STATEMENT

OF

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April 16, 2026

BEFORE THE
UNITED STATES HOUSE OF REPRESENTATIVES
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
ENERGY SUBCOMMITTEE

"Subsurface Science and Technology: American Energy and Mineral Dominance"

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President and CEO, Quaise Energy

United States House of Representatives
Committee on Science, Space, and Technology
Energy Subcommittee

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"Subsurface Science and Technology: American Energy and Mineral Dominance"

Mr. Chairman, Ranking Member Ross, and distinguished members of the Committee, thank you for the opportunity to testify on the critical role geothermal energy must play in meeting America's energy future.

My name is Carlos Araque, and I have the honor of serving as President and CEO of Quaise Energy. We develop geothermal power plants that generate electricity from the Earth's heat deep underground. We are both a project developer and a technology innovator. Our proprietary millimeter wave (MMW) drilling technology is designed to access superhot rock—over 300°C (572°F)[1]—at depths and temperatures other technologies cannot reach economically.

Tapping these higher temperatures will allow our geothermal plants to produce up to 10 times more electricity per well than conventional geothermal systems, enabling utility-scale geothermal projects that can compete with today's most efficient power plants. We have successfully demonstrated our technology in field conditions, penetrating more than 100 meters through granite.

Our breakthrough MMW drilling technology makes gigawatt-scale geothermal plants viable across the globe, including regions where geothermal has never been possible before. For the United States, the implications are strategic: vast domestic geothermal

[1] U.S. House of Representatives. (2026). Hot Rock Act, H.R. 7568, 119th Cong. § 2(6)– (7).

resources remain untapped beneath every region of the country, offering a firm power source that cannot be sanctioned, disrupted, or priced by external parties.

In short, our goal is to make superhot geothermal a primary source of baseload electricity worldwide with America leading the way. Our technology is transformative — enabling access to geothermal resources to meet increasing power demand on a commercially viable, accelerated timeline.

Why is this important?

America stands at a crossroads in the global energy race.

Global electricity demand is projected to triple by 2050, driven by innovation, rapid growth in artificial intelligence, electrification, and expanding digital economies.[2] For example, as shown in the chart below, a February 2026 Electric Power Research Institute study reports U.S. data centers currently account for 4-5% of domestic electricity use and estimates that figure to grow to 9-17% by 2030.[3]

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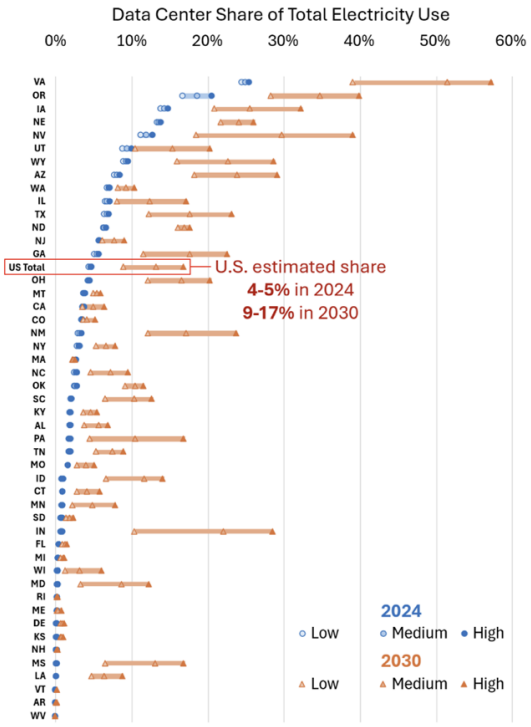
[2] McKinsey & Company. (2022, April 26). Global energy perspective 2022 [Report]. https://www.mckinsey.com/~/media/McKinsey/Industries/Oil%20and%20Gas/Our%20Insights/Global%20Energy%20Perspective%202022/Global-Energy-Perspective-2022-Executive-Summary.pdf

[3] Electric Power Research Institute. (2026, February 25). Powering Intelligence 2026: Updated Scenarios of Electric Power Research Institute. (2026, February 25). Powering intelligence 2026: Updated scenarios of U.S. data center electricity use and power strategies (Technical Report No. 3002034696). https://www.epri.com/research/sectors/technology/results/3002034696

Projected Data Center Electricity Use by State[4]



Similarly, data center electricity demand will continue to rise across global markets with global power demand from data centers forecast to increase by 165% by 2030.[5]

Meeting this demand requires reliable, affordable, around-the-clock power—exactly what superhot geothermal energy delivers.

The nations that lead in next-generation energy technology will shape the geopolitical order for decades and usher in a new era of domestic energy security.

America's path to energy dominance lies beneath our feet. But until now, the deepest, hottest portions of this resource have been technically and economically out of reach. In an era where other countries are investing billions to control critical energy

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[4] Electric Power Research Institute. (2026, February 25). Powering Intelligence 2026: Updated Scenarios of U.S. Data Center Electricity Use and Power Strategies. EPRI (Technical Report No. 3002034696). https://www.epri.com/research/sectors/technology/results/3002034696

[5] Goldman Sachs. (2024). AI to drive 165% increase in data center power demand by 2030. https://www.goldmansachs.com/insights/articles/ai-to-drive-165-increase-in-data-center-power-demand-by-2030

infrastructure, Quaise’s superhot geothermal technology offers a rare opportunity for American innovation to set the pace and stay decisively in front of the competition. My testimony today covers four key points:

1. **Superhot geothermal is a transformational power source and a once-in-a-generation opportunity to enhance American energy dominance and security.** It is America's largest untapped source of always-on baseload power—capable of strengthening the nation’s energy independence.

2. **Quaise's millimeter wave (MMW) drilling technology is the only method to access this resource economically—**allowing us to produce electricity at a levelized cost of energy (LCOE) that is in line with other baseload sources, opening the rest of the U.S. and world to geothermal energy

3. **Our commercial-scale flagship, Project Obsidian in Central Oregon, will be the first gigawatt-scale project to show the value of this powerful new energy source.** We will create the blueprint for nationwide and global deployment of always-on gigawatt scale geothermal power plants.

4. **With targeted, strategic federal policy, Congress can help to unlock geothermal's full potential and maintain American technological supremacy and leadership.**

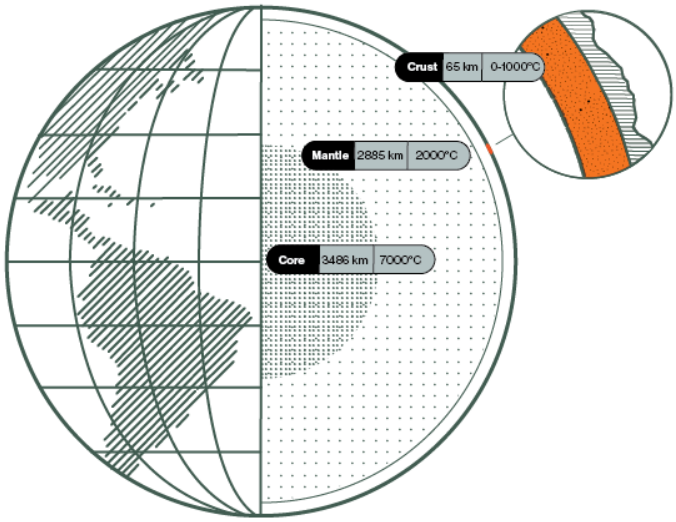
I. Superhot Geothermal: America's Untapped, Transformational Energy Resource

The Earth's crust holds an enormous reservoir of geothermal heat—constant, always available, and unaffected by weather or geopolitics. Department of Energy Secretary Chris Wright calls it an "awesome resource that’s under our feet" and an agency priority.

According to the Department of Energy, the geothermal energy beneath our feet is estimated to be more than 50,000 times the energy from all global oil and gas resources combined.[6]

The International Energy Agency (IEA) estimates that geothermal resources could supply roughly 150 times the current global electricity demand.[7] A single 1-kilometer-thick section of Earth's crust at 400°C (752°F) could meet global power demand for 660,000 years, akin to barely piercing the skin of an apple.

Primary Layers of the Earth's Crust[8]



But the challenge is not generating power from this resource—it is accessing it.

Conventional geothermal is currently limited to locations where five geologic conditions align:

1) large, shallow heat source,
2) permeable reservoir,

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[6] U.S. Department of Energy. (2004, November). Buried treasure: The environmental, economic, and employment benefits of geothermal energy. Office of Energy Efficiency and Renewable Energy. https://www1.eere.energy.gov/geothermal/pdfs/35939.pdf

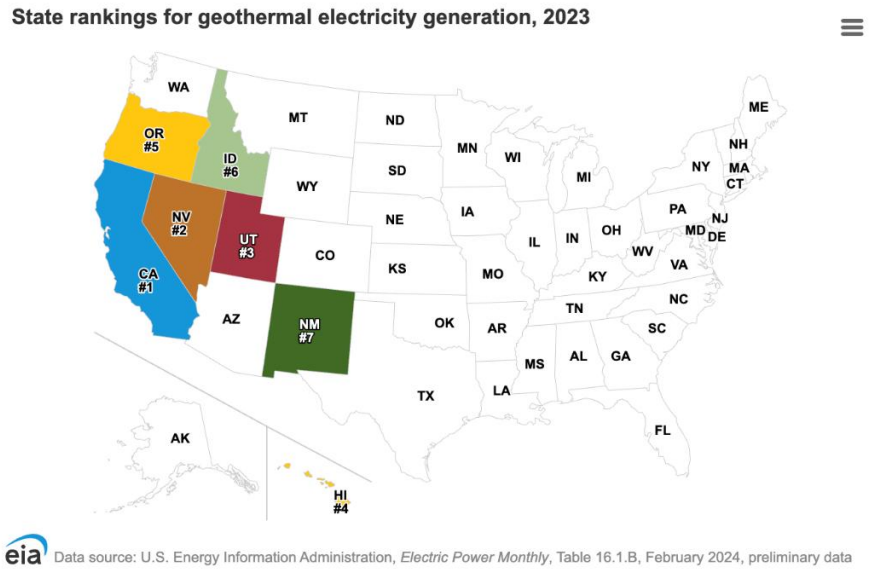
[7] International Energy Agency. (2024). The future of geothermal energy. https://www.iea.org/reports/the-future-of-geothermal-energy

[8] Extreme Tech. (n.d.). Digging the world's deepest hole to extract energy. https://www.extremetech.com/extreme/332693-digging-the-worlds-deepest-hole-to-extract-energy

3) impervious cap rock,
4) adequate water supply, and
5) reliable recharge mechanism.

Because of the requisite conditions, U.S. geothermal power generation is currently concentrated in only seven western states.[9] Geothermal today accounts for merely 0.5% of electricity generation in the U.S.,[10] with just 4 GW of installed capacity.[11]

State Rankings for Geothermal Electricity Generation[12]



By engineering pathways in hot rock to circulate water and extract heat, Enhanced Geothermal Systems (EGS) overcome water availability and permeability limitations that have hindered global deployment of conventional geothermal power. Combining EGS with superhot temperatures exceeding 300°C (572°F) is the game changer. This approach, where water is heated to supercritical temperatures underground, produces

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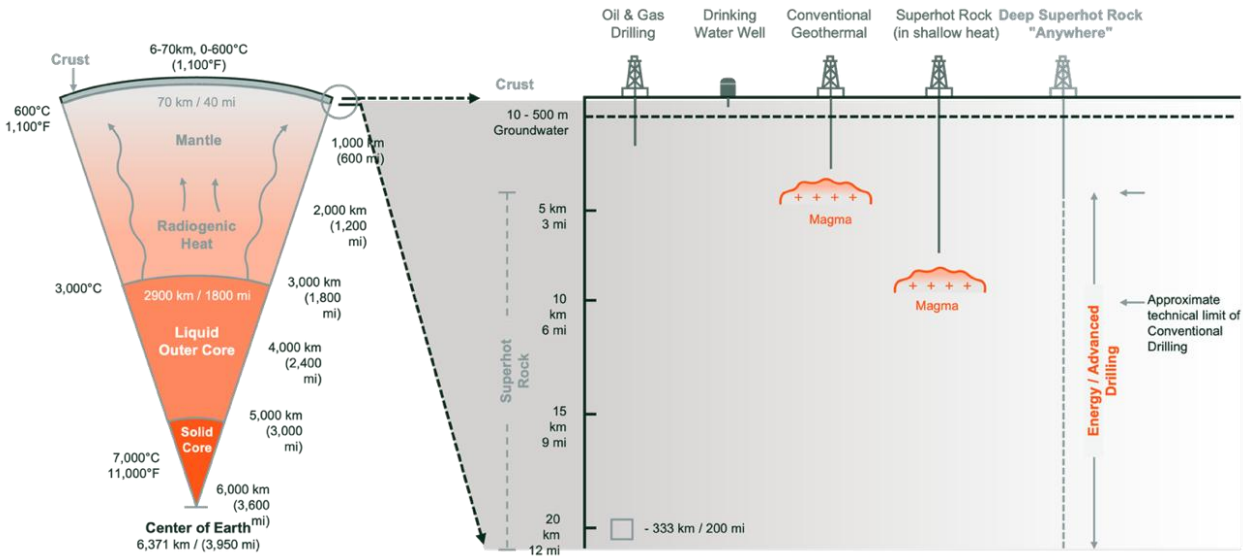
[9] U.S. Energy Information Administration. (2024, February). Geothermal Explained. https://www.eia.gov/energyexplained/geothermal/use-of-geothermal-energy.php
[10] U.S. Energy Information Administration. (2024, February). Electric power monthly: Preliminary data. https://www.eia.gov/tools/faqs/faq.php?id=427&t=1
[11] IEA Geothermal. (2024, June). 2022 Annual Report. IEA Geothermal Secretariat. https://drive.google.com/file/d/1r9nfsBdSNSgdzxpPtlpX2sn7YYWz1emF/view
[12] U.S. Energy Information Administration. (2024, February). Geothermal Explained. https://www.eia.gov/energyexplained/geothermal/use-of-geothermal-energy.php

up to 10 times more energy per well than geothermal systems operating at 200°C (392°F).

But traditional drilling technology cannot reach these temperatures economically outside of a few select locations given the challenges of drilling at extreme temperatures and depths. Hard, deep basement rock, that holds the heat needed to bring water to supercritical temperatures, remains out of reach with these legacy technologies.

Achieving Superhot Geothermal "Anywhere" Requires New Technologies[13]



Superhot geothermal delivers what no other clean energy source can:

- **Energy independence**—eliminating fuel imports and reducing exposure to commodity prices that can fluctuate in response to external pressures.
- **Location agnostic**—viable across more than 90% of the globe, including population centers east of the Mississippi.
- **Lowest cost at the meter**—technology-driven cost reduction at $50/MWh LCOE, reduced transmission and storage requirements.

[13] Hill, L. B., Rogers, T., Herter, J., Ingersoll, E., Uddenberg, M., Grossman, D., Chaisson, J., Hill, J., Ball, P., Garth, A., & Montgomery, M. (2022, November). Superhot rock energy: November 2022 update [Report]. Clean Air Task Force. https://cdn.catf.us/wp-content/uploads/2022/10/21171446/superhot-rock-energy-report.pdf

- **Minimal operational surface footprint**.[14]
- **Reliable, baseload power** with no dependence on weather, time of day, or energy storage.

To reiterate, the resource is vast, and the benefits are clear. The barrier is reaching it, and this is where Quaise comes in.

II. Quaise's Breakthrough: Millimeter Wave (MMW) Drilling Technology, only method to access this resource economically, opens the rest of U.S. and world to geothermal energy

Quaise's proprietary millimeter wave drilling technology is the breakthrough that can make superhot geothermal accessible worldwide.

My path to this work began in the oil industry.

I spent more than 15 years at Schlumberger developing downhole drilling technology before joining MIT's Engine Ventures as the founding Technical Director. It was there I met Dr. Paul Woskov, a Senior Research Engineer at MIT's Plasma Science and Fusion Center, who spent a decade adapting gyrotron technology—originally developed for fusion energy research—to ablate rock for deep drilling applications. The gyrotron is a microwave-emitting device capable of generating high-powered millimeter waves and a key component of our technology at Quaise.

Recognizing the transformative potential of this approach, I partnered with Matt Houde and Aaron Mandell to commercialize Paul's research and founded Quaise Energy in 2018.

In 2021, Quaise was awarded a U.S. Department of Energy Advanced Research Projects Agency-Energy (ARPA-E) $5M grant to support a test campaign of our millimeter wave drilling technology. It pulled from researchers at Oak Ridge National

[14] Quaise Energy. (Nov. 17, 2022). Mining the heat below our feet could unlock clean energy for the world. https://www.quaise.com/news/mining-the-heat-below-our-feet-could-unlock-clean-energy-for-the-world

Laboratory (ORNL) and MIT, among others, which was instrumental in proving the technology's power and potential.

Since then, we have made rapid and steady progress, moving millimeter wave drilling from our Houston lab to the Nabors Industries' drilling test yard last spring, where we successfully integrated our technology with a full-size drilling rig. Then, last summer at our Marble Falls field site just west of Austin, Texas, we drilled down more than 100 meters at a rate 10 times faster than in our laboratory with no rock contact and no wear and tear to the drilling machinery.

Last fall we broke ground on Project Obsidian, a 50 MW superhot geothermal plant in Oregon, building a 4-acre pad and sumps. Once the snow melts in a few weeks, we will begin drilling confirmation wells at the site. I invite you to come see the site when we open it for tours later this year.

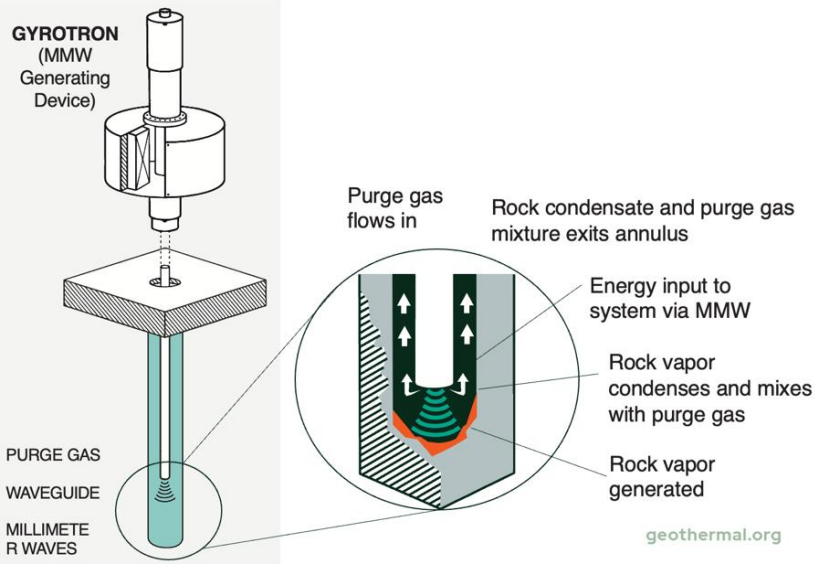
Our unique drilling technology utilizes a gyrotron to produce a concentrated millimeter wave beam that ablates rock and accesses superhot conditions at depths unreachable with conventional drill bits. These results confirm our approach works in rocks representative of the typical basement geology that hosts superhot resources globally.

This is not an incremental improvement—it is a fundamental breakthrough in accessing the Earth's abundant, natural thermal energy.

Conventional drilling technologies, refined over a century of use largely in the sedimentary formations that contain hydrocarbons, cannot economically access deep, crystalline rock formations nor drill in rock at the temperatures and pressures required to produce supercritical water.

Where drills stop, Quaise begins.

Gyrotron Technology for Use in EGS Drilling[15]



The Technology

Millimeter wave drilling is simple by design: at the surface a gyrotron generates high-powered, MMW-band microwaves capable of ablating rock at the bottom of the hole. The MMW beam is transmitted downhole via a cylindrical metallic waveguide, doubling as a drill pipe, while an inert purge gas is injected concurrently to lift rock fragments out of the hole.

Gyrotrons can continuously output power levels of 1 MW or more, with electrical-to-MMW power conversion efficiencies exceeding 50%. MMW sources are significantly more energetic, efficient, and cost-effective than the largest laser systems.

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[15] Meltzer, E. R., Stefaniuk, D., & Einstein, H. H. (2025). Linking chemical phase and mechanical properties to evaluate the use of millimeter-wave induced vitrified basalt in enhanced geothermal systems. Rock Mechanics and Rock Engineering. https://doi.org/10.1007/s00603-025-05124-0

For example, a 1 MW beam can rapidly heat the surface of rocks, inducing melting—effectively turning the rock into fine particles. In figurative terms, it “vaporizes” the rock.

The purge gas blows out the resulting low viscosity melt and fine rock particulate created by the MMW beam, capturing it at the surface in a baghouse.

Because activity occurs at the surface where the gyrotron is located, our system does not suffer from the same limitations of mechanical drilling with a physical drill bit rotating deep below the surface, losing torque as it goes deeper and often breaking, causing further operational delays and expenses.

In essence, the entire physical drilling operation can be replaced by a simple guided energy method, with no wear-and-tear on downhole equipment, more efficient energy delivery to access downhole rock, and a physical process that produces fine rock particles easily removed by purge gas. Drilling costs will no longer increase exponentially with depth, enabling economic access to superhot resources deep underground.

Economic Advantages

Millimeter wave drilling unlocks superhot resources almost anywhere. The resulting higher temperatures allow our plants to produce up to 10 times more power per well than conventional systems — enough to use traditional steam turbines rather than the specialized equipment lower-temperature geothermal requires. This higher energy density enables larger projects while reducing the number of wells and the amount of associated infrastructure, which our analysis indicates could lower electricity costs by up to one-third compared to other next-generation geothermal technologies at similar scales.

Project costs are also minimized by combining our proprietary technology with existing oil and gas supply chains and proven power generation equipment. For example, our MMW technology is designed to integrate with existing drilling rigs, with the waveguide taking the place of the drill pipe.

In short, our geothermal projects are designed to operate for more than 30 years with minimal ongoing costs.

American Labor and Supply Chain

Most of our key components are manufactured within the United States, meaning we can leverage established supply chains, infrastructure and technology to accelerate deployment, reduce risk and keep costs low.

MMW drilling is still drilling—it requires rigs and the know-how of experienced roustabouts, motor hands, derrickmen, tool pushers, and drillers, as well as geologists, engineers, and other experts needed to identify and reach superhot resources. The power plants will be built and operated with local talent. These are real jobs that cannot be outsourced or offshored.

The supply chain for MMW drilling is still developing. Key components have traditionally been manufactured only for nuclear fusion research and limited industrial applications. But there is an opportunity for the U.S. to reinvest in domestic manufacturing at this important stage of this sector's continued development—reducing costs and lead times and producing optimal, standardized equipment easy to scale in the drilling environment.

For example, the gyrotron is the critical enabling component — one where the United States does not yet lead, but can. Investing in domestic gyrotron capability is investing in American leadership in superhot geothermal.

We have the chance to lead the world in what will be the primary energy source of the future—we must capitalize on it.

III. Our commercial scale flagship, Project Obsidian in Oregon, is our first step in demonstrating the gigawatt-scale potential of this incredible new energy resource

First, we will demonstrate our millimeter wave drilling technology by 2028. Once operational, Project Obsidian **will deliver 50 MW of baseload power** by 2030, scaling to 250 MW by 2032, and establish the template for national and global deployment of always-on gigawatt-scale geothermal power plants. We are developing our first commercial projects in areas where superhot rock is relatively shallow, proving project economics and operational capabilities with reduced drilling costs and fewer technical risks to create a scalable model for building the first geothermal power plants east of the Mississippi River.

Project Obsidian: Central Oregon

This first-of-its-kind superhot geothermal project will set a new standard for sustainable, resilient infrastructure. Project Obsidian follows a staged deployment strategy that reduces risk:

- **Phase 1 —** Superhot EGS at 300°C (572°F): In this phase, we will drill to superhot rock at 300°C (572°F), closing the gap with oil and gas in unit economics and power output per well. This will give private and public markets the evidence they need to invest at gigawatt scale.

- **Phase 2**: **—** Superhot EGS at 400°C (752°F): In this phase, we will deploy our millimeter wave system to reach 400°C (752°F) rock, unlocking geothermal as the most powerful energy source on earth — surpassing the unit economics, speed of deployment, and geographical reach of fossil and nuclear energy.

Project Obsidian at 50 MW by 2030 is not our end goal — it is a proof point. Our goal is to establish a template for future superhot rock projects — proving the technologies, project economics, financing pathways, permitting procedures, and utility offtake structures.

With private capital already willing to invest in this resource, targeted federal funding can accelerate deployment 10 times, achieving gigawatt-scale in the same timeframe.

Our approach is rooted in Wright's law – for every cumulative doubling of units produced, costs will fall by a constant percentage. We aim to replicate the rapid scaling and deployment seen in the American shale and solar revolutions. As production scales and drilling efficiencies improve, unit costs will decline, and the cost of MMW-drilling based superhot rock energy will fall at a rate comparable to those seen in other energy technologies. Our modeling indicates that at commercial scale, our LCOE will be in line with or below other baseload sources, including natural gas and advanced nuclear.

The Path Forward: National and Global Deployment

As we demonstrate commercial viability and refine our drilling processes, we will develop additional projects across the U.S. where our millimeter wave technology will access deeper, hotter rock, proving the full economic potential of superhot geothermal at scale.

We have initial leases in Oregon, New Mexico, Utah and Nevada and seek to expand our work in additional states over the coming years.

Our aim is to develop superhot geothermal projects east of the Mississippi River, where superhot rock is located at depths that other drilling approaches cannot reach economically.

Our millimeter wave technology uniquely positions Quaise to serve major population and industrial centers with firm, baseload electricity where it is needed most: at the point of use.

Because we can reach superhot rock not previously accessible, our technology expands geothermal viability from around 5% to over 90% of the world's population based on our calculations, making clean baseload power viable virtually anywhere. Through American technology and ingenuity, countries worldwide will have the potential to generate power from their domestic geothermal resources, regardless of proximity to historical geothermal hotspots.

IV. Federal Policy Can Help Unlock Geothermal's Full Potential

Private-sector capital is ready to move into the superhot geothermal sector, but investors need a clear signal that this technology is strategically vital to the United States and backed by the full weight of the federal government. Taking such action will de-risk the private capital needed to scale manufacturing and accelerate deployment.

The One Big Beautiful Bill Act was one such important step, preserving the Section 48E Investment Tax Credit and the Section 45Y Production Tax Credit at 100% for geothermal projects beginning construction through 2033, phasing down through 2036. These credits are driving real investment decisions across the industry and provide the certainty developers need to commit capital. This signaled a recognition of geothermal's unique value as firm, domestic baseload power, and the market has taken notice. But tax credits will not suffice to scale this technology at the pace rising electricity needs and global energy security demands.

To fully realize superhot geothermal's potential and maintain American technological leadership, Quaise recommends policy action in five areas:

1. Provide federal authorization and funding for R&D and utility scale commercial pilots to speed superhot geothermal deployment.

The bipartisan Geo POWER Act, S. 4116, introduced by Senators Hickenlooper (D-CO) and Daines (R-MT) would authorize a utility scale commercial demonstration program for next-generation geothermal technologies, providing critical support for first-of-a-kind projects that prove commercial viability and establish deployment templates. This legislation directly addresses the "valley of death" between laboratory research and commercial-scale deployment.

The bipartisan Hot Rock Act, H.R. 7568, introduced by Representatives Auchincloss (D-MA-04) and Amodei (R-NV-02) will create milestone-based research grant programs and workforce training programs, among other proposed policies, that will help to ensure our industry continues to grow at the pace required to keep up with the nation’s energy demands.

2. Act on Reforms to the Permitting and Interconnection Process

While the Bureau of Land Management has been a helpful and proactive partner on Project Obsidian, permitting and interconnection remain in time-intensive processes that delay deployment. Geothermal projects face saturated interconnection queues and lengthy environmental reviews.

We encourage Congress to advance key reforms to the permitting process and act to speed up transmission development and remove interconnection hurdles. Specifically, permitting requirements should reflect geothermal's unique characteristics and lower environmental footprint. Congress should establish dedicated interconnection pathways for firm, baseload power resources like geothermal. Geothermal projects should be permitted as efficiently as oil and gas projects, dramatically accelerating nationwide deployment.

3. Maintain Tax Parity for Geothermal Energy

Quaise supports the geothermal provisions in the One Big Beautiful Bill Act described earlier and endorses the bipartisan Geothermal Tax Parity Act, H.R. 6873, introduced by Representatives Garamendi (D-CA-08) and Maloy (R-UT-02) and co-led by Representatives Moore (R-UT-01), Horsford (D-NV-04), and Fulcher (R-ID-01).

The proposal would allow geothermal projects to qualify for the same passive loss treatment available to oil and gas investments, enabling investors to deduct project losses against other income. The bill would also "extend existing tax treatment for geological and geophysical exploration costs to geothermal development, reducing upfront risk and encouraging private sector investment."[16]

[16] Maloy, C. (2025, December 18). Rep. Maloy introduces the Geothermal Tax Parity Act of 2025 [Press release]. U.S. House of Representatives. https://maloy.house.gov/news/documentsingle.aspx?DocumentID=1818

We encourage Congress to pass the Geothermal Tax Parity Act and maintain the investment and production tax credits preserved in the One Big Beautiful Bill Act through 2033.

4. Sustain Federal Investment

DOE support through programs like ARPA-E has been instrumental in advancing our technology from laboratory concept to field demonstration. ARPA-E's SCALEUP program allows our company to make not just a step forward, but the next great leap from laboratory to American manufactured energy systems. Sustained investment in next-generation geothermal research will maintain American leadership in energy technology development and accelerate cost reductions through continued innovation.

We recommend that Congress provide $410 million in fiscal year 2027 for the DOE Geothermal Office to accelerate utility-scale geothermal demonstrations and ensure rapid and widespread deployment of utility-scale, and indeed gigawatt-scale, enhanced geothermal systems, as well as ongoing geothermal R&D programs, field testing, and technology validation.

5. Support Workforce Development

The geothermal industry leverages the same workforce, equipment, and supply chains as the oil and gas industry. According to IEA, the global geothermal workforce could grow to about 1 million people by 2030.[17]

We recommend that Congress provide federal support for STEM education and trade apprenticeships to ensure America has the skilled workforce necessary to deploy superhot geothermal at scale.

Conclusion

[17] IEA (2024), The Future of Geothermal Energy, IEA, Paris https://www.iea.org/reports/the-future-of-geothermal-energy, Licence: CC BY 4.0

Superhot geothermal is a category-defining resource — with the promise of fusion and the actionability and scalability of oil and gas. If fusion and fission are of strategic importance to America, superhot geothermal must be as well.

The geothermal industry is experiencing unprecedented momentum. With investments at $1.5 billion[18], DOE projects 90–300 GW of firm geothermal power is possible by 2050, and Quaise believes the potential is far higher.

Historic bipartisan support, combined with new policy incentives and recognition from trusted organizations demonstrates the opportunity that superhot geothermal presents to meet soaring global energy demand. With the right policy framework, superhot geothermal can become a cornerstone of American energy security and economic competitiveness.

Quaise is ready to lead this transformation.

Our technology works.

Our first commercial project is under development.

Our partnerships are in place.

What our industry needs now is strategic federal policy support to accelerate deployment and ensure America maintains its edge in the global race for abundant clean, baseload power.

Thank you for the opportunity to testify today. I welcome your questions.

[18] Akindipe, D., Martinez Smith, F., & Witter, E. (2025). 2025 U.S. geothermal market report. National Laboratory of the Rockies; U.S. Department of Energy. https://www.nlr.gov/geothermal/2025-us-geothermal-market-report