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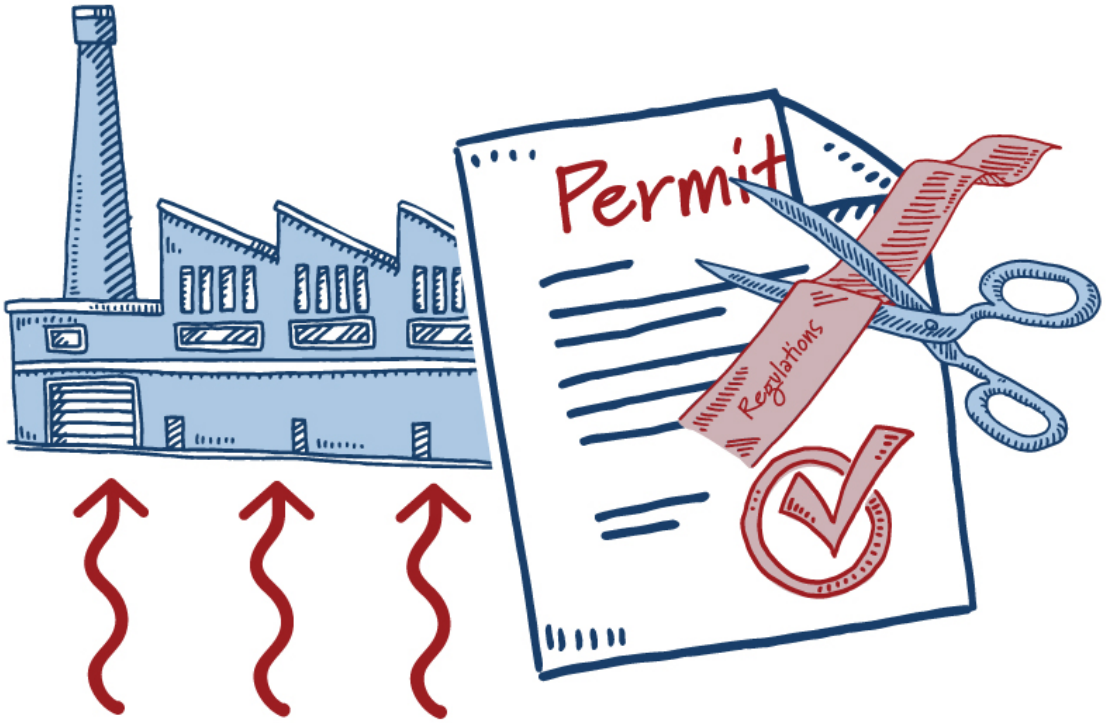

A Clear Path for Geothermal Permitting: Cutting Delays, Driving Deployment

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December 2025

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Executive Summary

Energy demand in the United States is skyrocketing, and policymakers are seeking ways to increase energy production while keeping prices low for consumers. Geothermal energy represents one of the most promising pathways to provide clean, reliable, baseload power to meet rising demand. While the U.S. leads the world in installed geothermal capacity, the resource remains primed for a significant expansion.

Recent advancements in drilling – leveraging technology pioneered during the shale revolution – have sparked renewed interest in geothermal. Today, the U.S. has roughly 4 GW of installed geothermal capacity, but studies now estimate that next-generation geothermal systems could supply 100 GW of new power across the U.S. by 2050. Despite all of this potential, an outdated federal permitting regime threatens future growth and is a significant barrier to deployment.

Federal investments through the Department of Energy (DOE) Geothermal Technologies Office and the Defense Innovation Unit have accelerated innovation and reduced technical risk. Significant investment and recent power purchase agreements (PPAs) between major U.S. tech firms and geothermal companies further demonstrate the potential of this emerging energy source. In addition, energy tax incentives reshaped by the One Big Beautiful Bill (OBBB) prioritized new geothermal power.

With the financial and technical barriers for geothermal well-addressed, federal permitting policies remain the biggest hurdle for new geothermal deployment. This report identifies opportunities to modernize geothermal permitting and leasing to accelerate the buildout of geothermal energy resources. Key policy recommendations include:

1. **Increase lease sale frequency** by requiring annual geothermal lease sales and ensuring BLM meets these timelines.
2. **Require replacement lease sales** when scheduled auctions are missed.
3. **Incentivize early-stage exploration** by clarifying "casual use" activities under BLM jurisdiction that don't require further review.
4. **Codify and expand categorical exclusions (CatExes)** for geothermal resource confirmation and early-stage activities.
5. **Narrow the scope of actions subject to NEPA** review – consistent with the Supreme Court decision in *Seven County*.
6. **Require timely processing** of geothermal lease nominations and NEPA reviews.
7. **Leverage best practices across BLM field offices** via a Geothermal Ombudsman and Permitting Task Force, and improve transparency through centralized data systems.
8. **Create or expand cost-recovery and set-aside funding authorities** so geothermal can benefit from the same funding tools available to oil, gas, wind and solar permitting.

Taken together, these reforms would shorten project timelines, reduce regulatory uncertainty, de-risk private investment and expand the pipeline of geothermal projects under review. By aligning geothermal permitting with other energy resources and modernizing federal land management practices, Congress can accelerate deployment of a clean, firm power resource needed to meet rapidly rising demand and strengthen U.S. energy security.

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Introduction

Geothermal energy is a reliable, baseload, zero-emissions energy resource that can be deployed rapidly to meet rising demand. At 3.9 GW, the U.S. currently leads the world in geothermal electric capacity and has the potential to expand production capacity 20-fold by 2050.[1,2] More than 90% of discoverable resources are located on federal lands.[3] Onerous federal permitting process, however, restricts the development of this abundant resource. A series of federal policy reforms can alleviate these bottlenecks and allow next-generation and conventional geothermal energy systems to power advanced manufacturing, data centers, artificial intelligence (AI) and other rapidly growing power needs.

Congress has long supported geothermal research and development (R&D) through the Geothermal Technologies Office (GTO) and the Frontier Observatory for Research in Geothermal Energy (FORGE) at the Department of Energy and Defense Innovation Unit (DIU). These programs have advanced drilling techniques, reduced technical risk, and helped attract private investment. Federal energy tax incentives, like the Section 45Y production tax credit and the Section 48E investment tax credit, preserved under the One Big Beautiful Bill (OBBB) further strengthened early-stage project economics.

Next-generation geothermal technologies, including enhanced geothermal systems (EGS) and closed-loop technologies, are increasingly appealing to large energy consumers because they provide 24/7, clean and reliable power. These technologies allow developers to engineer conditions in a wider range of geologic features (such as at extreme depths and temperatures), expand geothermal potential beyond naturally occurring reservoirs, create rural jobs and enhance U.S. energy security. Reflecting the growing demand, hyperscaler technology leaders have signed PPAs and letters of intent to purchase, including recent agreements between Meta and XGS as well as Google and Fervo Energy.[4,5]

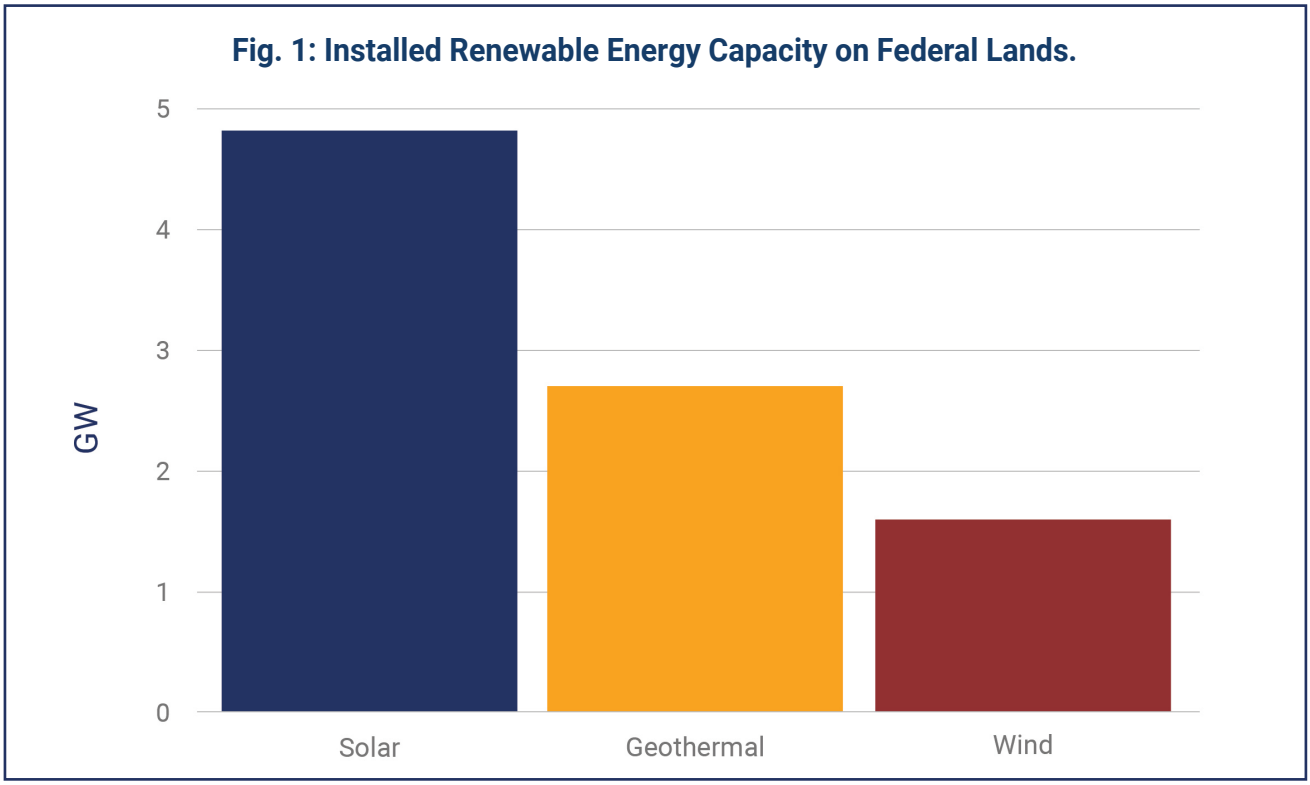
McKinsey estimates that $900 million in private capital has been channeled toward next-generation technologies over the past five years, alongside more than 780 megawatts (MW) of PPAs and letters of intent over the past two years alone.[6] Moreover, DOE's Pathways to Commercial Liftoff: Next Generation Report, released in March 2024, concluded that next-generation geothermal energy could provide 100 GW of clean, firm power by 2050.[7] This would roughly equal the current amount of nuclear power capacity installed in the U.S. today. The report highlighted geothermal energy's "unique value proposition," including low workforce and supply chain risk, minimal land use and flexible generating capacity. There too lies an opportunity to grow geothermal energy globally, with estimates suggesting geothermal could meet up to 15% of global electricity demand growth and $2.5 trillion of cumulative global investment by 2050.[8] Developing this technology domestically creates opportunities for U.S. companies to sell the energy as other markets around the globe emerge, advancing America's energy dominance agenda abroad.

Federal land management will be central to unlocking this opportunity domestically. The BLM approved the nation's first geothermal project in 1978. Today, there are over 51 operating power plants on BLM-managed land, with 2.6 GW of installed capacity.[9] The reforms recommended by this report are timely as BLM oversees a growing list of geothermal projects recently approved or currently under review at BLM, including 2.2 GW of new geothermal power.[10] As these projects move forward, these projects represent a 56% increase compared to current U.S. installed geothermal capacity.[11]

Policy Recommendations

Over the past two decades, BLM has rapidly deployed wind and solar energy projects on public lands, with installed renewable energy capacity reaching 9 GW of power.[12,13] Installed geothermal capacity is roughly half that of solar, despite the fact geothermal resources are readily available on BLM-managed lands. Reforms are needed to streamline permitting and ensure developers and investors have more certainty when making investment and development decisions. Then-Chair Lisa Murkowski (R-AK) noted in a 2019 Senate Energy and Natural Resources Committee hearing that "regulatory reforms alone…could double geothermal capacity." [14]

Fig. 1: Installed Renewable Energy Capacity on Federal Lands.

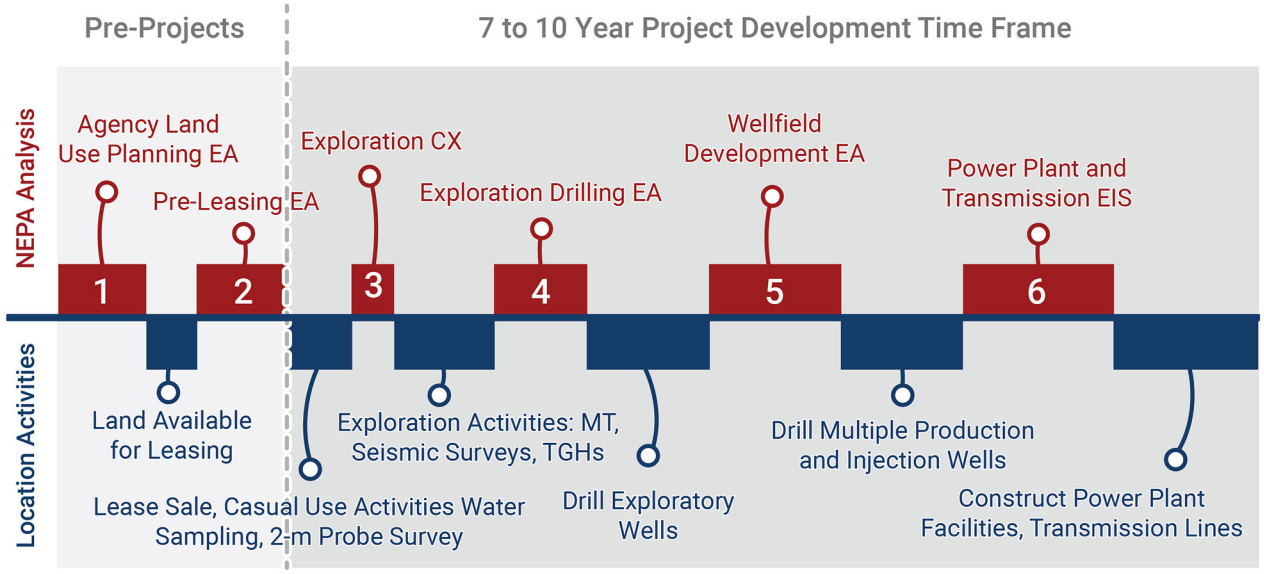


Source: Mai et al (2025)

Geothermal resource exploration is the highest risk phase of development financially, requiring significant efforts to identify, characterize and assess a viable reservoir. This uncertainty, combined with high initial capital expenditure and extended permitting timelines, deters private investment. Permitting delays further increase costs, threaten investment and exacerbate geothermal's primary financing challenge: high upfront costs.[15] Furthermore, exploration, drilling and power plant capital expenditures make up more than 70% of costs.

Each stage of geothermal resource development – agency land use planning, pre-leasing, reconnaissance exploration, exploration drilling, wellfield development and power plant and transmission development – may require a separate authorization and compliance with NEPA.[16] The permitting timeline remains long, inconsistent and opaque.

Fig. 2: Geothermal Development on Federal Lands Can Trigger NEPA six separate times.



Source: Adapted from DOE Geovision report (2019)

In its 2019 Geovision report, DOE found that permitting delays and additional regulatory steps can extend the timeline for geothermal projects by 5-7 years before developers can demonstrate an investment-grade geothermal resource.[17] These extended timelines are largely due to geothermal's inability to benefit from policy reforms enacted by the Energy Policy Act of 2005 (EPAct05), which provided categorical exclusions (CatEx) to expedite certain oil and gas exploration activities, but not geothermal. This regulatory disparity persists despite geothermal exploration relying on similar drilling technologies and methods.[18]

BLM has the authority to tier an environmental analysis for geothermal leasing based on the 2008 Programmatic Environmental Impact Statement (PEIS) for Geothermal Leasing in the Western United States and the associated Land Use Plan for the nominated parcels in question.[19] Tiered analyses typically take the form of an Environmental Assessment (EA) conducted at the BLM state or field office level. These documents typically require several months to a year to prepare, including an opportunity for public comment and frequently result in a finding of no significant impact (FONSI).[20] Policy reforms related to federal leasing, permitting reviews and BLM procedures can alleviate the regulatory burdens that can delay deployment of next-generation geothermal energy projects.

Geothermal Leasing Reforms

Federal leasing is of particular importance due to the vast majority of geothermal resources located on federal lands. The Geothermal Steam Act of 1970 is the governing statute for geothermal leasing procedures on federal lands.[21] Significant reforms were enacted in EPAct05, which set a requirement for biennial lease sales and removed the ability for BLM to issue noncompetitive leases and moved away from the determination of "Known Geothermal Resource Areas" or KGRAs.[22]

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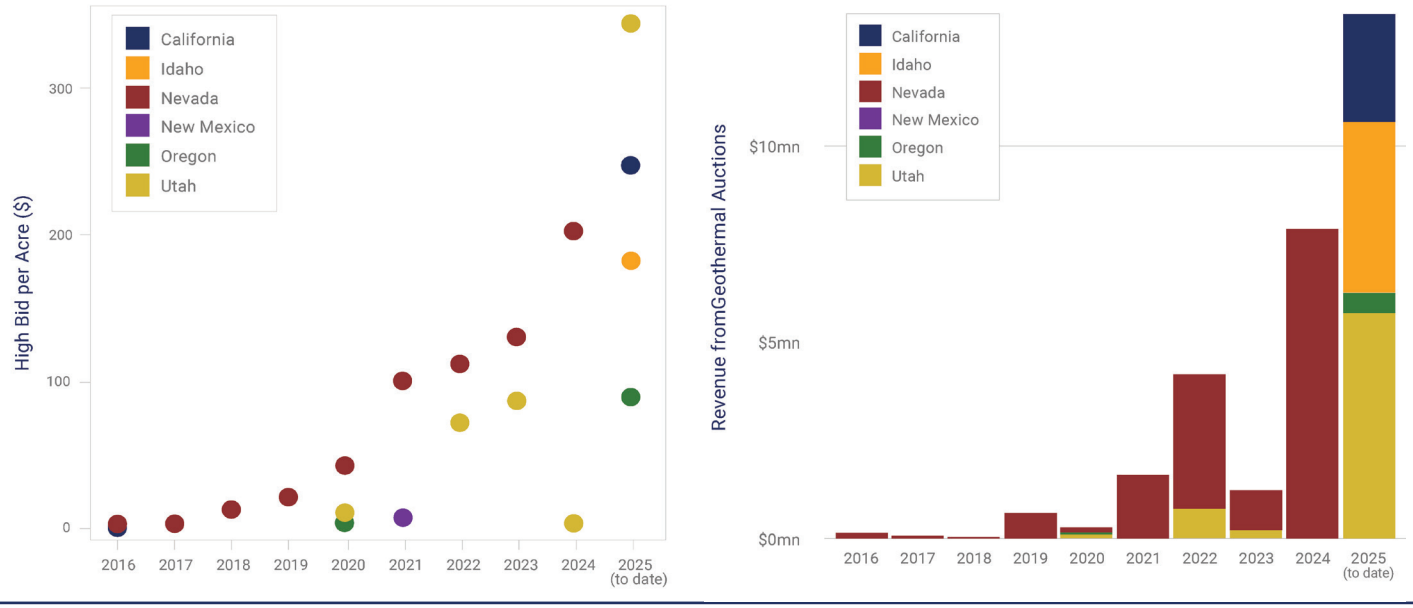
NEPA review timelines for lease sales vary considerably. Notably, BLM's Nevada field office has shown consistent timelines over the four lease sales since 2021. Sharing best practices from Nevada with other BLM offices could be a helpful process improvement. The multiple levels of environmental review create challenges for BLM field offices to comply with existing law and interpretation of definitions, such as how to interpret "casual use" activities, is inconsistent across offices. Often cited challenges include a lack of resources across field offices, minimal status updates and coordination, as well as inconsistent defined standards for interpretation of activities. These reforms have the potential to increase transparency, improve industry confidence and remove barriers to widespread scale geothermal deployment.

Recommendation 1: Maximize geothermal interest by requiring annual lease sales

The Geothermal Steam Act of 1970 requires the Secretary of the Interior to hold a competitive lease sale once every two years for BLM and U.S. Forest Service (USFS) lands when nominations are pending.[23] However, in practice, this has rarely been the case. Infrequent land sales, unclear timelines and inconsistent milestones hinder the development of long-term plans for geothermal projects. In an effort to facilitate geothermal development across federal lands, BLM could increase the frequency of lease sales, or Congress could increase the statutory requirement to mandate annual lease sales.

In recent years, geothermal exploration and development on federal lands has increased substantially. While competitive geothermal lease sales on public lands netted roughly $70 million between FY2008-FY2017, recent years have outpaced the annual average.[24] Utah BLM's 2025 sale netted $5.6 million while generating the "most per acre revenue of any previous geothermal lease sale on BLM public lands in Utah in recent history, averaging $111.47 per acre."[25] The 2025 Idaho sale told a similar story, recording over $4.4 million in geothermal lease sales across 9 parcels.[26] And in Nevada, the October 2024 lease sale saw 64 out of 66 parcels receive competitive bids.[27] As Bloomberg highlighted, for the "first time in years, the U.S. has leased every parcel of public land to geothermal development at record prices…average prices increased by 282% this year to $127 per acre."[28] This signifies strong alignment between the parcels offered by lease by BLM and industry interest in developing projects on those parcels.

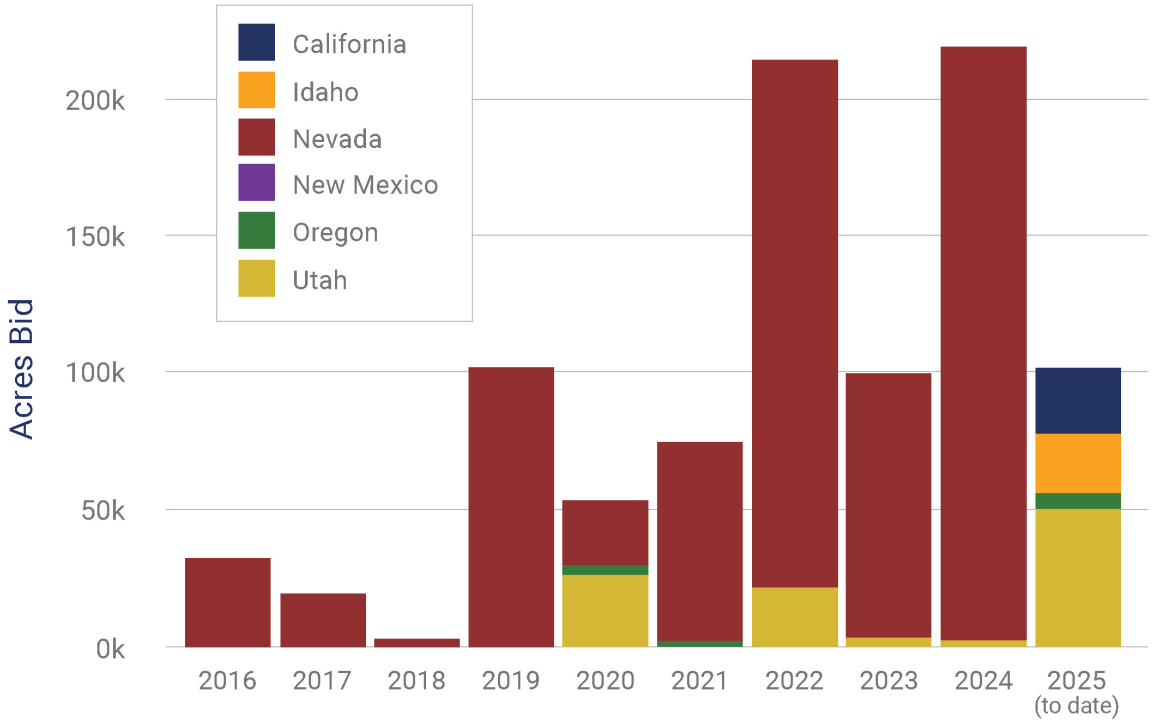
Figure 3: Price and total revenue from geothermal lease sales are also increasing.



Source: Bureau of Land Management State Offices

While these are encouraging signals, challenges remain with the cadence and inconsistency of geothermal lease sales. BLM offices differ in staffing capacity, technical understanding and limited oversight resulting in a piecemeal approach that sends mixed messages to industry. Despite the statutory requirement for biennial auctions, only Utah and Nevada have held auctions on a biennial cadence. One illustrative example is California, which despite being the nation's largest producer of geothermal energy, only recently held its first competitive lease sale since 2016 – in August 2025.[29] Comparatively, states like Utah and Nevada have each held five competitive lease sales since 2020, with Utah setting revenue-raising records that generate more than $5 million across 50,000 acres of land.[30]

Figure 4. Most states hold auctions infrequently, but when auctions do happen, acres with bids are steadily increasing.

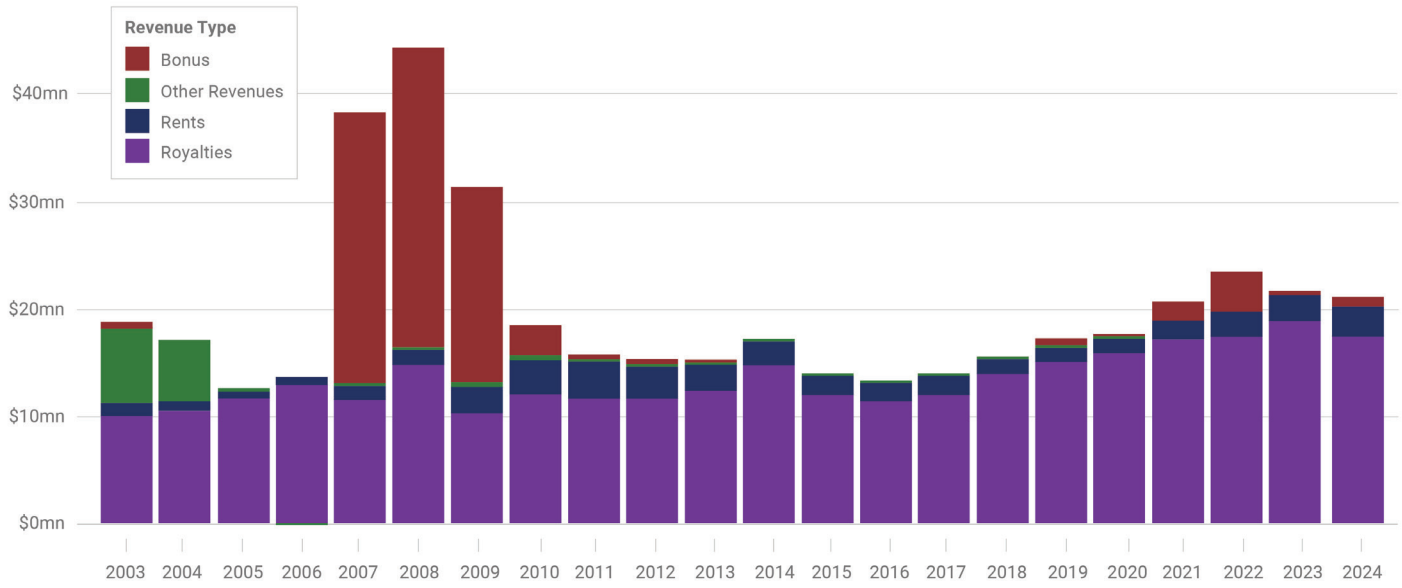


Source: Bureau of Land Management State Offices

Recommendation 2: Require a replacement lease sale if one is missed

In addition to increasing the cadence of mandatory lease sales, including a requirement that replacement lease sales be held when the schedule is missed is an important process reform to ensure BLM is offering sufficient parcels to support geothermal development. Similar provisions were enacted related to oil and gas lease sales in the OBBB, including in instances where a sale is "canceled, delayed, or deferred, including for a lack of eligible parcels; or if "the percentage of acreage that does not receive a bid is equal to or greater than 25 percent of the acreage offered." [31]

Figure 5: Geothermal royalties represent a significantly greater share of federal revenue than elements related to the leasing process (bonus and rent payments).



BLM could consider ways to encourage additional project development on federal lands, consistent with Congressional direction. One way to account for this would be to allow some version of noncompetitive leasing, which was previously allowable until amendments for the Energy Act of 2005. As noted by at least one geothermal developer, "an entirely public auction driven process for leasing disincentivizes companies from exploring for new resources, given any discoveries will be made available for others to bid on at public auction, without having done any of the work necessary to find those sites."

For small, innovative companies, the public auction creates a disincentive to pioneer new methods of identifying geothermal resources. Companies that undergo early stage activities to identify previously unidentified resources must then compete with much larger incumbents who have the resources to place substantially higher bids at auction. While BLM should continue to rely predominantly on the auction structure to maximize competition, Congress could consider an alternative pathway for new entrants that can leverage and incentivize new discovery technologies. One way to do this would be to create a mechanism for granting priority rights to a developer that establishes a new geothermal discovery.

Categorical Exclusions

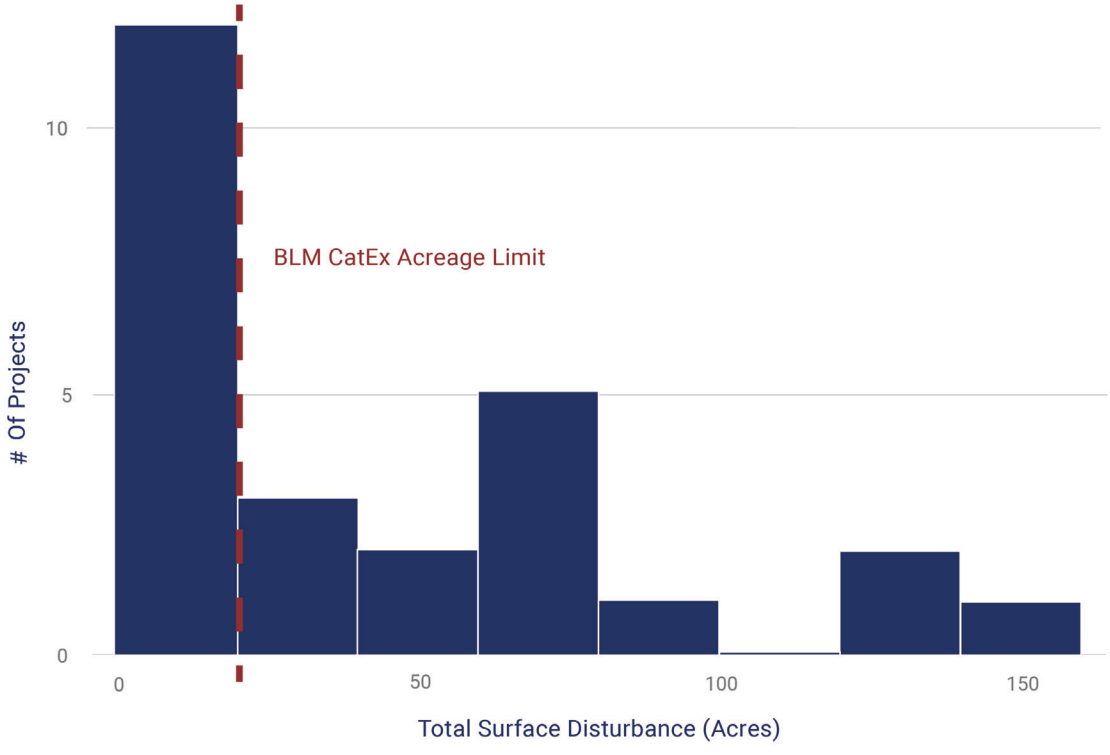
The Energy Policy Act of 2005 streamlined the permitting process for certain oil and gas wells through Section 390.[32] This provision created a rebuttable presumption that certain oil and gas activities on federal lands were eligible for a CatEx from further NEPA review.[33] A CatEx is an important step to promote exploration and accelerate discovery of geothermal resources in subsurface reservoirs while reducing risk and regulatory uncertainty. In part deriving from the CatEx policy in EPAct05, domestic oil and gas development has rapidly reshaped the global energy market, with the U.S. becoming a net energy exporter and doubling natural gas production.[34]

However, this provision did not include the same expedited treatment for geothermal resource development. This has led to longer permitting timelines identified by the DOE despite geothermal using similar drilling techniques and often the same drilling workers and equipment as the oil and gas industry. As noted, geothermal resources are largely located on federal lands and federal permitting under NEPA remains a primary hurdle to energy development. With geothermal development expected to expand, ensuring a more efficient permitting process for low-impact, early-stage exploration activities will allow BLM to focus its environmental review on areas more likely to trigger environmental impacts.

While the BLM has taken emergency action to streamline geothermal energy permitting on federal lands, industry would benefit from codifying reforms to provide long-term durability.[35] For example, BLM initiated a 2024 rulemaking to use new authorities enacted under the Fiscal Responsibility Act (FRA) to adopt existing categorical exclusions from other federal agencies.[36] These CatExes from the Forest Service (USFS) and the Department of the Navy (DON) have made some progress to streamline one stage of the geothermal permitting process, but they are limited in scope and impose restrictions, such as one-year project limits, road construction caps and pre-lease-only restrictions, that do not universally align with geothermal development needs.

To remedy this, BLM initiated an additional rulemaking to amend its NEPA procedures to add a new CatEx for geothermal resource confirmation activities.[37] BLM established the additional CatEx for projects up to 20 acres of total surface disturbance in January 2025.[38] In the Substantiation Report accompanying the CatEx proposal, BLM demonstrated that geothermal resource exploration activities, including temperature gradient well drilling, core sampling and geophysical surveys, have consistently resulted in FONSIs, with none requiring an Environmental Impact Statements (EIS) since at least 2003.[39]

Figure 6: Acreage of geothermal projects receiving FONSI and evaluated by BLM to support CatEx.



Data from the Substantiation Report showed that all 26 geothermal exploration projects evaluated by BLM resulted in a FONSI, including those with more than 20 acres of surface disturbance. One such project yielded a FONSI despite a total surface disturbance of 142.9 acres. Disturbed acreage appears to have very little correlation with the environmental outcomes measured by BLM.

Despite the supportive data for projects with a larger surface disturbance, BLM elected to limit the CatEx to 20 acres. As a result, 54% of the very same projects analyzed by BLM to establish the CatEx would not have been eligible for it, despite the data showing no discernible environmental difference, reinforcing the appropriateness of a CatEx.

Recommendation 3: Codify and expand CatExes to streamline geothermal reviews

Under the status quo, BLM will continue to devote a greater share of limited staff time than necessary to environmental assessments that are unlikely to yield any material environmental benefits compared to a CatEx. As such, BLM could revise the CatEx to include a larger surface disturbance, or Congress could codify provisions to the same effect.

Congress has similarly considered proposals to equalize permitting reviews between oil and gas development and geothermal. One such proposal is the Streamlining Thermal Energy through Advanced Mechanisms (STEAM) Act, which would amend Section 390 of the Energy Policy Act of 2005 to include geothermal.[40] Another proposal from the 118th Congress is the Geothermal Energy Optimization (GEO) Act, which proposed language directing the Department of the Interior to develop a CatEx for geothermal observation test projects in addition to expanding Section 390 to geothermal resource wells.[41]

These would have a positive effect to streamline future development. By covering early-stage exploration activities project developers can expedite resource viability assessments, reduce unnecessary permitting hurdles and minimize costs and site disturbances. Streamlining the exploration timeline and de-risking initial investments would make geothermal projects more attractive to private capital, accelerate development and expand the nation's portfolio.

Recommendation 4: Narrow scope of actions subject to NEPA

The current NEPA structure requires federal agencies to determine the environmental impact of proposed actions, with the average review lasting 4.5 years. Strengthening permitting efficiency through narrowing the scope of actions subject to NEPA would mitigate the regulatory burdens placed on industry. Specifically, Congress could codify a standard consistent with the Supreme Court's decision in Seven County Infrastructure Partners v. Eagle County, which dictated that a federal agency may only consider effects that share a "reasonably close causal relationship to and are proximately caused by, the immediate project or action under consideration" and "may not consider effects that are speculative."[42] Such principles are included in the Standardizing Permitting and Expediting Economic Development (SPEED) Act.

Best Practices for the Bureau of Land Management

The BLM's geothermal program has been the subject of various reform efforts over the past decade. The Interior Office of the Inspector General published findings in 2013 detailing procedures and requirements that were outdated, redundant or conflicting.[43] While BLM has taken steps to resolve some of these issues, additional opportunities remain to ensure the program is suited to meet an influx of new demand from project developers.

Recommendation 5: Incentivize exploration through aligned lease structures and clarified "casual use"

Geothermal surveys and other resource-proving techniques should be encouraged on BLM lands, especially relative to increased energy demand. As one geothermal company notes, "casual use" activity interpretation varies across BLM field offices, delaying projects and injecting regulatory uncertainty. To remedy this, BLM could publish a clear list of geothermal exploration methods that have no significant disturbance or permanent impact to land resources. Mining regulations may offer a helpful template for geothermal, such as permitting the collection of geochemical, rock, soil, gas, or mineral specimens using hand tools, airplane-based and drone sensing, near-surface geophysical surveys and shallow ground-temperature collection using portable probes with limited surface impact.

Recommendation 6: Require BLM to process all active nominations on a set timeline to provide greater predictability for industry and initiate NEPA review within 60 days

Establishing a deadline to review nominated parcels and determine whether to move forward to auction on a set timeline would be a worthwhile process improvement so that nominated parcels do not languish indefinitely. One illustrative example is evident in the 2023 Utah geothermal lease sale, where one of the parcels offered for auction was originally nominated in 2008.[44] A set timeframe would provide developers with greater certainty, help de-risk early project planning and ensure BLM resources are allocated efficiently toward high-potential sites.

Incorporating defined review criteria would align geothermal leasing timelines more closely with those of other industries. In turn, this would send a clear signal to investors and project developers that the federal government is committed to deploying geothermal resources at scale. Establishing accountability measures, such as public reporting on public nominations, could further incentivize timely processing and improve transparency across BLM field offices.

Recommendation 7: Leverage best practices across BLM field offices through a task force to manage geothermal permitting through a centralized process.

While the Energy Act of 2020 sought to improve permitting at BLM for all forms of renewable energy, there remain acute needs for geothermal energy projects specifically. The Energy Act of 2020, signed into law by President Trump at the end of his first term, included a provision to establish "Renewable Energy Coordination Offices" or RECOs that would "maintain program oversight and effectiveness by providing policy direction and guidance; facilitate resolution of complex or controversial issues related to renewable energy activities when elevated by State or Regional RECOs; and provide annual reports as necessary to Congress."[45] These reforms were similar to provisions specific to geothermal energy in the Advanced Geothermal Innovation Leadership (AGILE) Act of 2019.[46]

More recent legislation has sought to address many of these same prolonged challenges, including the 2025 Geothermal Ombudsman for National Deployment and Optimal Reviews Act, which would establish a Geothermal Permitting Task Force and a Geothermal Ombudsman to implement best practices for geothermal permitting and leasing through technical assistance at the field office level and coordinating intergovernmental efforts at the local, tribal, state and federal levels.[47,48]

Additional improvements could be adapted from other bureaus within Interior, such as the Bureau of Ocean Energy Management (BOEM) offshore wind leasing database to provide greater visibility to nominated parcels yet to be leased through BLM. For example, the BOEM Interactive Lease Statistics Dashboard provides near real-time information to developers and regulators regarding the number of total blocks, active leases and approximate number of acres leased in a region.[49] Increased transparency and digitized systems could help spur industry interest and provide more clarity as leases and auctions are brought forward.

Recommendation 8: Dedicate funding to increase geothermal permitting review capacity

Unlike other energy resources on federal lands, geothermal lacks a dedicated permitting funding stream. While revenue from oil and gas projects is used to accelerate future permit reviews through the BLM Permit Process Improvement Fund, this provision specifically excludes geothermal.[50] Similarly, wind, solar and transmission projects under review by BLM are subject to cost-recovery under the Federal Land Management and Policy Act (FLPMA), allowing project developers to account for approximately 70% of staff costs related to project approvals.[51]

For oil and gas projects, the EPAct05 established a set-aside fund to improve interagency coordination in processing onshore federal oil and gas permits. Under this structure, half of the funding from rents for non-geothermal onshore mineral leases are deposited in the fund and can be used by the Secretary to support oil and gas permit processing at BLM.[52] Through 2026, fees collected for processing applications for permits to drill will be deposited to this fund and available for federal oil and gas permitting activities. While the EPAct05 included a separate provision for geothermal, known as the Geothermal Steam Act Implementation Fund, which supported updated geothermal resource mapping and leasing activities.[53] However, these provisions have long such sunsetted, leaving the geothermal projects without a similar funding stream to sustain the increased amount of work.

More recent efforts in Congress have sought to unlock additional funding sources to support geothermal permitting. One proposal is the Geothermal Cost-Recovery Authority Act, which would allow an agency to recover costs associated with geothermal permitting, similar to what exists across oil and gas, wind and solar projects.[54] Implementing this funding structure could unlock additional resources at BLM to process geothermal leasing and permitting decisions in a timely manner. Additional resources will be necessary to meet the increased interest from developers as demonstrated by the growing list of geothermal projects recently approved or currently under review at BLM, including 2.2 GW of new geothermal power.[55] Similar funding arrangements could streamline permitting reviews for geothermal as they have done for other energy resources on federal lands.

Conclusion

Geothermal energy has the potential to scale across the U.S. and meet growing energy demand. As global energy demand increases to fuel the AI race, power advanced manufacturing, data center growth and revitalize the American industrial base, the U.S. must ensure overly cumbersome and antiquated permitting doesn't hinder geothermal development. Taken together, the policy recommendations offered by this report would shorten project timelines, reduce regulatory uncertainty, de-risk private investment and expand the pipeline of geothermal projects under review. By aligning geothermal permitting with other energy sources and modernizing federal land management practices, the U.S. stands to benefit from a firm power resource needed to meet rapidly growing demand while strengthening U.S. energy security.

Bibliography

1. Lawrence Berkeley National Laboratory. Enhanced Geothermal Systems: A Promising Source of Round-the-Clock Energy. LBNL News Center. April 10, 2025. https://newscenter.lbl.gov/2025/04/10/enhanced-geothermal-systems-a-promising-source-of-round-the-clock-energy/
2. Pacific Northwest National Laboratory. Geothermal Energy. U.S. Department of Energy. https://www.pnnl.gov/geothermal-energy
3. Bureau of Land Management. Comprehensive Strategic Plan for Geothermal Management. U.S. Department of the Interior. 2005. (Referenced for statistic: 90% of U.S. geothermal resources are on federal lands.)
4. ThinkGeoEnergy. Geothermal PPAs Gain Ground with Data Center Demand.https://www.thinkgeoenergy.com/geothermal-ppas-gain-ground-with-data-center-demand/
5. DataCenterDynamics. Meta, XGS Ink 150 MW Geothermal Deal in New Mexico. https://www.datacenterdynamics.com/en/news/meta-xgs-ink-150mw-geothermal-deal-in-new-mexico/
6. McKinsey & Company. Is Geothermal Energy Ready to Make Its Mark in the U.S. Power Mix?https://www.mckinsey.com/industries/electric-power-and-natural-gas/our-insights/is-geothermal-energy-ready-to-make-its-mark-in-the-us-power-mix
7. McKinsey & Company. Is Geothermal Energy Ready to Make Its Mark in the U.S. Power Mix? https://www.mckinsey.com/~/media/mckinsey/industries/electric%20power%20and%20natural%20gas/our%20insights/is%20geothermal%20energy%20ready%20to%20make%20its%20mark%20in%20the%20us%20power%20mix/is-geothermal-energy-ready-to-make-its-mark-in-the-us-power-mix_final.pdf
8. International Energy Agency. The Future of Geothermal Energy — Executive Summary. https://www.iea.org/reports/the-future-of-geothermal-energy/executive-summary
9. Bureau of Land Management. Geothermal Energy Program. U.S. Department of the Interior. https://www.blm.gov/programs/energy-and-minerals/geothermal-energy
10. Bureau of Land Management. Pending Geothermal Projects. U.S. Department of the Interior. https://www.blm.gov/programs/energy-and-minerals/geothermal-energy/pending-geothermal-projects
11. U.S. Energy Information Administration. Electricity Annual — Table EPA 4.03: Geothermal Capacity and Generation. https://www.eia.gov/electricity/annual/html/epa_04_03.html
12. Bureau of Land Management. Biden-Harris Administration Delivers Historic Milestones: New Actions for Clean Energy. https://www.blm.gov/press-release/biden-harris-administration-delivers-historic-milestones-new-actions-clean-energy
13. National Renewable Energy Laboratory. U.S. Geothermal Resource Overview. NREL/TP-91848. 2025. https://docs.nrel.gov/docs/fy25osti/91848.pdf
14. U.S. Senate Committee on Energy and Natural Resources. Hearing Record.https://www.energy.senate.gov/services/files/9C84A7D2-AC8E-4BFF-9A18-F1B094DBA784
15. ClearPath. Regulatory Reform Could Unlock Gigawatts of Zero-Emission Geothermal. 2019. https://clearpath.org/tech-101/regulatory-reform-could-unlock-gigawatts-of-zero-emission-geothermal/
16. Bureau of Land Management. Geothermal Energy Program. U.S. Department of the Interior. https://www.blm.gov/programs/energy-and-minerals/geothermal-energy
17. U.S. Department of Energy. GeoVision: Harnessing the Heat Beneath Our Feet. Office of Energy Efficiency and Renewable Energy. https://www.energy.gov/eere/geothermal/geovision

18. Congressional Research Service. Considerations for Federal Leasing of Onshore Energy: Oil and Gas and Geothermal Power. CRS Report R48064. 2024. https://crsreports.congress.gov/product/pdf/R/R48064/11
19. Bureau of Land Management. Geothermal Programmatic Environmental Impact Statement (PEIS).https://www.blm.gov/sites/blm.gov/files/Geothermal_PEIS_final.pdf
20. Department of the Interior, Bureau of Land Management. Substantiation of Proposed NEPA Categorical Exclusion for Geothermal Resource Exploration Operations. 2025. https://eplanning.blm.gov/public_projects/2034686/200628933/20121177/251021157/Substantiation-Report_Geothermal_Resource_Confirmation.pdf
21. U.S. Congress. Public Law 91–581, "Geothermal Steam Act of 1970," 84 Stat. 1566 (Dec. 24, 1970), available at https://www.congress.gov/91/statute/STATUTE-84/STATUTE-84-Pg1566.pdf
22. H.R. 5350, Enhancing Geothermal Production on Federal Lands Act, Statement of Michael Nedd, Deputy Director, Operations, Bureau of Land Management, U.S. Department of the Interior (July 19, 2022). https://www.doi.gov/ocl/hr-5350
23. 30 U.S.C. § 1003(b)(2) (Geothermal Steam Act of 1970) — "Competitive lease sales" provision under the Geothermal Steam Act's leasing procedure. https://uscode.house.gov/view.xhtml?edition=prelim&path=%2Fprelim%40title30%2Fchapter23&
24. Bureau of Land Management. Geothermal Energy Fact Sheet.https://www.blm.gov/sites/blm.gov/files/energy_renewablegeothermalfactsheet.pdf
25. Bureau of Land Management. BLM Geothermal Leases — Utah Sale Nets Over $5.6 Million.https://www.blm.gov/press-release/blm-geothermal-leases-utah-sale-net-over-56-million
26. Bureau of Land Management. BLM Geothermal Lease Sales — Idaho Net Over $4 Million.https://www.blm.gov/press-release/blm-geothermal-lease-sales-idaho-net-over-4-million-0
27. ThinkGeoEnergy. 64 of 66 Parcels Sold in BLM Nevada Geothermal Lease Sale. https://www.thinkgeoenergy.com/64-of-66-parcels-sold-in-blm-nevada-geothermal-lease-sale/
28. Bloomberg News. U.S. Geothermal Companies Are Spending Big on Federal Land Leases. October 10, 2025. https://www.bloomberg.com/news/newsletters/2025-10-10/us-geothermal-companies-are-spending-big-on-federal-land-leases
29. Bureau of Land Management. California Geothermal Regional Information. https://www.blm.gov/programs/energy-andminerals/renewable-energy/geothermal-energy/regional-information/california
30. Salt Lake Tribune. Utah Renewable Energy BLM Sale. April 11, 2025. https://www.sltrib.com/news/environment/2025/04/11/utah-renewable-energy-blm-sale/
31. U.S. Congress. H.R. 1 — Replacement Sale Requirement (Sec. 50101). 119th Congress. https://www.congress.gov/bill/119th-congress/house-bill/1/text?s=5&r=1
32. U.S. Congress. Energy Policy Act of 2005. Public Law 109-58. https://www.congress.gov/109/plaws/publ58/PLAW-109publ58.pdf#page=155
33. Property and Environment Research Center (PERC). Harnessing the Heat Beneath Our Feet. July 19, 2021. https://perc.org/2021/07/19/harnessing-the-heat-beneath-our-feet/
34. U.S. Energy Information Administration. Natural Gas Price History. https://www.eia.gov/dnav/ng/hist/n9050us2a.htm
35. Bureau of Land Management. DOI Implements Emergency Permitting Procedures to Accelerate Geothermal Energy.https://www.blm.gov/press-release/doi-implements-emergency-permitting-procedures-accelerate-geothermal-energy

36. Federal Register. Adoption of Categorical Exclusions Under Section 109 of NEPA. April 19, 2024. https://www.federalregister.gov/documents/2024/04/19/2024-08382
37. Federal Register. NEPA Implementing Procedures for BLM. October 22, 2024. https://www.federalregister.gov/documents/2024/10/22/2024-24358
38. Federal Register. NEPA Implementing Procedures for BLM — 516 DM. January 16, 2025. https://www.federalregister.gov/documents/2025/01/16/2025-01055
39. Department of the Interior, Bureau of Land Management. Substantiation of Proposed NEPA Categorical Exclusion for Geothermal Resource Exploration Operations. https://eplanning.blm.gov/public_projects/2034686/200628933/20121177/251021157/Substantiation-Report_Geothermal_Resource_Confirmation.pdf
40. U.S. Congress. H.R. 1077 — 119th Congress. https://www.congress.gov/bill/119th-congress/house-bill/1077/text
41. U.S. Congress. S. 3954 — 118th Congress. https://www.congress.gov/bill/118th-congress/senate-bill/3954/text
42. U.S. Congress. H.R. 4776 — 119th Congress. https://www.congress.gov/bill/119th-congress/house-bill/4776/text
43. Department of the Interior, Office of Inspector General. Evaluation of BLM Geothermal Resources Management.March 7, 2013. https://www.doioig.gov/sites/default/files/2021-migration/FinalEval_BLM_GeothermalResourecesMgmt_030713.pdf
44. ThermalZones.com. Claim UTU-086295. https://thermalzones.com/claims/utu----086295
45. Bureau of Land Management. Instruction Bulletin IB-2022-040. https://www.blm.gov/policy/ib-2022-040
46. U.S. Congress. S. 2657 — 116th Congress (AGILE Act of 2019). https://www.congress.gov/bill/116th-congress/senate-bill/2657/text
47. U.S. Congress. S. 3954 — 118th Congress. https://www.congress.gov/bill/118th-congress/senate-bill/3954/text
48. U.S. Congress. H.R. 5631 — 119th Congress. https://www.congress.gov/bill/119th-congress/house-bill/5631/text
49. Bureau of Ocean Energy Management (BOEM). Interactive Lease Statistics Dashboard.https://www.boem.gov/regions/gulf-america-ocs-region/leasing-and-plans/boem-interactive-lease-statistics-dashboard
50. Witherbee, K., et al. Geothermal Funding Mechanisms for BLM and USFS. Geothermal Data Repository. https://gdr.openei.org/files/1262/WITHERBEE%20et%20al%20-%20Geothermal%20Funding%20Mechanisms%20for%20BLM-USFS.pdf
51. U.S. Department of the Interior. BLM FY 2025 Greenbook. 2024. https://www.doi.gov/sites/default/files/documents/2024-03/fy2025-508-blm-greenbook.pdf
52. The White House. FY 2026 Budget Appendix. https://www.whitehouse.gov/wp-content/uploads/2025/05/appendix_fy2026.pdf
53. Witherbee, K., et al. Geothermal Funding Mechanisms for BLM and USFS. https://gdr.openei.org/files/1262/WITHERBEE%20et%20al%20-%20Geothermal%20Funding%20Mechanisms%20for%20BLM-USFS.pdf
54. U.S. Congress. H.R. 398 — 119th Congress. https://www.congress.gov/bill/119th-congress/house-bill/398/text
55. Bureau of Land Management. Pending Geothermal Projects. https://www.blm.gov/programs/energy-and-minerals/geothermal-energy/pending-geothermal-projects