermal drilling risk has constrained next generation geothermal to Western states. Addressing this risk through targeted federal support in a range of different locations would significantly expand the footprint of American geothermal generation.

To this end, we appreciate the support that President Trump's initial Fiscal Year (FY) 2026 Budget Request has indicated for increased support for the development of firm, baseload power. We look forward to working with Congress and this Administration across the FY 2026 appropriations process and other avenues to support investments in these important projects.

Conclusion

In 2019, the U.S. Department of Energy released its landmark report, GeoVision: Harnessing the Heat Beneath our Feet. GeoVision projected that American geothermal generation capacity could expand more than 15×, reaching over 120 GW by 2050 and supplying 8.5% of total U.S. electricity generation. GeoVision's projections predated many of the technological advances that Fervo has since made to unlock shallower and cooler geothermal resources.

Today, GeoVision's projections have proven conservative. Follow-on analysis by DOE and the U.S. National Renewable Energy Laboratory (NREL) estimated that geothermal energy generation capacity could exceed 230 GW by 2050 and also found that the nation's available geothermal resource is significantly larger, potentially by orders of magnitude, than previously known.[3] The progress we have demonstrated at Cape Station, both in terms of drilling performance and resource scale shows that EGS is years ahead of even the most optimistic projections.

At Cape Station, you are seeing the birth of EGS—the next great American energy revolution. Fervo is building hundreds of megawatts today, and together with our partners, like the people of Utah and the members of this committee, we are excited to start building gigawatts tomorrow. Thank you for the opportunity to show you the work we are doing here in southwest Utah. I look forward to answering your questions.

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[3] Augustine, Chad, Sarah Fisher, Jonathan Ho, Ian Warren, and Erik Witter. 2023. Enhanced Geothermal Shot Analysis for the Geothermal Technologies Office. Golden, CO: National Renewable Energy Laboratory.NREL/TP–5700–84822. https://www.nrel.gov/docs/fy23osti/84822.pdf.

QUESTIONS SUBMITTED FOR THE RECORD TO MR. TIM LATIMER, CEO, FERVO ENERGY

Questions Submitted by Representative Huffman

Question 1. Legislation is now under consideration that mandates annual geothermal lease sales in all states with known geothermal resources on federal land. The legislation also requires that all eligible acreage (pursuant to a land use plan) nominated by industry be offered for lease—without leaving any opportunity for public input into leasing, site-specific analysis, or scoping to address potential resource or land use conflicts prior to a lease auction. Land use plans are often woefully outdated—some are over 40 years old and no longer accurately reflect existing resource conflicts. Please explain how the industry will work with stakeholders to ensure nominations will avoid, minimize, mitigate, and compensate for any resource conflicts.

Answer. Fervo Energy values strategic and thoughtful siting as well as working with stakeholders to ensure geothermal energy development avoids and minimizes resource conflicts. Across our extensive leaseholding portfolio, we undertook an extensive analysis of sensitive habitat and social impacts. We chose to pursue the Cape Station Project located in an area that did not have sensitive, historic, or cultural resources. For Cape Station, Fervo spent engaged the BLM permitting process early and deliberately to maximize prospects of success and expedite processing. Early on in our project development process, we conducted widespread engagement with the county, city, non-governmental organizations, and the state.

We think these proactive approaches are essential to geothermal development. Fervo has made technological advances in the past five years that vastly grow geothermal's potential scale and make it viable across U.S. geographies. A scaled geothermal industry will also create hundreds of thousands of jobs, largely in rural areas. Based on the National Renewable Energy Laboratory's job creation model, each new geothermal plant creates tens of thousands of construction and operational jobs, many of them requiring workers with drilling expertise and oil and gas backgrounds. Committees across the West stand to benefit substantially from strategic and thoughtful geothermal energy development at scale.

Question 2. A common theme during the hearing was permitting delays, which were mostly attributed to duplicative NEPA reviews and other inefficient regulatory processes. Not discussed was the adequacy of agency funding and staffing to be able to process geothermal reviews and permits in a timely manner. Some people with industry experience believe federal regulators process paperwork for oil and gas much faster than for geothermal due to disparities in funding and staffing and less centralization and coordination associated with geothermal permitting than fossil fuel permitting. In your experience, do you believe the agencies—particularly the BLM's Renewable Energy Coordination Offices and other relevant offices—are adequately funded and staffed with geothermal permitting experts to be responsive to your needs and act in a timely manner?

Answer. Enhanced geothermal systems (EGS) combine two different types of development: 1) the subsurface elements, which produce the heat; and 2) the above-ground infrastructure, which generates and transmits the electricity. Unlike solar and wind energy, where conditions are easily observable above ground, the conditions required for a successful geothermal system exist thousands of feet below the surface of the earth in highly heterogeneous layers of rock. This means that projects often must expend significant resources to drill deep enough to find a sample that is reasonably representative to extrapolate across the whole project reservoir. Once the resource is confirmed, a geothermal developer is required to file an additional permit application to construct the above-ground power generation facility.

In summary, under current laws and regulations, EGS faces a unique challenge that NEPA documents have to be completed in sequence, rather than simultaneously, for land use planning, pre-leasing, exploration, drilling, well-field development, power plant construction, and transmission. The requirement to complete each of these in sequence extends project timelines which is particularly costly for first-of-a-kind projects relying on expensive venture capital rather than debt finance.

BLM field offices are linchpins in the permitting process and have substantial discretion in how they approach geothermal energy project development. When they work well with developers and are effective, the field office can be a great asset and permitting is straightforward. However, inconsistency across field office permitting policy and staffing resources can increase development uncertainty and discourage

responsible clean energy projects and investment. Bolstering support for BLM field offices would be helpful. With additional resources, BLM could hire a dedicated team of geothermal experts to develop training materials, best practices and standard operating procedures and provide technical support to field offices to ensure timely review of geothermal power projects on federal lands. The funding could also be utilized to hire, train and promote personnel at BLM field offices to process geothermal permits.

Mr. STAUBER. Thank you very much for your testimony.

Our next witness is Mr. Jake Garfield, and he is the Deputy Director of the Utah Office of Energy Development, and he is stationed in Salt Lake City, Utah.

You are up for 5 minutes.

STATEMENT OF MR. JAKE GARFIELD, DEPUTY DIRECTOR, UTAH OFFICE OF ENERGY DEVELOPMENT, SALT LAKE CITY, UTAH

Mr. GARFIELD. Representative Stauber, Representative Maloy, and Representative Begich, thank you so much for the chance to be here today. My name is Jake Garfield. I am the Deputy Director for the Utah Office of Energy Development. We are a State agency whose mission is to bring new energy sources to Utah and make sure that Utah's energy remains reliable and affordable.

We are so excited about the potential of geothermal energy in Utah and so grateful for the investments from the private sector, from companies such as Fervo and Ormat. And we are so grateful for the investments being made by the Department of Energy and the University of Utah and other parties in the FORGE project.

In Utah, 42 percent of our land is managed by the BLM, and in the west desert, where most of our geothermal resources are located, that percentage is even higher. That presents both opportunities and challenges, and we are grateful to the administration of the Congress in helping us work through this challenge. We are also grateful for the BLM personnel at the State office, the local field offices, who I believe are doing their best to work through some of those challenges and help move geothermal projects forward.

Today I would like to make four suggestions on how the BLM could, or how we could make changes both at the policy level and at the legislative level to help make progress on geothermal issues at the Bureau of Land Management.

First, the BLM really should put more land into their annual geothermal lease sales. In the last 5 years, the Utah BLM has put up a little over 160,000 acres for geothermal lease sale in Utah. In that same time period, the Nevada BLM put over 700,000 acres up for lease sale, over 4.4 times the amount of land that went up for lease sale in Utah.

The last geothermal lease sale that the Utah BLM did was fantastic, it was very successful, but it was significantly larger than the past 4 years of lease sales. This discrepancy between Utah and Nevada is even more stark when you consider that the Nevada BLM hasn't even held their 2025 lease sale yet.

If it can be done in Nevada, it certainly can be done here. The demand for parcels of land to potentially develop geothermal

energy far exceeds the supply currently being offered by the BLM, and that is a change we would really like to see.

Secondly, we would like the BLM to consider doing broad-scale programmatic planning for geothermal development in the West. They did this type of programmatic planning in 2008, and they looked at basically just where geothermal development can happen and where it could happen if all other criteria are met.

But an update to this 2008 plan could use the best available scientific data. It could use the best research to figure out where geothermal energy really is feasible and where it should happen, where it should be prioritized potentially over other land uses.

Just last year, the Biden administration did a similar planning effort for solar power. And if it can be done for solar, it certainly should be done for geothermal energy, particularly since geothermal energy has far fewer impacts on the landscape and, unlike solar, is a reliable baseload dispatchable source of energy.

Third, we will need to see a lot of progress with permitting of transmission. Transmission is uniquely challenging for geothermal energy, because unlike oil or coal, you cannot transport the source of the fuel to your generation site. We need transmission lines to go to the source of the energy itself, and right now we are permitting from BLM and from other agencies to get transmission done. It simply takes far too long.

We are seeing the initial construction of the long transmission line from renewable energy sites in Wyoming down to southern Nevada, that's the TransWest Express line. So far it has taken 16 years to permit, and construction still won't be done for another 5 years.

If we see delays like that with transmission, we will never see the full build-out of Utah's geothermal potential.

And lastly, as we mentioned before, we need to see progress with NEPA permitting. We need the timeline shortened for geothermal itself.

As Representative Maloy mentioned in her opening remarks, there were carve-outs for oil and gas development in the Energy Act of 2005 that were not extended to geothermal development. We are so optimistic about the bills that would extend those type of categorical exclusions to geothermal development.

In conclusion, thank you again for coming today. We are so grateful for the provisions in the reconciliation package, in Representative Fulcher's CLEAN Act, in the GEO Act, and the other acts of Congress that will help us make so much progress with developing our geothermal resources.

Thank you.

[The prepared statement of Mr. Garfield follows:]

PREPARED STATEMENT OF JAKE GARFIELD, DEPUTY DIRECTOR, UTAH OFFICE OF ENERGY DEVELOPMENT

Thank you Chairman Stauber, Representative Begich, and Representative Maloy, for the opportunity to participate in the hearing today. My name is Jake Garfield, I am the Deputy Director for the State of Utah's Office of Energy Development. The mission of our Office is to encourage the development of new energy resources in Utah to ensure that Utah's energy remains reliable and affordable.

Thank you for coming to visit our beautiful state, where we are so excited by the potential of geothermal energy to provide reliable, baseload power to Utah and other parts of the western United States. We are grateful for investments being made by

the private industry into developing Utah's geothermal resources, such as FERVO Energy's Cape Station project, currently the world's largest next-generation enhanced geothermal project. We are also extremely grateful for the investments by the U.S. Department of Energy, the University of Utah, and other partners into the FORGE project, a dedicated field laboratory performing cutting-edge research on enhanced geothermal systems.

In Utah, a tremendous amount of our land is Federal land under the jurisdiction of the Bureau of Land Management ("BLM")—roughly 22.8 million acres, or 42% of Utah's land area. But the percentage of BLM land is much higher in Utah's West Desert where the majority of our potential geothermal resources are located. Operating in an environment where the BLM is by far the majority landowner over Utah's geothermal resources is a challenge that we have to live with, and we greatly appreciate the efforts of both Congress and President Trump's Administration to make this situation more manageable.

We appreciate the dedication and hard work of BLM personnel at the Utah State Office, Color Country District Office, and Cedar City Field Office, who I believe are doing their best to make progress on geothermal projects. We are excited about the BLM's recent geothermal lease sale, where 50,961 acres in 14 parcels were sold for $111.47 per acre on average, a record for the Utah BLM. Clearly, there is a lot of interest in Utah's geothermal potential. While we are pleased with the progress currently happening, we think there is certainly room to improve the BLM's process, through both statutory and regulatory changes.

Today, I would like to make a couple suggestions on ways that the overall permitting process on BLM land could be improved to encourage greater use of this incredible, emission-free energy source beneath our feet.

First, the BLM should put more land up for lease in their yearly geothermal lease sales so that the private sector has more options of sites where they can drill exploratory wells and seek to develop geothermal resources. We know this can be done, because it is already being done by the BLM in Nevada. In the last five years, the Utah BLM has put up a total of 160,031 acres for geothermal lease sale across 59 parcels, while in the same time period the Nevada BLM has put up 706,008 acres for lease sale across 240 parcels. That is 4.4× the total acreage in Nevada vs Utah, and that discrepancy is even more stark when you consider that the Nevada BLM has not even held their 2025 lease sale yet, which will occur in October.

This may not be a straight apples-to-apples comparison—Nevada is a larger state with even more BLM land than Utah. But the private sector interest in Utah's geothermal resources is tremendous, and our conversations with geothermal companies show that the demand to lease geothermal parcels in Utah far exceeds the supply being offered by the Utah BLM over the last five years. The Utah Geological Survey ("UGS") recently received funding during the 2025 Utah Legislative Session to complete geothermal resource exploration projects across Utah. The BLM should consider relying on the data UGS compiles to verify nominated lands and identify prospective areas for leasing. This collaboration will lead to better engagement with private industry and state exploration programs, and ensure alignment between the federal government and private industry interested in Utah.

Second, the NEPA process for permitting geothermal development on BLM land after a lease is secured takes far too long, and it hinders the ability of the private sector to fully invest in geothermal exploration and development. A 2014 study[1] by the National Renewable Energy Laboratory found that a typical Environmental Impact Statement for a geothermal project on BLM land takes an average of 824 days, and a typical Environmental Assessment for geothermal projects takes 337 days. Even processing a Categorical Exclusion takes 97 days on average.

These long timeframes introduce uncertainties and complexities into the process, which holds back the level of investment we would likely see from the private sector if these time frames were shorter.

A practical solution to unwinding these permitting delays would be to introduce additional Categorical Exclusions for geothermal development. We have already seen encouraging developments, including new Categorical Exclusions adopted by the BLM in April of last year and January of this year, which allow smaller-scale projects to conduct exploratory drilling without extensive environmental review. But there are still many opportunities to bring additional Categorical Exclusions into the process. For example, Section 390 of the Energy Policy Act of 2005 includes

[1] Young, K. R., Witherbee, K., Levine, A., Keller, A., Balu, J., & Bennett, M. (2014). Geothermal permitting and NEPA timelines. In GRC Transactions (Vol. 38, pp. 893–902). National Renewable Energy Laboratory. Available at https://gdr.openei.org/files/1258/Geothermal%20Permitting%20and%20NEPA%20Timeline%20Analysis%20%20FINAL.pdf.

certain Categorical Exclusions for oil and gas development that were not extended to geothermal development. Oil and gas drilling in a developed field or at a location where drilling has occurred within the last 5 years is categorically excluded under the 2005 Act. Seeing as how the drilling process for geothermal wells is very similar to the drilling process for oil and gas wells, these are the types of Categorical Exclusions that should be expanded to include geothermal energy.

Although Utah's geothermal areas are dominated by BLM land, the State of Utah actually does a fair amount of permitting on state lands managed by the Utah Trust Lands Administration, on lands dedicated to producing revenue for Utah's public education system. The geothermal permitting process on these state trust lands is much quicker than it is on BLM land. For permits and leases on federal land, Utah's regulatory agency for geothermal resources, the Utah Division of Water Rights, issues subsurface exploration permits, production and injection permits, and geothermal water rights on top of the exploration permits the BLM requires. On state lands, there are no duplicating efforts between state and federal regulatory procedures for exploration permits and water rights, making the permitting timeline on state trust lands much quicker. Additionally, Utah does not have any NEPA-type law requiring such lengthy environmental analysis. Protections against environmental degradation are instead built into the State's leasing process. Categorically excluding from NEPA analysis more of the BLM's permitting steps could allow the BLM to create the kinds of efficiencies we see at the state level.

Third, the BLM should update their programmatic EIS for geothermal development across the western United States. Last year under the Biden Administration, the BLM completed its West—Wide Utility-Scale Solar Energy Programmatic EIS, which identified lands Available for Application for solar development. Something similar could happen for geothermal development. While the BLM did complete a Programmatic EIS for Geothermal Leasing in 2008, it is time to update that document using the best available scientific data gleaned from recent exploration and new technological developments. An updated programmatic EIS for geothermal development could identify areas with the greatest geothermal potential, and where geothermal development should be prioritized as the highest and best use of the land, possibly to the exclusion of other uses.

Fourth, the BLM should find ways to decrease the permitting time for new transmission lines. Transmission is uniquely challenging for geothermal resources, since power generation must occur at the energy site, unlike more traditional fuels sources like coal or natural gas where fuels can be transported to generation locations. Permitting new transmission lines to Utah's geothermal hot spots will be essential to putting more geothermal electrons on the gird and realizing Utah's full geothermal potential.

When permitting new transmission lines takes too long it makes development of renewable resources much more difficult. As an example, we can look at the TransWest Express transmission line, which will run from Sinclair, Wyoming to Clark County, Nevada, crossing much of Utah along the way. The initial right-of-way application with the BLM was filed in November 2007. Initial construction in Wyoming did not even start until fall of 2023, 16 years later. The BLM's EIS for the project, from Notice of Intent to the Record of Decision, took almost 6 years. Construction is expected to be completed in 2029. The BLM transmission process simply takes too long. We need to establish more energy corridors running through high—need areas that streamline the permitting of future transmission lines. Ultimately, its likely that we will need to see amendments to NEPA itself to expedite faster permitting for transmission lines.

In conclusion, Utah is very optimistic about the future of geothermal resources in Utah, in no small part because of the attention that Congress and the Administration are giving to geothermal development on Federal lands. We are excited about the geothermal provisions included in the reconciliation package, as well as Representative Maloy's Geothermal Energy Opportunity Act, Representative Fulcher's CLEAN Act, and other critical pieces of legislation. Thank you for listening to our recommendations and concerns, and for your work to make our energy supply more reliable, secure, and affordable.

Mr. STAUBER. Thank you very much for your testimony.

Our next witness is Dr. Joseph Moore, and he is a Research Professor at the University of Utah's Energy and Geoscience Institute, and he is stationed in Salt Lake City, Utah.

Dr. Moore, you are now recognized for 5 minutes.

STATEMENT OF DR. JOSEPH MOORE, RESEARCH PROFESSOR, ENERGY & GEOSCIENCE INSTITUTE, THE UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Dr. MOORE. Thank you.

Good afternoon, Chairman Stauber and distinguished members of the Subcommittee. My name is Joseph Moore, and I am a Research Professor at the University of Utah and a Principal Investigator of the Utah Frontier Observatory for Research in Geothermal Energy, or FORGE. I am honored to appear before you today to discuss the Utah FORGE project, an innovative geothermal energy research project funded by the Department of Energy.

I am providing testimony today as an individual and not on behalf of the University of Utah.

In the 1970s, attempts to create geothermal reservoirs where none exist naturally were initiated by the Los Alamos National Laboratory. Numerous experiments followed worldwide, but none were capable of producing more than a few megawatts electric.

In 2018, the DOE awarded the University of Utah a grant to build and operate a field-scale underground laboratory, where tools and techniques for the creation of enhanced geothermal systems could be tested.

In addition to operating the field laboratory, Utah FORGE manages 28 external R&D contracts with private companies, national laboratories, and universities.

Approximately $100 million of the nearly $293 million received from the DOE has been used to fund these R&D projects. Several have led to new tools.

Utah FORGE is the only field-scale laboratory in the world dedicated to EGS research.

In the remaining time, I would like to highlight three of the key results that have been achieved.

Reducing well costs was an early priority. This ultimately comes down to minimizing the number of times that the drill string must be removed from the drill hole and the bits replaced. Working with private industry, new bit designs were developed that increased the rate of penetration by 50 percent, leading to significant reductions in drilling costs.

Second, induced seismicity is a natural consequence of reservoir creation, and even small-magnitude events can lead to public concern, property damage, and project shutdowns. Our efforts are focusing on developing new monitoring tools and technologies. Information on seismic activity can be monitored by anyone in real time through our seismic data web page. Computers placed in the local libraries allow easy access to this web page.

The successful stimulation of slanted and encased well proved to be an important step in reservoir creation. In recent tests, 90 percent of the water injected was recovered at a temperature of 380 degrees Fahrenheit. The results of the test demonstrate low water loss and high temperatures are achievable.

Prior to Utah FORGE, the growth of the geothermal industry over the last two decades was slow. Many new companies are now investing in EGS as a result of the technological advances demonstrated at Utah FORGE.

Fervo located its project immediately adjacent to Utah FORGE, and several other companies have leased land in the vicinity.

The data generated at Utah FORGE can be downloaded from the Geothermal Data Repository free of charge.

Utah FORGE is a unique publicly owned and operated laboratory. It is an essential test site for EGS technology advancement and a stepping stone to hotter environments, including super hot resources.

Our current 4-year contract, which began in October 2024, will end in 2028. There is still significant work to be done. Unless DOE provides additional funding, we may have to plug and abandon the wells and bring the surface back to grade. We urge the committee members to continue their support of the Utah FORGE Project and EGS development in the United States.

Thank you for the opportunity to testify on the Utah FORGE Project. I am happy to answer any questions you may have.

[The prepared statement of Dr. Moore follows:]

PREPARED STATEMENT OF DR. JOSEPH MOORE. UTAH FORGE RESEARCH PROFESSOR

Good afternoon Chairman Stauber and distinguished Members of the Subcommittee. My name is Joseph Moore. I am a Research Professor at the University of Utah and the Principal Investigator of the Utah Frontier Observatory for Research in Geothermal Energy (FORGE). I am honored to appear before you today to discuss the Utah FORGE project, an innovative geothermal energy research project funded by the Department of Energy in the State of Utah. I am providing testimony today as an individual and not on behalf of the University of Utah.

The thermal energy beneath our feet is enormous. Some of this energy reaches the surface naturally through hot springs, but this is only a small fraction of the available energy. In fact, in 2006 Jeff Tester and his colleagues concluded that if we could capture even 2% of the thermal energy between depths of 2 to 6 miles, we would have more than 2000 times the amount of energy used in the United States annually.

In 2022 the DOE set an ambitious objective of 60,000 MW of electric power generation by 2050. We currently produce 3,900 MW electric from conventional hot spring systems. Reaching the 60,000 MW electric goal from hot springs systems is an impossible challenge. These systems are characterized by a heat source, permeability, mainly as fractures in the rocks, and water to transfer the heat. Although we can drill deep enough to find the temperatures needed to generate electricity, most rocks do not have sufficient natural permeability to circulate water to the depths required.

In the 1970s, attempts to create geothermal reservoirs where none exist naturally were initiated by the Los Alamos National Laboratory. Numerous experiments followed worldwide, but none were capable of producing more than a few MW electric. These projects used pressurized water to create an interconnected fracture network that would allow water to circulate between the injection and production wells.

In 2014, the DOE issued a Funding Opportunity Announcement (FOA) to build and operate a field scale underground laboratory where tools and techniques for the creation of Enhanced Geothermal System (EGS) reservoirs could be tested. The Utah site was one of five locations considered for the laboratory. The number of sites was narrowed down to two: one at Fallon, Nevada and the second near Milford, Utah. Deep test wells were drilled at each site. In 2018, the DOE determined the Utah location best met the requirements of an ideal EGS test site. Temperature, low permeability reservoir rocks and a low potential for induced seismicity were important factors in the decision.

Since the award was made, six additional wells ranging from 3,000 to 11,000 feet in length and four 1,000-foot wells have been drilled. The deepest well reached a depth of 9,500 feet and a temperature of approximately 450 °F.

In addition to operating the field laboratory and maintaining a strong outreach program, Utah FORGE has managed 28 external R&D contracts with private companies, National Laboratories and Universities. Approximately $100 M of the

nearly $293 M received from the DOE has been used to fund these R&D projects. Several have led to the development of new tools for geothermal applications.

Utah FORGE is the only field scale laboratory in the world dedicated to EGS research. The ultimate goal of the project is to provide a roadmap for EGS development. I would like to highlight some of the results that have been achieved since the project was initiated and illustrate the importance of this research. Significantly, no private geothermal company can afford to maintain a dedicated laboratory like Utah FORGE on its own.

The project team identified a number of critical needs required to bring EGS to commercialization. Reducing drilling costs, mitigating induced seismicity, minimizing water losses, optimizing the stimulation techniques required for creating the fracture network that forms the reservoir, and controlling fluid movement between wells are among the most important issues.

Drilling costs can account for 50% of a geothermal project. Reducing well costs ultimately comes down to minimizing the number of times worn drill bits and bottom hole assemblies must be replaced. Utah FORGE pioneered the development of Polycrystalline Diamond Compact (PDC) bits for the geothermal industry. Working with private industry, bit designs were progressively improved over a period of three years. The result was a 50% increase in the rate of penetration in the hard, hot, abrasive granite that hosts the Utah FORGE reservoir and a significant reduction in drilling costs. Using the newly designed bits, Utah FORGE drilled over 2,000 feet on a single bit run in granite, a world record at the time.

Induced seismicity is a natural consequence of reservoir creation. Even small magnitude events can lead to public concern, property damage, and project shutdowns. Our efforts to minimizing potential damage are focusing on new monitoring tools and technologies. We are testing fiber optic cables suitable for high temperatures, seismometers for measurements at reservoir depths, and improved Traffic Light Systems. These systems define the measures that must be taken when seismicity exceeds predetermined levels. We update the local communities quarterly on our activities to keep them informed. Information on seismic activity can be monitored by anyone in real time through our seismic data webpage. Computers placed in the local libraries allow easy access to this webpage.

The successful stimulation of cased wells proved to be an important step in reservoir creation. After the initial tests in vertical wells, highly slanted production and injection wells were drilled and successfully hydraulically stimulated. Ninety percent of the water injected was recovered during a 30-day circulation test and the produced water reached a temperature of 380 °F. The results of the test demonstrate low water loss and high temperatures are achievable. Longer circulation tests, ranging from four months to a year will be conducted to monitor temperature and permeability changes in the reservoir.

Prior to Utah FORGE, the growth of the geothermal industry in the United States over the last two decades was slow. The positive results and technological advances demonstrated at Utah FORGE have had a major effect on the industry. Many new companies are now investing in EGS, and even some of the major oil and gas companies have shown significant interest in geothermal development. Fervo located its project immediately adjacent to Utah FORGE and several other companies have leased land in the vicinity. All of the data generated at Utah FORGE can be downloaded from the Geothermal Data Repository, a database available to the public free of charge.

Utah FORGE is a unique publicly owned and operated laboratory. It is an essential test site for EGS technology advancement and a stepping-stone to hotter environments, including superhot resources. No comparable facilities exist in the world. Our current four-year contract, which began in October 2024, will end in 2028. There is still significant work left to do, particularly at higher temperatures. Unless DOE provides additional funding, we may have a to plug and abandon the wells and bring the surface back to grade. We urge the Committee members to continue their support of the Utah FORGE project and EGS development in the United States.

Thank you for the opportunity to testify on the Utah FORGE project. I am happy to answer any questions you may have.

Mr. STAUBER. Thank you, Dr. Moore.

Our final witness is Mr. Paul Thomsen, and he is the Vice President of Business Development at Ormat Technologies, Incorporated, and he is stationed in Reno, Nevada.

Mr. Thomsen, you are now recognized for 5 minutes.

STATEMENT OF MR. PAUL THOMSEN, VICE PRESIDENT OF BUSINESS DEVELOPMENT, ORMAT TECHNOLOGIES, INC., RENO, NEVADA

Mr. THOMSEN. Thank you very much, Chairman Stauber, Representative Maloy, and Representative Begich, and all the members of the Subcommittee. I can't really contain how excited I am to be here.

I first testified in front of Congress on geothermal 17 years ago. I think Tim and I did this about 7 years ago, and today, all the things that we were really pushing for then are coming to fruition.

By way of introduction, my name is Paul Thomsen. I am the Vice President of Business Development for Ormat Technologies. We are a global leader in geothermal power and recovered energy development, and we operate 22 power plants on Federal lands in the Western United States.

We have two projects right here in Utah, one called Cove Fort and the other called Blundell.

The five items that we really have been pushing on forever are setting timelines for permits, royalty fixes, the ability to do concurrent permitting, annual lease sales, and ESA reforms. And I am happy to say we are making incredible progress on all of those.

Ormat supports the geothermal permitting reforms initiated by this Committee, including H.R. 301, thanks to Representative Maloy. These reforms aim to streamline the permitting process, allowing for quicker deployment of geothermal energy on Federal lands.

The GEO Act, for instance, mandates a 60-day deadline for the Department of the Interior to process geothermal drilling permits. We can tell you lots of stories about getting our NEPA approval and then waiting for geothermal drilling permits for, not 1 year, not 2 years, but even longer. So, this legislation is just critical to that.

The GEO Act is also critical at setting deadlines for processing these permits, and the legislation has already led to the issuance of long delayed permits. We have a project called Baltazor, for example, that received its NEPA approval 3.5 years ago, and we couldn't get those geothermal drilling permits.

With this Committee's work and the new Administration, those permits were issued. Thanks to the diligent work of Director Jon Raby and Greg Wischer from the Department of the Interior.

Let's move on to royalties on leases for multiple plants. In the 2005 Energy Policy Act, there was a royalty structure that said geothermal power plants should pay one royalty rate for the first 10 years, and once the plant is paid off, that royalty rate should increase. We are the first company to take a project past year 10, and kind of an unexpected consequence was that nearby facilities using the same geothermal resource were also moved into that higher royalty rate.

So, the Committee looking at fixing that will drive much more geothermal development and wiser development because you won't

be looking to try to disturb more public lands by separating power plants just to receive better tax benefits moving forward.

Concurrent consideration of multiple permits. You have heard the stories today, geothermal has to apply for an exploration permit that used to take 2 to 4 years. And then if we found the geothermal resource, we had to permit a utilization plan or a power plan that took another 2 to 4 years. We have many projects that exceed 10 years in kind of the permitting regime.

So this Committee's work and the Administration's now to allow for concurrent permitting is huge. And being able to expedite permits moving forward can drastically reduce the time of 4 to 8 years of permitting development down to something to meet our energy needs, as Representative Maloy discussed.

We, last week, submitted 10 geothermal projects, representing hundreds of megawatts for the accelerated permitting process under NEPA.

We heard about annual lease sales. We have been pushing on that. We heard Mr. Garfield talk about it. We couldn't be happier to see more and more States putting geothermal up for leasing. It is very hard to develop it if you can't get access to those Federal lands, and I am happy to report that States like Nevada, Utah, Idaho, and Oregon are all planning to conduct lease sales this year.

BLM, for example, is going to have possibly two lease sales this year. So we are making huge progress in that area.

Lastly, I want to talk about the U.S. Fish & Wildlife Service. U.S. Fish & Wildlife Service has proposed many ESA listings that could impact geothermal development. They are looking at species like the Dixie Valley toad, the bleached sandhill skipper, the Fish Lake tui chub, the greater sage-grouse, the monarch butterfly. The list goes on and on. And Fish & Wildlife Service really fought with the Department of the Interior for the last 4 years and really stopped these projects from moving forward. We have examples of BLM not wanting to issue those permits because they were under threat of being sued by the Fish & Wildlife Service.

That is not really how the process is meant to work. We shouldn't have regulatory capture due to threat of litigation. So, we urge the committee to address the interagency conflicts that hinder geothermal energy exploration.

Ormat is dedicated to advancing geothermal energy on Federal lands. It supports this Committee's, the President's, and the Secretary's energy production goals for fostering job creation and economic development.

We appreciate your support and look forward to collaborating to unlock geothermal energy's full potential in the United States.

Thank you.

[The prepared statement of Mr. Thomsen follows:]

PREPARED STATEMENT OF PAUL THOMSEN VICE PRESIDENT OF ORMAT TECHNOLOGIES, INC.

Chairman Stauber, and members of the Subcommittee, thank you for the opportunity to testify today. My name is Paul A. Thomsen, and I am the Vice President of Ormat Technologies Inc. On behalf of Ormat, I am grateful for this Committee's leadership to advance the deployment of geothermal energy.

Ormat Technologies, headquartered in Reno, Nevada, is a vertically integrated global leader in geothermal power and recovered energy generation (REG). With

more than 1,600 employees and over 60 years of industry expertise, Ormat designs, develops, manufactures, owns, and operates geothermal power plants worldwide—delivering more than 3,400 megawatts of gross capacity across 30+ countries. Ormat has a strong operational presence on federal lands, with 22 active facilities spanning 880 acres and utilizing 300,920 acres of Bureau of Land Management (BLM) land across California, Nevada, New Mexico, and Utah. Ormat's state-of-the-art, air-cooled binary facilities provide stable and reliable renewable energy, 24 hours a day, seven days a week, with zero carbon emissions.

Permitting Reform

Ormat strongly supports the geothermal permitting reforms pursued by the Trump Administration and proposed by this Committee in various legislative vehicles, including H.R. 301 and the legislative proposals to comply with the reconciliation directive included in section 2001 of the Concurrent Resolution on the Budget for Fiscal Year 2025, H. Con. Res. 14. These reform measures, discussed in further detail below, would streamline the permitting process for geothermal development and allow for more renewable energy to be deployed on federal lands.

Agency Deadlines for Geothermal Development Permits (H.R. 301)

We can't thank Congresswoman Maloy and this committee enough for its efforts on the Geothermal Energy Opportunity Act, or the GEO Act. This bill expands the Geothermal Steam Act of 1970 to establish a deadline for the Department of the Interior to process applications related to geothermal leases. Specifically, this legislation would require Interior to process each application for a geothermal drilling permit or other authorization under a valid existing geothermal lease within 60 days after completing all requirements under applicable federal laws and regulations (including the National Environmental Policy Act of 1969, the Endangered Species Act of 1973, and the National Historic Preservation Act) unless a federal court vacates or provides injunctive relief for the underlying lease.

Although this legislation has not yet been enacted, the Trump Administration's renewed focus on geothermal energy has already led the Nevada BLM to issue Ormat's long-delayed drilling permits for the Baltazor project—permits that had been stalled for over two years following the completion of a NEPA review. This progress represents a significant milestone in addressing water monitoring requirements for our geothermal resource confirmation projects and expediting geothermal project development on BLM lands. We are pleased to see BLM proceeding quickly to support the Administration's agenda to produce more domestic energy. Ormat is excited to begin drilling at this project and complete the initial steps toward bringing it online.

Royalties on Leases with Multiple Plants

Ormat sincerely appreciates the Committee's efforts to clarify the legal framework governing royalty rates for geothermal leases with multiple operating power plants. This clarification is a critical step toward ensuring fairness and consistency across the industry. It also addresses longstanding concerns around royalty overpayments, helping to prevent future discrepancies and supporting continued investment in geothermal energy.

Concurrent Consideration of Multiple Project Phases

In response to President Trump's January 20, 2025, declaration of a National Energy Emergency, the Department of the Interior has implemented emergency permitting procedures to accelerate the development of domestic energy resources and critical minerals, including multiple project phases. These measures expedite the NEPA, ESA, and NHPA review and approval of projects related to energy within the United States, reducing a 4—8-year process to approximately 28 days. This applies to actions related to geothermal energy, among other energy sources. Secretary Burgum emphasized the urgency of these procedures to protect our energy security and national security. By reducing permitting timelines, the Department will lead with urgency, resolve, and a clear focus on strengthening the nation's energy independence.

Under the alternative NEPA and Section 106 procedures, Ormat has submitted requests for DOI to process Operations Plans for our Mason, Harmony, Diamond Flat, Pinto, and Rincon projects. Additionally, Utilization Plans have been submitted for the Lone Mountain, Pearl, Whirlwind, and Truckhaven projects to be assessed under these alternative procedures as well.

Annual Lease Sales

Annual lease sales are being commenced in many states, including Nevada, Utah, Idaho, and Oregon. We commend Acting BLM Director Jon Raby for his continued

support of geothermal development and efforts to implement the President's Executive Order declaring a National Energy Emergency. This leasing initiative is crucial for securing an affordable and reliable domestic energy supply, vital for our nation's national and economic security. BLM Idaho will host two geothermal lease sales this year, which will significantly contribute to meeting the objectives outlined in the Executive Order. By facilitating these sales, BLM Idaho is pivotal in unleashing the geothermal drilling required to enhance our domestic energy supply.

Endangered Species Act Reform

The U.S. Fish & Wildlife Service (USFWS) has been proactive in proposing ESA listings and, in some cases, emergency listing species to block geothermal energy development. Below is a list of proposed ESA listings and critical habitat designations affecting geothermal energy development. I urge this Committee to take action to end the ongoing infighting between agencies, which undermines the President's and Secretary's shared goal of expanding geothermal energy production.

- **Dixie Valley Toad (DVT)**. In April 2022, the USFWS listed the DVT as endangered on an emergency basis, the first time USFWS has invoked emergency listing procedures since 2012. The listing was finalized in December 2022. In 2024, USFWS proposed to designate critical habitat for the toad, which proposal remains pending. The DVT is endemic to the Dixie Meadows springs complex in Dixie Valley, Nevada. The toad population is currently stable, and no changes in population, toad health, or habitat are documented. The listing decision was based entirely on alleged and unproven impacts of Ormat's proposed Dixie Meadows geothermal project in the vicinity of the springs. USFWS ignored Ormat's comments on the proposed listing, explaining that its state-of-the-science closed-loop technology maintains reservoir pressures and avoids groundwater drawdowns that could affect DVT habitat. Now, USFWS is considering designation of critical habitat, which will present even greater challenges to permitting the Dixie Meadows geothermal project. The proposed critical habitat designation is also flawed because it fails to meet the agency's obligation to define what environmental features are necessary for the toad and what degree of habitat changes would adversely affect the toad.
- **Bleached Sandhill Skipper (BSS)**. In January 2025, the USFWS proposed to list the BSS as endangered. The public comment period for this listing decision closed on March 10, 2025. USFWS has determined that major threats to this small butterfly species include climate change and groundwater pumping, which are allegedly drying the alkali meadows in Nevada. These impacts are unrelated to geothermal development, and as explained in Ormat's detailed comments, are based on faulty data and unsupported assumptions. Given the proximity of the species to Ormat's proposed Baltazor geothermal project, listing this species could impact Ormat's ability to develop the Baltazor project and another geothermal project in the vicinity.
- **Fish Lake Valley Tui Chub**. In 2022, USFWS found that the Fish Lake Valley tui chub (FLVTC; a small fish) may be warranted for listing as an endangered or threatened species. The species is currently under status review. USFWS has a court-ordered deadline to determine whether listing is warranted by May 17, 2025. According to USFWS, potential threats to this species include groundwater pumping from agriculture, encroachment of invasive aquatic plants, geothermal development, lithium extraction, climate change, and stochastic events. As a species under review by USFWS, the BLM affords the same protections to the species as if it were listed. This species occurs in proximity to Ormat's Lone Mountain geothermal project, another geothermal development, and the Rhyolite Ridge lithium project. On the basis of the best available scientific evidence, Ormat categorically denies that the Lone Mountain geothermal project could impact the species.
- **Greater Sage-Grouse**. The greater sage-grouse (GRSG) was petitioned for listing in the early 2000s. After extensive review and litigation, USFWS determined that listing was not warranted, relying in large part on BLM resource management planning efforts to conserve the species. The Bi-State Distinct Population Segment of the species (spanning areas of Nevada and California) is currently under status review for listing as a threatened species. The GRSG is a small, round-bodied game bird that lives primarily in sagebrush habitat throughout the western US. Given its extensive range and presence in areas of existing and potential geothermal development, a decision to list either the Bi-State population or the species as a whole could

significantly impair numerous energy projects, utility development, and right-of-way usage throughout the West.

- Monarch Butterfly. In 2024, the USFWS proposed to list the monarch butterfly as threatened and to designate approximately 4,400 acres of critical habitat in Alameda, Marin, Monterey, San Luis Obispo, Santa Barbara, Santa Cruz, and Ventura Counties in California. USFWS found that the monarch butterfly is threatened by loss of habitat from drought, agriculture, urban development, insecticides, and climate change. If the species is listed or if critical habitat is designated, countless geothermal projects (greenfield or operating facilities) could be impacted. The host plant for this species is widespread in small populations across Ormat's geothermal portfolio area.

Conclusion

Thank you for your attention to these critical issues. Ormat is committed to advancing geothermal energy development on federal lands, supporting the President's and Secretary's agenda to produce more energy, and creating jobs and economic development, especially in rural areas. We appreciate your continued support and look forward to working together to unleash the full potential of geothermal energy in the U.S.

QUESTIONS SUBMITTED FOR THE RECORD TO MR. PAUL THOMSEN, VICE PRESIDENT OF BUSINESS DEVELOPMENT, ORMAT TECHNOLOGIES, INC

Questions Submitted by Representative Huffman

Question 1. Legislation is now under consideration that mandates annual geothermal lease sales in all states with known geothermal resources on federal land. The legislation also requires that all eligible acreage (pursuant to a land use plan) nominated by industry be offered for lease—without leaving any opportunity for public input into leasing, site-specific analysis, or scoping to address potential resource or land use conflicts prior to a lease auction. Land use plans are often woefully outdated—some are over 40 years old and no longer accurately reflect existing resource conflicts. Please explain how the industry will work with stakeholders to ensure nominations will avoid, minimize, mitigate, and compensate for any resource conflicts?

Answer. The proposed amendment to the geothermal leasing legislation does not alter the requirement that all nominated parcels must undergo an Environmental Assessment (EA) prior to being offered at a lease sale. This process continues to provide opportunities for public input and environmental review. While the EA conducted at the leasing stage does not include site-specific analysis or scoping for development—level impacts, those evaluations are appropriately addressed during the EA or Environmental Impact Statement (EIS) process associated with subsequent development plans. The intent of the amended language is to ensure that states conduct comprehensive, statewide annual lease sales rather than limiting offerings to specific districts or geographic areas, thereby improving consistency and access to geothermal resources. Ormat Technologies supports this approach and remains committed to responsible development. We proactively engage with local communities, Tribal governments, and environmental stakeholders prior to nominating parcels, using modern geospatial tools and environmental data to avoid or minimize conflicts. Where impacts are unavoidable, we support mitigation and compensation strategies to ensure that geothermal development proceeds in a manner that is both environmentally responsible and publicly accountable.

Question 2. A common theme during the hearing was permitting delays, which were mostly attributed to duplicative NEPA reviews and other inefficient regulatory processes. Not discussed was the adequacy of agency funding and staffing to be able to process geothermal reviews and permits in a timely manner. Some people with industry experience believe federal regulators process paperwork for oil and gas much faster than for geothermal due to disparities in funding and staffing and less centralization and coordination associated with geothermal permitting than fossil fuel permitting. In your experience, do you believe the agencies—particularly the BLM's Renewable Energy Coordination Offices and other relevant offices—are adequately funded and staffed with geothermal permitting experts to be responsive to your needs and act in a timely manner?

Answer. Permitting delays remain a significant barrier to geothermal development, and yes, duplicative NEPA reviews and regulatory inefficiencies are a source of the delays. It is also important that agencies are equipped with the necessary funding, staff, and expertise to carry out their permitting responsibilities. We greatly value our collaborative relationship with the Bureau of Land Management (BLM) and appreciate the dedication of its staff, many of whom work diligently under constrained resources.

Compared to oil and gas, geothermal projects often face longer timelines due to limited personnel, decentralized permitting structures, and a lack of specialized knowledge within agency teams. This disparity results in slower processing even when environmental reviews are complete. To address these challenges, we support increased funding for BLM's Renewable Energy Coordination Offices, the establishment of geothermal-specific permitting teams, and the implementation of statutory deadlines, such as those proposed in the Geothermal Energy Opportunity (GEO) Act, to ensure timely and predictable permitting. These reforms are essential to unlocking the full potential of geothermal energy as a reliable, renewable baseload resource.

In summary, the proposed "H.R. 301 GEO Act" provides several specific changes needed to streamline geothermal development on federal lands. While we have discussed the benefits and crucial nature of those changes, it is important to reiterate that the proposed changes do not affect the geothermal industry's responsibility and integrity in meeting the highest standards for environmental stewardship.

Mr. STAUBER. Thank you very much.

The Chair will now recognize members for 5 minutes of questions. I now recognize myself for 5 minutes.

In 2019, under President Trump's leadership, the Department of Energy released its report, GeoVision: Harnessing the Heat Beneath Our Feet, which estimated geothermal could provide over 120 gigawatts of electricity by 2050. For context, the entire domestic grid currently produces 1,250 gigawatts today for the EIA.

The Department of Energy estimate predated many technological advances that Fervo has made in just the past 5 years that has vastly grown geothermal's potential scale and has made it viable across multiple geographies.

Mr. Latimer, could you please describe how making it easier to permit geothermal energy development on Federal lands would increase energy dominance?

Mr. LATIMER. Thank you so much for the question, Chairman, and indeed it has been an exciting time in geothermal. I would say, not just Fervo, but also the pioneering work you heard from Dr. Moore at the Utah FORGE site means that almost as soon as that document was printed, and it was a great effort to coordinate all of the information about geothermal innovation, it was out of date.

And we have pushed forward numerous technology innovations that allow it, that make it easier for us to find geothermal. Between our pilot project and today, as I mentioned to you earlier today, we have reduced drilling costs by over 70 percent. And that takes geothermal from a niche resource that can't really have much impact on the grid to one that we can do in many, many more locations in a much greater scale. And so we are quite excited.

You know, it is difficult for the data to keep up with how fast the technology innovations are happening, so I think the potential is even greater for that.

But of course, as you mentioned, it also requires better permitting, because what we see is an urgent need for there to be reliable, clean, firm power on the grid. And if you hear about the timelines,

for example, that Mr. Thomsen talked about earlier, if we want to have cleaner energy on the grid and it be, round-the-clock, firm power, but it takes us 10 years to start construction, we are not going to be in the position where we can have the positive impact that we want to.

So oftentimes our projects, we have the technology ready to go, we have the supply chain ready to go, and we are in a position where we are waiting for these multiple, redundant permitting applications.

I think there is a way to do these projects with a very high quality, without sacrificing any of the environmental attributes, but just doing some of the reforms that are in the bills that you have proposed, allow us to really just, you know, remove some of the redundancy in the system that lets this grow much faster.

And I think the real question is, is that a goal we want to set for mid-century or beyond or do we want to have this ramp up and reliable firm power from geothermal happen much more quickly. And if that is the case, that we want to have more impact sooner, there has to be a way to streamline the permitting reforms with reforms like what this Committee has talked about.

Mr. STAUBER. So, would you say, I think I know the answer, that Fervo or other developers are sitting on the sidelines in terms of developing additional projects because of these permitting challenges?

Mr. LATIMER. I think that is right. And I think one of the things that, to say is, you know, the numbers we have discussed today, where sometimes it can take over a decade to permit these projects, those are only the projects that actually move forward to get far enough to even enter the permitting queue.

And I can tell you, we have had numerous projects where we have had community support, we have had high-quality geology, we have looked at and had some sort of transmission solution, but we haven't even prioritized investing in the project yet because we didn't see a viable pathway to getting permits.

And much like Paul talked about with the Ormat experience, we have numerous examples where our permits have sat for years without even getting an answer or review. And I think really having a renaissance in energy the way we need to, we have to address those fundamental issues.

Mr. STAUBER. It is simply not acceptable for permits to sit for years and years on end when we have the technology and expertise and the investment wanting to do so.

You know, geothermal power faces a unique challenge in the fact that reviews under NEPA have to be completed in sequence, or one after the other, rather than simultaneously. This includes land use planning, preleasing exploration, drilling, well field development, power plant construction and transmission, all of which have to be done separately. This means drastically increased project timelines and costs, all of which hit American consumers, both in terms of the cost of energy and the reliability of our electric grid.

This completely is the opposite of what we should be doing. Getting more reliable, abundant, and affordable online energy that is demanded continues to skyrocket. The energy demand is only

going to go up as we move into the AI race, et cetera. It is energy that is going to bring that dominance to this great Nation, so——

Mr. Thomsen, you know what, I am going to ask, I am going to wait for probably my second round to ask you that question.

So now I will go to Representative Maloy for 5 minutes of her questioning.

Ms. MALOY. Thank you.

I am going to start with a question to Mr. Latimer and Mr. Moore both, because you both touched on this today. When we were on the field trip part of this, we talked about it a little bit, but will both of you speak to the importance of having government research and combining it with private investment, like we are doing in Beaver County, and why that is so important to developing resources?

Mr. LATIMER. Want to start?

Dr. MOORE. Happy to start. Absolutely.

Mr. STAUBER. Your mic.

Dr. MOORE. Absolutely. Thank you for the question.

When we started FORGE, projects had been done around the world and none had been able to produce more than two or three or four megawatts of electric. And this had been recognized. A key problem, we didn't have the tools, we didn't know how to do the exploration, we didn't know how to do the drilling.

And as Tim said, a lot of this came from the oil and gas industry. In fact, the objective of FORGE was to take oil and gas tools and upgrade them, make them more useful. And we learned very quickly, many of the tools didn't work at the temperatures at FORGE. We are up at 500 degrees Fahrenheit, so we are quite hot.

There was no infrastructure to build these tools. There was no reason the oil and gas industry, for example, would build tools suitable for high temperatures. We didn't have the drilling techniques, for example, the bits, that we needed.

And FORGE has now drilled seven or eight wells. Deepest is 9,500 feet. It is the only commercial-scale R&D facility in the world, and that is really critical because we are testing new tools.

I mentioned we have 28 R&D projects that FORGE funded. I don't think we would have seen the increase in enthusiasm really from the geothermal industry, and I must admit from the oil and gas industry as well, to get back into geothermal. And I think, without Fervo's work, that wouldn't have happened, but fortunately they are using some of the tools that are being developed.

Ms. MALOY. Thank you.

Mr. LATIMER. Yes, I would echo that and say that, you know, just to make this concrete, that the value of some of these public-private partnerships is oftentimes it is difficult to attract private sector investment to do truly innovative things.

So, when Fervo started in 2018, we raised the seed round to get started. We raised about $500,000, and we had to scrap and fight to find any, look over every stone to find that funding. And more often than not, the answer we got was, Well, how do you know you have something there when you drill geothermal, this is uncertain, you can't see what is down there.

And we did a lot of feasibility testing with that funding, but we realized, to do the next step, we needed to raise $10 million, not

$500,000. And we faced that same skepticism from the investors. What if the resource isn't there? What if you can't drill it?

Well, around that time we were raising that next round of funding so we could progress our technology forward, the Utah FORGE team published their results on drilling the wells there, and we were able to point and say, Look, here is some of the drilling techniques that we are proposing to use that have been derisked. And on top of that, we actually are going to site our project right next door to theirs so we can leverage the available data that Joe talked about earlier on the Geothermal Data Repository.

And I don't think we would have been successful in raising the private sector funds needed for a new venture had we not had this ability to leverage resources done by the national labs and the universities and supported the Department of Energy.

And I think that is where these partnerships are critical in times where you could have something with phenomenal impact on society but where the private sector is insufficient to fund it. And you can partner together in a research collaboration that really moves the needle.

And what we are doing in Beaver County through the partnership with Utah FORGE is I think a tremendous example of this working well.

Ms. MALOY. Thank you.

Mr. Thomsen, I have a short time left, but I am going to give you a really short question. You said that you testified about this 17 years ago. And I assume that you are excited to see some of these things starting to move, but you also have a really bipartisan background.

And I think when we talk about permitting reform, sometimes politics get involved and there is some skepticism. But if we streamline permitting, we can do things in a clean, safe environmental way.

How confident are you that we can do geothermal permitting faster and protect the environment?

Mr. THOMSEN. I am very confident. I think we have shown we can do the baseline studies, we can comply with NEPA.

You know, one of the amazing things about geothermal is it has a footprint disturbance 22 times smaller than solar with integrated storage. These typical power plants, as you probably saw today, take up a 15- to 20-acre pad.

The geothermal reservoir is preserved into, you know, perpetuity, if managed correctly. You know, Ormat has been in operation since 1985. We have never had a take permit associated with one of our projects.

We can move the geothermal power plants, we can move the wells and so forth to make them as benign as possible to the surrounding environment.

Couple that with no emissions and baseload power, the environmental footprint of these facilities is astonishing. And the fact that it takes almost as long to permit, you know, a mining site is an example of just waiting too long.

And what your bill does is say, once NEPA is complete, it doesn't short-shrift the NEPA process at all. It just says, once it is done,

the administrators in these offices need to issue these permits timely.

Ms. MALOY. Thank you. My time is expired. I will have follow-up questions during the next round.

Mr. STAUBER. Before I go to Representative Begich from the great State of Alaska, because you brought up mining, I will tell you, it takes 29 years, on average, to open up a mine in the United States of America; 29 years.

Mr. BEGICH. Thank you, Mr. Chairman.

My first question is to Mr. Latimer.

Mr. Latimer, we know that geothermal is kind of lumped in to this category that we call renewable resources. We got solar, we got wind, we have got hydro, we got geothermal.

Now, with solar and wind, what we have seen, in a couple of significant examples, we saw this in Texas, we saw this recently in Spain, we have seen it in Germany, they may be renewable resources but they are not necessarily reliable resources. Hydro and geothermal, of course, are sustained resources. They are baseload. They are reliable.

Can you speak to the importance of reliable baseload power versus what some might call fair-weather power?

Mr. LATIMER. Yes. And I think, I very much appreciated the Chairman's opening comments about there being such an acute need for energy that we really need to be looking at all these resources.

And I think there is valuable parts of solar and wind that can add to the grid, but it is also important to distinguish where geothermal offers value, where solar and wind may not.

And it is something that, you know, even if the weather changes, the Earth is always hot, you know, and it has been for 4 billion years, and it will continue to be for a few billion more. And so, as a result, we have a load profile that is far more reliable.

And actually, what we are seeing in our off-take contracts with our customers is reliability is sort of the key focus of off-takers today. And so actually, you know, we struggled a little bit, we were in a very different power market when we started the business over 7 years ago, to really get people to really hold on to the value of what this reliability means.

And there were two big events that happened in the United States that really made a difference. One was in August 2020, the State of California experienced rolling blackouts for the first time in over two decades as a result of a very hot summer evening that really stressed the electric grid.

And then in Texas, my home State, many of us, myself included, lost power for over 5 days in Winter Storm Uri, just a few months later. And all of a sudden, you saw reliability go from an afterthought in planning processes for power to first and foremost.

And we saw a number of State regulatory changes that ascribed value to something that provides power around the clock, and geothermal is unique in its ability to do that. It works in warm weather, it works in cold weather. You know, everybody knows Iceland is a geothermal country. So, if you want to know if it works in cold weather, there is your answer. And it also provides that rotating inertia that is very valuable to the grid.

And what we are seeing is, more and more, our customers are looking at how do they meet their goals when it comes to reliability, cost, and sustainability and emissions. And more and more they are coming to the answer that geothermal plays a huge role in that mix because we just offer different value that other energy resources haven't. And that has been a huge part of explaining this renaissance in geothermal.

Mr. BEGICH. And just a follow-up question.

You know, we often see that emerging power technologies require heavy subsidies in order to exist and be somewhat competitive to traditional energy. Long term, thinking long term, do you think that geothermal is going to be cost-competitive to other forms of more traditional energy? And kind of maybe some commentary around that?

Mr. LATIMER. Absolutely. You know, the technology innovations we are talking about that we have pioneered and that the University of Utah has pioneered and that the DOE has supported are very new, and so there is still a lot of learning that is happening. And so even between our first and second project here in Beaver County, Utah, we are reducing our cost by over 30 percent.

And so, we are at a very steep part of the learning curve, actually, where the support from the DOE and the investment tax credits that are on the books make a big difference for getting our industry off the ground.

But our mission at Fervo, and I don't think we would be doing this if we didn't think this was the case—is that we are on a cost trajectory where, within a few years, it is going to be the cheapest form of power, period. And that is with or without subsidies. That is whether or not you manufacture a clean, dirty, reliable, you name it. We just want to have the cheapest form of electricity, period. And the fact that it is clean and it does have these reliability attributes are very, very positive.

But when you look at the technology cost structure, the trajectory we are on, we have every confidence that this is going to be the lowest cost way to get electricity to people within the next 5 to 10 years, and that is what we are after.

Mr. BEGICH. That is very exciting. I appreciate that commentary.

And I will now yield to the Chair. I will have follow-up questions in round two.

Mr. STAUBER. Thank you very much.

So, at the Chair's request, I am going to go a second round of questioning. I think that we traveled here, we have the audience members. There are still some more questions that I have, and I am going to recognize myself for the next second round of questioning.

Mr. Thomsen, if Congress were to change these requirements and allow different steps of the NEPA process to run concurrently, what kind of impact would that have on our ability to get geothermal projects built and brought online in a timely fashion?

Mr. THOMSEN. Chairman, thank you for the question.

I think we touched on it a little bit with the DOE GeoVision report, that if we can reduce the permitting timelines, we can unleash gigawatts of generation for geothermal deployment.

I will just elaborate a little bit. You know, today. We have talked about technologies that capture low temperature heat. There is a huge amount of resource out there for geothermal development today with, you know, older technologies, traditional technologies, new technologies, advancing technologies to be developed. And the single biggest hurdle has been permitting, and I have been harping on that for over a decade.

And, again, I think, you know, to touch on the point that we do comprehensive baseline studies. We do comprehensive numerical water modeling. And what sets geothermal apart, which I think is important to say, is we have to have a symbiotic relationship with the resource. We don't go in and try to extract something and leave. We have to, if we want to be successful, operate a power plant for about two decades, 20 years. The amortization rate is about 10 years.

So, we become incredibly good stewards of the land and the reservoir because we have the same goal in mind, to maximize the amount of power we can produce, the revenue that we generate. We have to protect those precious geothermal reservoirs, and we invest an incredible amount of time and money to do just that.

Mr. STAUBER. Thank you.

Mr. Garfield, how long does it take for the State of Utah to permit a geothermal project on State lands?

Mr. GARFIELD. I have been discussing this question with our State land agency. I was asking that, how long does it take. And they said they really can't put a number on it because geothermal energy is so new, especially on State lands. But they did say we do have a couple of projects, but there have been unique circumstances each time.

But they said they can get things permitted very quickly, much quicker than the BLM fundamentally because we don't have a NEPA-type statute in Utah. They are cognizant of what they are doing. When they get a proposal for a development, they make sure that the land will not be degraded, that there are measures for mitigation, for reclamation of the land later.

But they are not required under statute to do the type of duplicative and onerous analysis that is required under NEPA. And that fundamentally is why both our State land, our State trust land agencies and other State agencies are able to do this type of permitting much quicker than at the Federal level.

Mr. STAUBER. So, it is safe to say that Utah understands that the Federal Government simply is not getting it yet. And that is why these hearings are so important.

So, Mr. Thomsen brought something up. He talked about permitting. We have all talked about permitting here.

You know, if we don't accelerate it, we are going to be left behind. I am going to give you an example. If we don't get a bridge permitted in northern Minnesota and finish by early November, December if there is a permitting problem, that wait is for 5 months till the road restrictions come off in the spring, and that time is money.

And you are looking at geothermal. Time is money. You are looking for that investment to come on board.

I can tell you, Mr. Latimer, I was extremely impressed with Fervo today.

And I will tell the audience members, as the Chair of Energy and Mineral Resources, your Utah Reps are really pushing geothermal, not only my Committee but the full Committee, pushing geothermal.

To come out here and actually see what you are doing, this is that next-gen opportunity, and I commend you for all the work you did.

Mr. Moore, you have been doing this for a lot of years, and you are studying, and you are seeing the work that you put in and the technology. And I hope that you know that we appreciate it, the next generation appreciates it. And we certainly appreciate, you know, the State of Utah leading that.

And just by meeting a few of you earlier today, the enthusiasm, the get-it-done attitude.

Mr. Thomsen, you brought up something very important. In Minnesota, we mine, right. I am a pro-mining environmentalist. Nobody gets to own that term because I live there, I work there, I have raised my family there. I am going to pass away there in my home State of Minnesota where we lead in mining, with the exception of the great State of Alaska.

So, I just want to, as I close my comments, I just want to say thank you very much. It was just an exceptional day at Fervo.

And with that being said, Representative Maloy, you are up for your second round of questioning.

Ms. MALOY. Thank you.

Mr. Garfield, I want to follow up on the questions that the Chairman just asked you.

How does the State of Utah's permitting process for geothermal development differ from the State's typical permitting process? Can you speak to that?

Mr. GARFIELD. Differ from other permitting processes for other developments?

Ms. MALOY. Uh-huh.

Mr. GARFIELD. It is so new. I think there is a lot that is still going on here, but I would be happy to ask that question of our permitting agencies and get back to you with more information.

Ms. MALOY. I will follow up in writing——

Mr. GARFIELD. Please do.

Ms. MALOY [continuing]. Afterward with that one so that you can talk to your counterparts in the State.

Ms. MALOY. But where does the process break down most often for the State in trying to get energy projects permitted? Can you tell me that?

Mr. GARFIELD. At the State level?

Ms. MALOY. Uh-huh.

Mr. GARFIELD. That is another question I should probably get back to our permitting agencies.

Ms. MALOY. OK. I will follow up in writing with that one too. I will get you off the hot seat.

Mr. Thomsen, I said I was going to follow up with you on your answers. And one of the things I want to follow up with you on, because you have been doing this for so long, will you talk about

the impact that—we all know , we need to produce more energy in this country. We know that there is a need for increased energy production. But even looking backward, we have been producing geothermal energy in rural areas.

Can you talk about the impact that has on the economies of rural areas when we have sustainable energy being produced?

Mr. THOMSEN. Absolutely. Thank you.

Through the Chair to Representative Maloy, you know, once you have a geothermal project up and running, it requires very few employees to operate it. We do not really have a burden on police stations, fire stations, et cetera. We have had county commissioners refer to our power plants as ATMs in the desert in rural Nevada.

But the impact, because when you produce power 24 hours a day, 7 days a week, 52 weeks a year, and sell that electricity under a power purchase agreement, you create a good amount of revenue. And in the State of Nevada, for example, a huge portion of that goes back to the local counties.

And so, in States that have a lot of federally owned land, where they are not always getting the payment in lieu of taxes from the Federal Government, these projects have an astonishing effect.

We are probably the largest employer in many rural counties in Nevada, next to mining, which is the biggest employer in northeastern Nevada. So the impact is just huge.

And if I can, I would go back to one of the previous questions about, you know, the impact on the work at Utah and the public-private partnership.

What is unique about geothermal is that we can't bottle up the electricity and put it on the USS Duracell and ship it to the highest bidder. It is a U.S. domestic product. The price is controlled by the U.S. market. So, whether we are in Nevada or Utah, we can only sell the electricity for what the public utilities commissions will limit. So, you know, it has got a cap on its energy, on its price point that we can get for it. We can't gouge ratepayers.

It also limited us from what we could spend in subsurface research. So, the public-private partnership from like the University of Utah and the Department of Energy to go after the subsurface work has just been critically important and brings in world-class researchers to work on these projects.

The University of Nevada, the University of Utah, every time we are working on an advanced EGS project, experts fly in from all over the world to help and work in these communities, and it is really astonishing to see the impact.

Ms. MALOY. When you are hiring people to run the plants once they are up and running, how often do you hire local talent?

Mr. THOMSEN. Almost always.

Ms. MALOY. Thank you.

Mr. THOMSEN. You know, coming from a small town, you know, we have very rural power plant locations, and the best people to have work there are the local employees. We can teach them to use a voltmeter and work at the power plants. We employ Tribal members at our projects because they are the best stewards of the land and know what is going on in that community.

Ms. MALOY. Thank you.

Mr. Latimer, just really fast because I am almost out of time. When we were out onsite today, you talked about how the research you are doing is going to unlock your ability to produce geothermal energy, hopefully in a lot of places we don't think of as geothermal right now. Will you just, in 30 seconds, say how widespread that could be?

Mr. LATIMER. Yes. It could easily be nationwide, and then the mission is to take that around the world. It is purely a function of cost, and we have dropped cost so quickly, and we are on a trajectory to drop it even more. It is going to unlock a huge resource.

We can drill a well now to 15,000 feet deep for what we thought we could drill a well to 5,000 feet deep just a couple of years ago because of the drilling innovations we have had. And that means that, while we are here in Utah, because of the great local support and the great policy support, it is also because of the great geology. But what we are learning here allows us to develop the technologies and allow us to take this to other communities all across the country because we are lowering the drilling cost of development.

Ms. MALOY. Thank you. My time has expired.

Mr. STAUBER. Thank you very much.

Representative Begich, your second round of 5 minutes.

Mr. BEGICH. Thank you, Mr. Chair.

First question to Mr. Thomsen. Stranded geothermal must be connected to the grid. What level of core grid investment is required nationwide, and you can give me a directional ballpark, to fully utilize our Nation's geothermal potential?

Mr. THOMSEN. Thank you very much for the question.

Through the Chair to Representative Begich, I was discussing this actually driving in today that I think, with all the progress that we are going to see on permitting, the next, you know, hurdle will be transmission and interconnection of these facilities.

I think a lot of what this Committee has discussed in kind of streamlining permitting needs to apply to transmission infrastructure, and we are going to need to build more. However, I also think we need to look at the existing transmission infrastructure.

Today it is a very archaic process. If you take a transmission position, and you have your 30 megawatts, whether you use it or not or whether it is an intermittent resource or not, you lock up that portion of the transmission.

I would be willing to bet today that our entire transmission infrastructure is used about 50 percent of the time. And I think a real hard look at the open access tariff program at FERC and trying to figure out a very smart way to say I need to use my existing transmission assets more efficiently would unleash a huge amount of development.

You know, these intermittent resources we have talked about, we know some of them don't work when the sun goes down, but that transmission that they have procured is locked up. And so, it is just amazing to me that load serving entities and utilities aren't driving after this, because more energy on that system, more revenue in wheeling charges and so forth.

And then simultaneously, we need to be building out more infrastructure. Trying to move power to the places that need it is going to be the next step of unleashing this geothermal development.

Mr. BEGICH. Thank you. That is an insightful observation. I appreciate that commentary.

My next question to Mr. Latimer. Grid resilience, grid diversity, grid upgrades, and grid expansion require mining, specifically copper. Do you have concerns about supply of mineral resources necessary to develop those grid improvements?

Mr. LATIMER. Well, it might be above my pay grade to talk about copper. I think you may be more of the expert on that topic.

I think clearly, without a doubt, the transformation that is undergoing on the grid right now, the need to meet reliable power and drive emissions lower is going to require a huge amount of resources.

I could speak a little bit more to geothermal than I can to the other parts. Of course, we need the grid to be successful, but I just know geothermal a little bit better.

One of the big advantages of geothermal is we have a relatively straightforward supply chain, and it is quite domestic already, and we don't often require a lot of the same minerals or mining content that other resources have. And a lot higher portion of it, compared to other energy resources, are sourced here in the United States.

So, I think, without a doubt, we are going to need to have all kinds of things to move forward on transforming the grid as we continue to improve it. But from where we sit in the geothermal world, we are very fortunate that we have straightforward projects with local and domestic supply chains without a lot of the same risks and exposures of other energy resources.

So that is what the vantage point from geothermal looks like.

Mr. BEGICH. So as long as the grid is there, the geothermal technology, in terms of the resource load, is relatively low compared to other——

Mr. LATIMER. That is right.

Mr. BEGICH [continuing]. Energy generation sources?

OK. And last question. I have just got 1 minute and 30 left here.

For Dr. Moore, can you walk us through the methodology for exploration, discovery, and proving up of a geothermal resource?

Dr. MOORE. Sure.

Mr. THOMSEN. In 30 seconds.

Dr. MOORE. In 30 seconds.

Well, primarily, we are looking for hot rocks that are isotropic at this point. In other words, they have the same properties in all directions. Granite would be the best.

So, we use a variety of techniques. We use seismic reflection to locate the top of the granite, where we are going to drill into it. We look for faults and fractures in the rocks; we are actually not trying to produce from them.

We drill a test well. And probably the biggest and most important step is to drill a test well that is deep enough. So, the first well we drilled was 8,000 feet deep, and that gave us information on temperature, which is absolutely critical, stress field. We have to know which way the Earth's forces are pushing against us so we

drill in the proper directions. Again, rock type. And so those are pretty basic.

I would guess a typical, like at FORGE, 10 million to do the basic exploration.

Mr. BEGICH. Thank you. That is a relatively low cost investment relative to other exploratory activities in the energy space.

My time has expired, and I appreciate your commentary. Thank you.

Mr. STAUBER. I want to thank the witnesses for your valuable testimony and to my congressional members for their questioning.

Without question, Utah leads in geothermal, and I think for many, many years you will; the expertise, the opportunities you have here.

The members of the Subcommittee may have some additional questions for the witnesses and we will ask you to respond to these in writing.

Under Committee rule 3, members of the Committee must submit questions to the Committee clerk by 5 p.m. On Thursday, May 15. The hearing record will be held open for 10 business days for these responses.

And before I gavel out, I want to recognize SUU President, President Mindy Benson, in the audience, for your hospitality. It is greatly appreciated. What a wonderful university. Thank you, President Benson.

I also want to thank, want to thank the audience for your attendance. What an opportunity your great State has.

And, of course, to Representative Maloy, who has brought me to your great State twice now. And Utah is something special, and it is a privilege serving with you in Congress.

And I am going to take—I am just going to put in a shameless, shameless plug. Minnesota is the State of hockey. The Utah Mammoth just signed my nephew, Jackson Stauber, as a goaltender for another 2 years, so——

If there is no further business—if there is no further business, the Committee stands adjourned.

Thank you all. Be safe.

[Whereupon, at 3:03 p.m., the subcommittee was adjourned.]

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