Geothermal Power Development:

Policy Considerations and Cross State Comparison

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Overview

- Comparative analysis of geothermal-related policies, regulations, and legislation across seven states – Utah, Nevada, Colorado, New Mexico, California, Texas, and Montana – to examine how different jurisdictions approach geothermal power development.
- Intended to inform State Energy Offices, state policymakers, and other stakeholders as they consider improvements to geothermal power regulatory frameworks.
- Begins with an overview of geothermal power definitions, permitting processes, and key considerations for states seeking to update their geothermal development policies, followed by a cross-state comparison of how each state addresses geothermal power development, and concludes with a survey of relevant state legislation.
- This analysis provides a sample of geothermal permitting processes, definitions, and relevant legislation. It is not intended to be a definitive or comprehensive assessment or to provide recommendations.
- Please contact Kaitlyn McBride (kmcbride@naseo.org) or Cassie Powers (cpowers@naseo.org) with questions or to provide additional input.

External Review Process

- Shared with external experts to confirm the accuracy of the information and to solicit insights on effective approaches, policy gaps, and potential pitfalls.
- Input was received from Gabriel Eckstein, Mike O'Connor (Center for Public Enterprise), Dan West (Clean Air Task Force), Caity Smith (XGS Energy), and Jack Conness (Fervo Energy).
- Shared with and reviewed by the State Energy Offices included in the analysis: Utah, Nevada, Colorado, New Mexico, California, Texas, and Montana.
- Feedback from all reviewers was incorporated into the final document and analysis.

Initial Considerations

Geothermal Definition	When establishing a definition for geothermal, one may consider explicitly identifying what is encompassed within the geothermal right. The definition could be framed to prioritize clarity and brevity, helping to reduce potential ambiguity and avoid multiple interpretations. Alignment with existing mineral extraction laws and/or water rights frameworks may also be considered. Additionally, one may consider using the term "heat", rather than geothermal "fluids," as this term more accurately encompasses nonconventional geothermal technologies (such as enhanced geothermal systems (EGS) and closed-loop systems) that extract heat from the subsurface rather than a fluid. Click here to view the state policy comparisons.
Temperature Threshold	Defines the minimum temperature threshold for what constitutes a geothermal resource. Typically, lower temperature thresholds are often used to distinguish geothermal resources from water resources or ground-source heat pumps (GSHPs), which may be subject to distinct permitting processes. Higher temperature thresholds may indicate utilization for electricity generation, which may result in differing regulatory frameworks for electricity generation and direct-use applications. Click here to view the state policy comparisons.
Ownership of the Heat	Identifies the responsible regulatory agency, the applicable statutory frameworks (such as oil and gas, water, mining, or specific geothermal laws), and considerations related to thermal effects on adjacent wells, properties, and the reservoir. Resource classification can also influence ownership. Prior to establishing a regulatory framework for geothermal resource utilization, it may be helpful to clearly define ownership of the resource. Click here to view the state policy comparisons.

The Geothermal Permitting Process

Step 1	**Land Use Planning**	Land Use Plans (LUPs) outline the activities permitted or restricted on a given unit of managed land. Developers may wish to determine whether a LUP applies to the project site and, if so, whether it allows for utility-scale geothermal development. If not, the developer may need to pursue the applicable state or local LUP amendment process. Click here to view the state policy comparisons.
Step 2: Site Considerations	**Land and Resource Access**	If the surface is federally owned, the developer may need to obtain a federal right-of-way (ROW) permit. States that manage large areas of state or school trust lands may consider establishing or updating leasing processes to provide a clear framework. Geothermal lease terms and extension conditions vary widely across states. When determining lease terms and extensions, states may consider approaches that allow leases to remain active as long as the resource is viable and in production, rather than relying on fixed end dates that could discourage continued development. Types of Geothermal Leasing: 1) Competitive Leasing – Generally, the highest qualifying bid receives the leasing rights. However, in some states, if a parcel does not receive a qualifying bid, it may become available for noncompetitive leasing or later sale (example: California). 2) Noncompetitive Leasing – Typically follows either a direct application process (example: New Mexico) or direct negotiation process (example: Nevada). 3) Combo or Hybrid Leasing – Generally, a combination of competitive and noncompetitive leasing (example: Colorado). 4) Water Rights – Use of a geothermal resource may require a water right or permit (example: Idaho). Click here to view the state policy comparisons.

The Geothermal Permitting Process

Step 2: Site Considerations	**Geothermal Exploration Permitting**	Non-invasive exploration activities refer to those that fall short of drilling for the discovery or production of geothermal resources. The techniques used and permits required depend on where the exploration occurs. Common structures for approving geothermal exploration include: • Inclusion in the existing geothermal resource lease; • Geologic or geophysical permits; • Exploration or prospecting permits; • Unified drilling permits; and • Temperature thresholds and water nexus/use permits. In limited cases, other considerations may exist outside the scope of the exploration pathways listed above (for example, in Colorado). If a state is interested in creating an environment that encourages exploration for geothermal resources, it could consider whether to allow exploration on unleased lands. If so, they may consider establishing a process to noncompetitively lease those lands or otherwise provide incentives for exploration. States may also benefit from clearly distinguishing between activities permitted under an exploration versus drilling permits or alternatively, adopting a more unified permit structure that does not differentiate between exploration and production drilling. Click here to view the state policy comparisons.

The Geothermal Permitting Process

Step 2: Site Considerations	**Environmental Review**	A developer may be required to undergo review under the National Environmental Policy Act (NEPA) if the project involves a "major federal action." Common NEPA triggers include: • Projects located on federal land; • Federal ownership of the mineral estate; • Receipt of substantial federal funding or support; • Requirements for federal permits or approvals. Additional considerations during the environmental review process may include pre-existing land use, aesthetic and recreational resources, site-specific conditions, water quality, waste and hazardous materials, cultural resources, and air quality. States may also consider how their existing environmental review processes apply to geothermal projects and how frequently such projects are subject to review. Click here to view the state policy comparisons.
	Water Access and Water Rights	Water access and water rights are primarily governed by state law. Developers may require water for various activities such as dust suppression, construction, drilling operations, resource extraction, and plant cooling. Water may be obtained through agreements with a leaseholder or municipality or by acquiring a permanent water right. These rights are generally categorized as groundwater or surface water rights. In the western United States, surface water rights are typically governed by a prior appropriation system ("first in time, first in right"). In the eastern United States, surface water rights are generally governed by riparian rights, which are tied to land ownership. Click here to view the state policy comparisons.

The Geothermal Permitting Process

Step 2	**Transmission Siting and Interconnection**	Requirements for transmission and interconnection depend largely on the location of the transmission lines. Developers may be required to acquire a federal right-of-way, obtain approvals from state or local governments, or complete a state encroachment process. An interconnection agreement is typically required to connect to the grid. This agreement outlines the terms under which a utility allows an energy facility to interconnect with its transmission or distribution system. The Federal Energy Regulatory Commission (FERC) has jurisdiction over the interconnection of wholesale generators connecting to the transmission system. Click here to view the state policy comparisons.
Step 3	**Drilling and Well Development**	The legal and regulatory framework for drilling is generally governed at the state level for state or private lands and at the federal level for federally managed lands. Regulations for geothermal wells are sometimes modeled after oil and gas laws and regulations. Developers may also need to comply with applicable federal and state environmental regulations. Developers are typically responsible for obtaining necessary permits, accounting for land and mineral ownership, and securing right-of-way access. Possible permits and rights may include: • Land Access permits • Drilling permits • Pit permits • Pollution discharge permits • Water permits or water rights • Geothermal rights or leases Click here to view the state policy comparisons.

The Geothermal Permitting Process

Step 4: Siting and Construction	**Power Plant Siting, Construction, and Regulation**	Permit requirements for power plants vary based on the facility's location, size, the type of customer served, and whether the electricity is sold in interstate commerce. Constructing a power plant generally requires permission from local, Tribal, state and/or federal government entities. If the project is located on state land, it may be subject to a state energy facility siting procedure, which typically includes an application, a public comment period, and an appeals process. Under the Federal Power Act, FERC has authority over "public utilities," defined as entities that own or operate facilities subject to FERC jurisdiction. This includes facilities involved in the transmission of electric energy in interstate commerce or the wholesale sale of electric energy in interstate commerce. Click here to view the state policy comparisons.
	Construction and Transportation	Constructing a power plant generally requires numerous permits from federal, state, and local governments. These may include permits related to transporting construction materials, assessing or encroaching on federal or state right-of-way, demolishing existing structures, constructing new facilities, and managing stormwater and other water-related matters. Click here to view the state policy comparisons.
Step 5	**Decommissioning**	State and federal laws establish requirements for decommissioning. Some states have specific well abandonment standards, while the Bureau of Land Management (BLM) oversees similar requirements for wells under its jurisdiction. Click here to view the state policy comparisons.

Initial Considerations: Cross State Comparison

Geothermal Resources Definitions		
UTAH		***NEVADA***
The natural heat of the earth at temperatures greater than 100 degrees Celsius, and the energy, in whatever form, including pressure, present in, resulting from, created by, or extractable from that natural heat, directly or through a mineral medium using any type of enhanced or advanced geothermal system (updated by SB 21 2026).		The natural heat of the earth and the energy associated with that natural heat, including pressure and all dissolved or entrained minerals that may be obtained from the medium used to transfer that heat, excluding hydrocarbons and helium.
COLORADO	***NEW MEXICO***	
The natural heat of the earth, including the energy that may be extracted from it, the material medium used to extract that energy, and any dissolved or entrained minerals and gases obtained from a geothermal resource, excluding hydrocarbon substances and carbon dioxide.	The natural heat of the earth exceeding 250 degrees Fahrenheit, or the energy, in whatever form, below the surface of the earth present in, resulting from, is created by, or is extractable from that heat. This includes all minerals in solution and other products obtained from naturally heated fluids, brines, associated gases, and steam found below the surface of the earth, but excludes oil, hydrocarbon gas, other hydrocarbon substances, and the heating and cooling capacity of the earth not resulting from natural heat exceeding 250 degrees Fahrenheit (such as on-site GeoExchange heat pump systems).	
CALIFORNIA	***TEXAS***	***MONTANA***
The natural heat of the earth; the energy, in whatever form, below the surface of the earth present in, results from, is created by, or may be extracted from that heat; and all minerals in solution or other products obtained from naturally heated fluids, brines, associated gases, and steam found below the surface of the earth, excluding oil, hydrocarbon gas, or other hydrocarbon substances.	Products of geothermal processes, embracing indigenous steam, hot water and hot brines, and geopressured water; steam and other gases, hot water, and hot brines resulting from fluids artificially introduced into geothermal formations; heat or other associated energy found in geothermal formations; and any by-products derived from these resources.	The natural heat energy of the earth, including the energy, in whatever form, that may be found at any depth below the surface of the earth, and any minerals in solution or other products obtained from the material medium of a geothermal resource.

Initial Considerations: Cross State Comparison

Geothermal Temperature Thresholds		
UTAH	***NEVADA***	
100 degrees Celsius (formerly 120 degrees Celsius, dropped by UT SB 21, 2026).	Defined as the "natural heat of the earth," including energy obtained from any medium used to transfer heat, with a temperature greater than 85 degrees Fahrenheit at the surface.	
COLORADO	***NEW MEXICO***	
Uses a depth threshold to delineate regulatory authority. The Colorado Division of Water Resources (DWR) has authority over shallow geothermal resources (less than 2,500 feet), while the Colorado Energy and Carbon Management Commission (ECMC) regulates deep geothermal wells (greater than 2,500 feet).	250 degrees Fahrenheit.	
CALIFORNIA	***TEXAS***	***MONTANA***
Defines high-temperature geothermal fluid as naturally heated subterranean fluid at or above the boiling point of water at the surface, and low-temperature geothermal fluid as below that threshold at ambient atmospheric pressure. Low-temperature geothermal wells are subject to different requirements, including distinct bonding requirements. For geothermal power plants, the California Energy Commission (CEC) defines "commercial quantities of a geothermal resource" as sufficient steam or hot water from enough wells to reasonably support a proposed plant's estimated gross capacity over the life of the project.	N/A	N/A

Initial Considerations: Cross State Comparison

Ownership of the Heat

UTAH

Surface Estate – A person who owns the surface of the land also holds title to the geothermal resources, notwithstanding the severance or conveyance of the mineral estate, unless the surface owner expressly conveys or reserves geothermal resources through a recorded deed or other instrument.

NEVADA

Surface Estate – The owner of the surface estate owns the underlying geothermal resources and retains title to those resources when if the mineral estate is severed, unless the geothermal resources are explicitly reserved or conveyed to another party.

COLORADO

Water Right Treatment – All surface water and groundwater are owned by the Citizens of Colorado; however, individuals may obtain water rights to use these resources. Geothermal resources associated with “tributary groundwater” are subject to the state’s prior appropriation system. Wells utilizing tributary groundwater typically require permitting with the overlying landowner(s) as co-applicants or with their consent. Rights to geothermal resources associated with non-tributary groundwater, or resources not involving fluid, are generally allocated to the overlying landowner unless severed or reserved.

NEW MEXICO

Mineral Estate – The owner of the mineral estate holds rights to geothermal resources. However, New Mexico's Mining Act explicitly excludes geothermal resources from the definition of “minerals,” meaning ownership depends on how property rights are defined and severed; in practice, geothermal resources are typically associated with the mineral estate unless otherwise states.

CALIFORNIA

Mineral Estate – The owner of the mineral estate may hold rights to geothermal resources, but ownership is not explicitly defined in a single statute. California does not clearly define "minerals" to include geothermal resources. In practice, ownership depends on property rights and deed language and may reside with the mineral estate, the surface estate, or be shared between them, as governed by contractual agreements between parties.

TEXAS

Surface Estate – The owner of the surface estate owns the underlying geothermal resources and retains title even if the mineral estate is severed, unless those resources are explicitly reserved or conveyed to another party.

MONTANA

Sui Generis Classification – Geothermal resources are treated as sui generis, meaning they have an independent legal classification from minerals, water, and other resources. Where the mineral estate, geothermal resources are generally understood to remain with the surface estate.

Geothermal Permitting Process: Cross State Comparison

Step 1: Land Use Planning

UTAH

Delegated to **municipalities**. Municipal general plans must include a land use element.

NEVADA

Local government planning agencies are required to develop master plans that include a land use element. Developers must seek amendments to plans that do not accommodate their project, including regional plans if the project qualifies as a "project of regional significance." Amendments to local plans require a public hearing before the planning commission.

COLORADO

Primarily delegated to **local governments**. Planning commissions adopt land use plans, typically referred to as "master" or "comprehensive" plans. These plans must include elements addressing the development of local water resources.

NEW MEXICO

Delegated to **municipalities and counties.** Planning commissions develop master plans addressing land use, water, transportation, economic development, and infrastructure.

CALIFORNIA

Geothermal field development (including wells, pipelines, equipment, and roads) must comply with local land use requirements. Authority is **delegated to cities and counties**, which are required to adopt long-term general plans. Local jurisdictions may also adopt a geothermal element to address development policies. However, certification by the California Energy Commission (CEC) for power plants generally supersedes state, local, and regional permits and regulations, although the CEC evaluates projects for compliance with applicable laws and standards and may override nonconformance under certain findings.

Upstream resource development (e.g., exploration, drilling, injection) is governed by local, state, or federal permitting.

Downstream power plant siting (typically ≥ 50 MW) falls under CEC jurisdiction.

TEXAS

Delegated to **municipalities**. Municipalities may adopt a comprehensive plan for long-term development. State law requires public input, but municipalities otherwise establish their own procedures for adopting these plans.

MONTANA

Delegated to **local governments**. Planning jurisdictions may include incorporated municipalities or entire counties. Where a land use or growth plan is in place, developers must comply with its provisions.

Geothermal Permitting Process: Cross State Comparison

Step 2: Site Considerations – Land and Resource Access

UTAH

Leasing Agency: Utah Department of Natural Resources (DNR).

Developers must obtain a lease, easements, and any necessary permits to access of encroach on existing state lands and right-of-way (ROWs). Administrative authority for geothermal leasing varies by land type: **Non-Trust State Lands** = Utah Division of Forestry, Fire and State Lands (UDFFSL) issues geothermal leases. **State Trust Lands** = Utah School and Institutional Trust Lands Association (SITLA) issues exploration and renewable energy lease agreements.

Developers must also obtain a permit from the Utah Division of Water Rights to appropriate geothermal fluids prior to extraction.

NEVADA

Leasing Agency: Nevada Division of State Lands (NDSL) for state lands; Bureau of Land Management (BLM) for federally managed land.

More than 80% of land in Nevada is federally managed, and state trust lands are limited (approximately 3,000 acres). Nevada does not have a geothermal-specific leasing program; instead, developers apply for a general state land lease via an Application to Use State Lands. Theses leases are subject to competitive auction and approval by the Nevada State Board of Examiners (NSBE) and/or the Nevada Interim Finance Committee (NIFC). Lease parcels typically range from 40 to 1,280 acres.

ROW across state lands are processed through the same application but are not competitively bid and do not require NSBE or NIFC approval. Final authorization is issued by the Attorney General. Long-term encroachments on state highways or similar ROWs require an Occupancy Permit from Nevada Department of Transportation (NDOT), which may trigger traffic control and drainage requirements.

COLORADO

Leasing Agency: Colorado State Board of Land Commissioners (State Land Board or SLB).

The SLB manages geothermal resources on state trust lands and issues leases via an application and notice process. Developers must obtain a lease, ROW easements, and any permits required to access or encroach on state lands or ROWs.

Deep geothermal operations generally require a permit from the ECMC. Separate SLB ROW leases are required for project components (roads, power lines, pipelines) crossing SLB lands, and these remain subject to local permitting and zoning requirements. Encroachments or access changes on state highways or public ROWs require permits from the Colorado Department of Transportation, including utility/special use permits and, if applicable, highway access permits.

NEW MEXICO

Leasing Agency: New Mexico State Land Office (SLO).

Developers must obtain a lease, ROW easements, and any permits to access or encroach on state lands or ROWs. **Geothermal leases** (>250 °F) require a SLO competitive auction, along with surface bonding and royalty surety. **Business leases** (≤250 °F) may be issued through competitive or non-competitive processes (typically up to 5 years).

A temporary Right of Entry Permit is required for pre-lease sit access. ROW easements across state lands require surveys, fees, and bonding. Encroachments on state highways require permits from the New Mexico Department of Transportation (NMDOT).

Geothermal Permitting Process: Cross State Comparison

NASEO
National Association of State Energy Officials

Step 2: Site Considerations – Land and Resource Access

CALIFORNIA	*TEXAS*	*MONTANA*
Leasing Agency: California State Lands Commission (SLC). Developers must obtain a lease and any necessary ROW easements from the SLC for state-owned geothermal resources through a Geothermal Lease / Oil & Gas, Geothermal, and Mineral Application. This process may involve competitive bidding and review under the California Environmental Quality Act (CEQA). ROW easements for infrastructure such as roads, transmission lines, and pipelines crossing SLC lands are also subject to CEQA review. Encroachments on state highways require a permit from Caltrans, which is typically approved or denied within 60 days. Geothermal lessees may enter into unit agreements if the State Oil and Gas Supervisor determines such agreements are necessary to prevent waste of geothermal resources.	Leasing Agency: Texas General Land Office (GLO). Developers must obtain a lease and ROW easements from the GLO for state-managed lands, including Permanent School Fund (PSF) land, Texas Parks and Wildlife Department (TPWD) land, Relinquishment Act (RA) lands. Geothermal leasing (except on RA lands) is conducted via nomination and sealed-bid auctions held four times per year. On RA lands, the surface owner typically acts as the state's leasing agent, or alternative procedures apply if the surface owner is unavailable. ROW easements across state lands require GLO approval, and encroachments on state highway ROWs require permits from the Texas Department of Transportation (TXDOT). Geothermal lessees may form unit agreements for leases on PSF land if the School Lands Board determines the agreement is in the best interest of the state.	Leasing Agency: Montana Department of Natural Resources and Conservation (DNRC). The DNRC issues geothermal leases for state lands through a public notice and sealed-bid process to the highest qualified bidder. Developers must obtain a lease, easements, and any permits to access or encroach on state lands or ROWs. Short-term use of state trust lands may be authorized through a Land Use License. A water right from the DNRC Water Rights Bureau is generally required to appropriate geothermal resources unless an exception under MCA 85-2.306(3) applies. Additional ROW authorizations or Land Use Licenses may be required for access outside the lease area. Encroachments on state highway ROWs require permits from the Montana Department of Transportation (MDT).

Geothermal Permitting Process: Cross State Comparison

Step 2: Site Considerations – Geothermal Exploration Permitting	
UTAH	***NEVADA***
An **exploration permit is not required** for non-invasive exploration activities. Approval from the Utah Division of Water Rights is required prior to geothermal exploration drilling where temperatures exceed 100 degrees Celsius, with specific requirements for temperature gradient wells. A Notice of Intent (NOI) must be submitted to the Division of Water Rights before drilling, redrilling, deepening, altering casing, or abandoning a well.	An **exploration permit is not required** for non-invasive exploration activities, such as geologic mapping and geophysical surveys. Exploration drilling is permitted by the NV Division of Minerals (NDOM). Drilling activities may require waivers (e.g., Oil, Gas, and Geothermal (OGG) waivers) from the Nevada Division of Water Resources, but typically only when make-up water is needed for drilling operations. Monitoring wells may qualify for a waiver, while exploratory wells require a permit to drill from the NDOM, a geothermal project area permit, or a sundry notice.
COLORADO	***NEW MEXICO***
Exploration on state lands **requires a Geothermal Exploration Lease** from the Colorado State Land Board (SLB) and a geothermal well permit from either the Division of Water Resources (DWR) for shallow operations or the Energy and Carbon Management Commission (ECMC) for deep operations (greater than 2,500 feet or involving non-tributary groundwater). Seismic exploration requires a Form 20 from ECMC. Exploration on private land is permitted permitted at the local level, although seismic activities still require a Form 20 from ECMC. DWR permitting includes adjacent landowner notification, fees, basin notifications, and well construction standards.	Non-drilling exploration on state lands **does not require a permit**, provided it does not significantly disturb or alter the land. Geophysical exploration on state trust lands requires a Geophysical Exploration Permit from the Energy, Minerals and Natural Resources Department (EMNRD) Oil Conservation Division (OCD). Exploration drilling requires a Permit to Drill, with a unified permitting process that applies to exploration, production, and observation wells.

Geothermal Permitting Process: Cross State Comparison

Step 2: Site Considerations – Geothermal Exploration Permitting		
CALIFORNIA	***TEXAS***	***MONTANA***
The California Geologic Energy Management Division (CalGEM) must complete environmental review and issue a decision on geothermal exploratory projects within 135 days of accepting an application. Prior to drilling, **developers must submit a NOI and obtain a Permit to Conduct Well Operations from CalGEM**. Approved NOIs expire if operations do not commence within two years (where environmental review is required) or one year (where it is not), unless extended by CalGEM. The full exploration permitting process is outlined here.	Geothermal exploration on state lands **requires a geothermal or prospect lease** from the Texas General Land Office (GLO), and seismic work requires a separate seismic permit. GLO permits are issued only if in the state's best interest, and Texas Parks and Wildlife Department (TPWD) lands have additional requirements. Exploration drilling requires a drilling permit from the Railroad Commission of Texas (RRC), regardless of surface of mineral ownership.	Pre-drilling exploration **requires a Geothermal Exploration Plan** filed with the Montana Department of Environmental Quality (DEQ) and a NOI filed with the county clerk and recorder prior to any earth-disturbing geophysical exploration. The county clerk and recorder issues the geophysical permit and forwards it to the Montana Board of Oil and Gas Conservation (BOGC) (see 82-1-105 and 82-1-106 MCA). There is no clearly defined statewide permitting process for exploration drilling. Developers are advised to consult the Montana Department of Natural Resources and Conservation (DNRC) for requirements. Exploration wells are generally treated as water wells, requiring a licensed water well contractor and typically review under the Montana Environmental Policy Act (MEPA).

Geothermal Permitting Process: Cross State Comparison

Step 2: Site Considerations – Environmental Review

UTAH

Developers may choose to participate in a voluntary Energy Pre-Design Program administered by the Utah Department of Environmental Quality (DEQ) to help coordinate project permitting requirements.

NEVADA

Developers of projects exceeding 70 megawatts must obtain approval from the Nevada Public Utilities Commission (PUC) under the Nevada Utility Environmental Protection Act (UEPA), with review by the Nevada Department of Conservation and Natural Resources (DCNR).

COLORADO

Colorado does not have a unified state environmental review process. However, geothermal developers must comply with applicable requirements related to cultural and biological resources, water quality, air quality, and hazardous and solid waste.

Permits issued by the Energy and Carbon Management (ECMC) for deep geothermal operations include a comprehensive site location analysis with environmental impact assessment and mitigation requirements.

NEW MEXICO

Utility-scale geothermal projects typically require environmental permitting and regulatory approvals from multiple federal and state agencies.

CALIFORNIA

The California Environmental Quality Act (CEQA) applies to projects undertaken, funded, or requiring approval by a public agency. Geothermal exploratory projects may be reviewed separately from field development projects, with each requiring its own environmental documentation.

The California Geologic Energy Management Division (CalGEM) serves as the lead CEQA agency for geothermal exploratory projects but may delegate this role to a county that has adopted a geothermal element. The California Energy Commission (CEC) is the lead CEQA agency for geothermal power plants meeting the 50 MW threshold and also serves as the lead agency under the Opt-In Certification Program for streamlined permitting. In some cases, a joint NEPA Environmental Impact Statement (EIS) and CEQA Environmental Impact Report (EIR) may be prepared to satisfy both federal and state requirements.

TEXAS

Texas does not have a unified state environmental review process. Developers must comply with applicable requirements related to cultural and biological resources, water quality, air quality, and hazardous waste.

MONTANA

If the project requires state agency action, both the agency and the developer must comply with the Montana Environmental Policy Act (MEPA), unless an exemption applies under Administrative Rule 17-4-607(5).

Geothermal Permitting Process: Cross State Comparison

Step 2: Site Considerations – Water Access and Water Rights

UTAH

Geothermal fluids are regulated as a water resource in Utah, and any diversion or use requires a water right under the Geothermal Resource Conservation Act.

The Utah Division of Water Rights has jurisdiction, and developers must submit an Application to Appropriate Water in accordance with Utah Code Section 73-3.

NEVADA

Water use generally requires an appropriative right for beneficial use. However, water used for geothermal development may be exempt from appropriation if it is reinjected into the same aquifer or if losses occur due to testing or temporary system failures.

Closed-loop systems require separate water sources, which may be obtained through municipal supply, leases, purchases, or new or modified water rights. Any change in the point of diversion, place of use, or purpose of use requires a Water Right Change Application and approval. New appropriations require a Water Right Application to the Nevada Division of Water Resources.

COLORADO

Appropriation of geothermal fluids generally requires a permit from the Division of Water Rights (DWR), unless waived for non-impairing closed-loop systems or when the operation qualifies as a permitted deep geothermal operation using non-tributary groundwater solely for heat extraction.

Geothermal wells require prior approval from DWR (for shallow systems) or the Energy and Carbon Management Commission (ECMC) (for deep systems), depending on depth. Consumptive or ancillary water uses unrelated to heat extraction require separate water rights under Colorado water law, with requirements varying by basin and tributary status. DWR determines whether geothermal fluids are tributary or non-tributary, which affects whether rights are adjudicated in water court or governed under non-tributary rules. Early consultation with DWR is advisable.

Special rules apply in the Denver Basin and other designated basins. No separate water use permit is required for heat extraction from allocated geothermal resources.

NEW MEXICO

Closed loop projects exceeding 250 degrees Fahrenheit may use a Permit to Drill a Well with No Consumptive Use of Water, which can avoid many water rights requirements but requires an impairment analysis by the New Mexico Office of the State Engineer (OSE).

Consumptive or ancillary water uses generally require the acquisition of water rights and completion of ownership transfer and change-of-use, place, or point-of-diversion processes with OSE. Additional pathways may be available for temporary use, deep non-potable groundwater, restricted basins, and general appropriations. If groundwater is on state trust land, approval from the State Land Office (SLO) is required.

Geothermal Permitting Process: Cross State Comparison

Step 2: Site Considerations – Water Access and Water Rights		
CALIFORNIA	***TEXAS***	***MONTANA***
Water extracted during geothermal development is classified as a geothermal resource. Ancillary water uses require separate water rights or supplies, administered by the State Water Resources Control Board (SWRCB). When available, riparian rights may satisfy ancillary water needs without a permit, although filing a Statement of Water Use and Diversion is recommended. Changes to surface water rights require notification to SWRCB and, for changes in point, place, or purpose of use, may require a petition, public notice, and a hearing. Additional options include short- or long-term water transfers and, in limited cases, new appropriations subject to environmental review and basin-specific requirements.	Water produced during geothermal development is generally treated as part of the mineral estate and is not typically regulated under Texas water law. Geothermal resources are generally owned by the surface estate owner unless expressly conveyed otherwise, excluding minerals dissolved in groundwater (such as hot brines). Ancillary water needs must typically be met through municipal or governmental supplies, private agreements, temporary surface water permits, or new or amended water rights. Surface water rights operate under Texas's prior appropriation system, while groundwater use follows the rule of capture, subject to applicable groundwater conservation district rules.	Any well drilled to divert water for geothermal energy production requires a water right from the Department of Natural Resources and Conservation (DNRC). If the well exceeds a flow rate of 35 gallons per minute or an annual volume of 10 acre-feet, the full water right permitting process under MCA 85-2-302 applies. There is no distinction in the water rights process between open-loop vs closed-loop geothermal systems. Criteria for new water use permits are outlined in MCA 85-2-311. Water produced from oil and gas wells falls under the jurisdiction of the Montana Board of Oil and Gas Conservation (BOGC) (MCA 85-2-510). Any geothermal energy produced as a byproduct of oil and gas operations is therefore regulated by BOGC.

Geothermal Permitting Process: Cross State Comparison

Step 2: Site Considerations – Transmission Siting and Interconnection

UTAH

Developers of high-voltage power transmission lines that qualify as public utilities must obtain siting approval under Utah's Siting of High Voltage Power Line Act. Electric corporation must also obtain a Certificate of Public Convenience and Necessity (CPCN) before constructing or operating new or extended lines, unless the project only involves adding or replacing capacity.

The process includes filing a Notice of Intent (NOI) with the state commission, conducting public workshops, and obtaining local land use approvals. Appeals of local denials are reviewed by the Utility Facility Review Board. Projects not requiring a CPCN must still comply with applicable local siting regulations.

NEVADA

Transmission line developers that qualify as public entities may be required to obtain a CPCN from the Nevada Public Utility Commission (PUC). The CPCN process includes a 30-day public comment period, a potential pre-hearing conference, and a public hearing.

Transmission lines outside designated utility corridors require a Special Use Permit from local governments. Denials may be reviewed by the PUC and are subject to judicial appeal.

COLORADO

Transmission line developers that qualify as public utilities or cooperative electrical associations (CEAs) may be required to obtain a CPCN from the Colorado Public Utilities Commission (PUC). A CPCN is required for new transmission lines at or above 230 kV, as well as for extensions or modifications that increase noise or electromagnetic fields beyond established thresholds.

CEAs may be exempt from CPCN requirements if they are not regulated as public utilities and meet applicable criteria. All projects must comply with local government permitting and land use requirements.

NEW MEXICO

Large transmission line developers must obtain siting approval, and generating facilities must secure interconnection approval from the applicable utility. A CPCN from the New Mexico Public Regulation Commission (NMPRC) is required only for developers qualifying as public utilities.

A NMPRC Location Permit is required for transmission lines at or above 230 kV with a right-of-way width of at least 100 ft. This process includes an application, submission of relevant NEPA documents, and a public hearing. Lines below 230 kV are excluded from this requirement.

Generating facilities greater than 10 MW require utility approval through an application, technical studies, interconnection agreement, and testing. Facilities of 10 MW or less follow a similar but potentially streamlined process.

The New Mexico Renewable Energy Transmission Authority (RETA) may assist with siting, transmission capacity mapping, and interconnection upgrades. RETA also has bonding authority and eminent domain powers.

Geothermal Permitting Process: Cross State Comparison

Step 2: Site Considerations – Transmission Siting and Interconnection		
CALIFORNIA	***TEXAS***	***MONTANA***
A CPCN from the California Public Utilities Commission (CPUC) is required for transmission lines above 200 kV for entities that qualify as public utilities. A Permit to Construct is required for transmission lines between 50 kV and 200 kV and includes environmental review, public notice, and potentially a hearing. Interconnection with the California Independent System Operator (CAISO) is required for grid connection and involves an application, technical studies, a scoping meeting, and execution of a Generator Interconnection Agreement. A fast-track process is available for facilities of 5 MW or less. The California Energy Commission (CEC) licenses thermal power plants of 50 MW or greater, unless a Small Power Plant Exemption applies (typically for facilities between 50 and 100 MW). Authority may be delegated to local governments with approved geothermal elements. The CEC may also certify geothermal power plants of any size under its Opt-In Certification Program.	Transmission line developers that qualify as public utilities must obtain a Certificate of Convenience and Necessity (CCN) and siting approval from the Public Utility Commission of Texas (PUCT) before providing service. Interconnection within the Electricity Reliability Council of Texas (ERCOT) is required for facilities greater than 10 MW and involves an application, full system study, and an interconnection agreement filed with the PUCT. Facilities of 10 MW or less follow distributed generation procedures with the local transmission and distribution utility. Local government approvals must typically be obtained before the CCN process and may include alternate route analysis and, in some cases, an economic cost-benefit study within ERCOT regions.	Transmission line developers must obtain a Certificate of Compliance from the Montana Department of Environmental Quality (DEQ) for transmission lines greater than 69 kV and longer than 10 miles. This triggers review under the Montana Major Facility Siting Act and the Montana Environmental Policy Act (MEPA), including public notice and comment. Exemptions from the Certification of Compliance include certain lines at or below 230 kV or shorter than 10 miles, lines between 69 kV and 230 kV where more than 75% of the right-of-way has been secured, lines less than 150 miles where more than 75% of the right-of-way has been secured, upgrades to existing lines at or below 230 kV, and associated transmission substations or control equipment.

Geothermal Permitting Process: Cross State Comparison

Step 3: Drilling and Well Development

UTAH

All developers must obtain approval from the Utah Division of Water Rights, submit a Notice of Intent (NOI) to drill, file an application, provide a surety or cash bond, obtain a Well Driller's Permit, and comply with well maintenance and abandonment requirements. For new wells, developers must also submit a Plan of Operations.

NEVADA

Developers must obtain a Geothermal Resource Development Permit (GRDP) to drill a geothermal well. To cover multiple wells within a project area, a Project Area Permit is also required. A GRDP application must include surveyed coordinates, a drilling program, and a description of equipment and proposed locations. Following permit approval, developers must notify the Division prior to drilling, provide updates during drilling operations, and submit a well completion report within 30 days of completion. A sundry notice is required for any major or minor modifications to the drilling plan or well.

COLORADO

Developers must obtain a Geothermal Operations Permit from either the State Engineer or the Energy and Carbon Management Commission (ECMC) before constructing, operating, or modifying geothermal wells (e.g., increasing production or changing use). Deep geothermal operations (greater than 2,500 feet) require an ECMC permit, while shallow operations require a Division of Water Resources (DWR) permit. All projects must comply with applicable permit conditions and well construction standards. These requirements reflect DWR regulations and may not fully include ECMC-specific rules.

NEW MEXICO

Developers must obtain approval from the Oil Conservation Division (OCD) prior to drilling. A Permit to Drill is required for geothermal production, observation, thermal gradient, injection, or disposal wells. The application requires supporting documentation and a plugging bond. While OCD regulates oil and gas wells, geothermal wells are administered under ECAM.

CALIFORNIA

Developers must obtain a Permit to Conduct Geothermal Operations from the California Geologic Energy Management Division (CalGEM) prior to drilling. They must also submit a Notice of Intent (NOI) to drill or redrill a geothermal resource well for review, secure an indemnity bond, and pay applicable fees.

TEXAS

Developers must obtain a drilling permit from the Railroad Commission of Texas (RRC) for exploratory, commercial, geothermal (within designated fields), and co-production wells. Groundwater Conservation Districts may impose additional restrictions. Permits are submitted through the RRC's online system, and special approval is required for any exceptions to spacing and density requirements.

MONTANA

Montana does not have a well-established geothermal drilling permitting framework. Developers should contact the Department of Natural Resources (DNRC) for guidance. Production wells are generally regulated as water wells and must be drilled by licensed contractors.

Geothermal Permitting Process: Cross State Comparison

Step 4: Siting and Construction Process – Power Plant Siting, Construction, and Regulation	
UTAH	***NEVADA***
Developers that qualify as public utilities must obtain a Certificate of Public Convenience and Necessity (CPCN) from the Utah Public Service Commission (PSC) for electric generating facilities. Independent geothermal and other renewable energy producers are generally exempt from CPCN requirements for generation; however, associated transmission lines still require a CPCN. Applications are submitted to the PSC, followed by a public hearing, after which the PSC approves or denies the request and issues a certificate if approved (with rehearing available if denied).	Developers that qualify as public utilities must obtain a CPCN from the Nevada Public Utilities Commission (PUC) for energy generation facilities. The CPCN process includes a 30-day public comment period, a potential pre-hearing conference, a mandatory public hearing for electric utilities, and final PUC approval or denial.
COLORADO	***NEW MEXICO***
Developers that qualify as a public utilities must obtain a CPCN from the Colorado Public Utility Commission (PUC). Geothermal generation facilities may qualify as public utilities; however, a CPCN is typically required only if capacity exceeds 10 MW. Rural electric cooperatives are generally exempt for new construction or expansion within their certified service area. The PUC issues a decision within 60 days of receiving a complete application.	Developers that qualify as public utilities must obtain a CPCN from the New Mexico Public Regulation Commission (NMPRC). Applications must include detailed project descriptions and comply with public notice and hearing requirements.

Geothermal Permitting Process: Cross State Comparison

Step 4: Siting and Construction Process – Power Plant Siting, Construction, and Regulation		
CALIFORNIA	***TEXAS***	***MONTANA***
Developers of power generating facilities must obtain siting approval from the California Energy Commission (CEC) and, if they qualify a public utilities, a CPCN from the California Public Utilities Commission (CPUC) (generally for facilities exceeding 50 MW). Several certification pathways are available: Standard Application for Certification (AFC) (≥ 50 MW): Includes California Environmental Quality Act (CEQA) environmental review and a public hearing. CEC certification generally replaces most other state, local, and federal permits and supersedes conflicting statutes or regulations. Authority may be delegated to counties with geothermal elements. After certification, a separate drilling permit is required from the California Geologic Energy Management Division (CalGEM) or the local jurisdiction. Small Power Plant Exemption (50-100 MW): Avoids the full AFC process but still requires environmental review and other permits. After exemptions, developers must obtain permits from the local jurisdiction. Opt-In Certification (any size): A streamlined process requiring full environmental analysis and additional commitments, such as community benefits agreements, project labor agreements, and local economic benefits. The CEC must issue a decision within 270 days of a complete application. A drilling permit from CalGEM or local jurisdiction is still required after certification. The AFC and CPCN processes may run concurrently.	Geothermal energy facilities must register with the Public Utility Commission of Texas (PUCT) as either a Power Generation Company (≥ 1 MW, sells at wholesale, and does not own transmission or distribution facilities) or a Self-Generator (≥ 1 MW, not selling at wholesale). Renewable Energy Credit (REC) certification is optional and administered by the Electric Reliability Council of Texas (ERCOT) following PUCT registration. A CPCN is required only if the facility qualifies as a public utility or retail electric utility provider serving customers.	Geothermal facilities with a capacity of 50 MW or greater are subject to the Montana Major Facility Siting Act and must obtain a CPCN from Montana Department of Environmental Quality (DEQ). Construction must begin within 6 years of certification.

Geothermal Permitting Process: Cross State Comparison

Step 4: Siting and Construction Process – Construction and Transportation		
UTAH	***NEVADA***	
If a project located on Utah School and Institutional Trust Lands Administration (SITLA) land requires use of SITLA-managed land outside the project's lease area (e.g., for transmission infrastructure), SITLA may require a Special Use Lease.	N/A	
COLORADO	***NEW MEXICO***	
N/A	N/A	
CALIFORNIA	***TEXAS***	***MONTANA***
N/A	N/A	N/A

Geothermal Permitting Process: Cross State Comparison

Step 5: Decommissioning		
UTAH	***NEVADA***	
N/A	If a geothermal well is to be decommissioned, the operator must submit a plugging and abandonment plan through a sundry notice in accordance with NAC 534A.490, which governs the abandonment of geothermal production, injection, or observation wells.	
COLORADO	***NEW MEXICO***	
The Energy and Carbon Management Commission (ECMC) regulates deep geothermal operations across the full project lifecycle, including pre-project planning, operations, plugging and abandonment, and land reclamation.	N/A	
CALIFORNIA	***TEXAS***	***MONTANA***
The California Energy Commission (CEC) power plant certifications include project-specific decommissioning requirements. Geothermal wells must be plugged and abandoned in accordance with California Geologic Energy Management Division (CalGEM) regulations. Operators must submit a written Notice of Intent (NOI) to abandon, along with well information, prior to proceeding. On federal lands, the Bureau of Land Management (BLM) requires well plugging, surface reclamation, and financial assurance under 43 CFR Part 3200.	N/A	N/A

Relevant State Legislation

State	Title	Bill Number	Description	Status
Colorado	Regulation of Underground Injection Control Wells	HB 1112 (2026)	Grants the ECMC authority over class I, class IV, and class V injection wells and allows the ECMC to seek and adopt rules related to primacy from the United States Environmental Protection Agency (EPA) for these classes of injection wells – this could help accelerate geothermal permitting. The ECMC may assess and collect fees related to the regulation of class I, class IV, and class V injection wells.	Re-engrossed (5/11/2026)
Pennsylvania	Geothermal Energy Development Act	HB 2076 / SB 1131 (2026)	An Act providing for geothermal energy development; imposing duties on the Department of Environmental Protection; promulgating regulations; establishing the Geothermal Energy Development Fund; and imposing penalties.	In Progress (5/7/2026)
Oklahoma	Well Repurposing Act	HB 3173 (2026)	Filed by Representative Nick Archer (R-Elk City) to help address the state's abandoned or orphaned well challenges.	In Progress (4/28/2026)
Utah	Geothermal Amendments	SB 21 (2026)	Clarifies the purposes of the geothermal chapter, addresses definitions, modifies provisions related to ownership of geothermal resources or fluids, amends powers of the Division of Water Rights related to confidentially of information, addresses bonding requirements, and makes technical and conforming amendments.	Passed (3/26/2026)
New Mexico	Rename and Create Geothermal Tax Credits	HB 62 (2026)	Relating to taxation; naming the geothermal electricity generation income and corporate income tax credits to the geothermal energy production income and corporate income tax credits; creating a tax credit schedule based on the amount per kilowatt-hour of geothermal energy produced for credits.	Introduced (1/9/2026)

Relevant State Legislation

State	Title	Bill Number	Description	Status
Colorado	Geologic Storage Enterprise and Geothermal Resources	HB 1165 (2025)	Makes several updates to laws concerning the administration of underground geothermal resources, including: • Clarifying that "non-tributary groundwater" does not include" designated groundwater," as these terms are defined in current law; • Exempting certain geothermal operations from needing a well permit from the state engineer; • Requiring the state engineer to notify the operator of a prior geothermal operation of an application for a proposed well, and allowing the operator the opportunity to request a hearing if the application causes concern for material injury to the prior geothermal operation; • Renaming the State Board of Examiners of water well construction and pump installation contractors as the "state board of examiners of water well and ground heat exchanger contractors" (state board of examiners); • Establishing that the authority to regulate shallow geothermal operations is shared by the state engineer and the state board of examiners; and • Regulating ground heat exchanger contractors in the same manner that currently exists for water well construction contractors and pump installation contractors.	Passed (2025)
California	Streamlined Permitting at CEC	AB 531 (2025)	Allows geothermal power plants to get certified through the State Energy Resources Conservation and Development Commission (also known as the California Energy Commission, CEC) streamlined opt-in process. Expands the types of facilities eligible to be certified as environmental leadership development projects by the CEC to include geothermal power plants and projects that comprise multiple geothermal power plants on a single site.	Passed (October 2025)

Relevant State Legislation

State	Title	Bill Number	Description	Status
New Mexico	Well Repurposing Act	HB 361 (2025)	The Energy, Minerals and Natural Resources Department may authorize the conversion of an oil or gas well into a facility that provides energy storage or develops geothermal energy. When authorizing such a conversion, the Department may establish fees and financial assurance requirements specific to the energy storage or geothermal development uses.	Passed (July 2025)
Washington	Promoting the Development of Geothermal Energy Resources	SB 6039 (2024)	The Geological Survey shall compile and maintain a comprehensive database of publicly available subsurface geologic information relating to Washington State. It must be made available to the public in a searchable format. The Department must (by September 30, 2024) commence rulemaking to update its geothermal resources lease rates. They must also be competitive with geothermal resources lease rates adopted by the federal government and by other states in the western United States. The goal is to optimize the state's competitiveness at attracting geothermal exploration and development projects while balancing the state's obligation to trust beneficiaries and not adversely impact federally reserved tribal rights and resources. Subject to availability, establish a competitive geothermal exploration cost-share grant program in order to incentivize deep exploratory drilling. Cross agency collaboration to identify opportunities and risks associated with the development of geothermal resources in three locations with the highest geothermal potential.	Passed (March 2024)

Relevant State Legislation

State	Title	Bill Number	Description	Status
New Mexico	Geothermal Resources Project Funds	HB 91 (2024)	Amending the duties of the Energy Conservation and Management Division of the Energy, Minerals and Natural Resources Department. Creating the Geothermal Projects Development Fund, which authorizes grants, and the Geothermal Projects Revolving Loan Fund, which authorizes loans. The Division shall: • Regulate the exploration, development, and production of geothermal resources on public and private land; • May require persons seeking to explore, develop or product geothermal resources to obtain permits from the Division; • May limit and allocate production of geothermal resources as needed to prevent waste whenever the total amount of geothermal resources that may be produced from a geothermal reservoir is limited; • Allocate and distribute the allowable production to afford each ownership or lease interest in a geothermal reservoir the opportunity to produce its just and equitable share of the geothermal resources in the reservoir; • Have exclusive authority to regulation injection into geothermal wells pursuant to the Geothermal Resources Development Act; and • Have exclusive authority over matters related to the protection of natural resources, property, health and public welfare as they relate to geothermal injection wells. The Division has jurisdiction over: • All matters relating to the exploration, development and production of geothermal resources. • All persons, matters and things necessary or proper to enforce effectively the provisions of the Geothermal Resources Development Act (including investigations and inspections).	Passed (March 2024)

Relevant State Legislation

State	Title	Bill Number	Description	Status
New York	Regulation of Closed-Loop Boreholes	SB 8060 (2024)	Amends the Environmental Conservation Law and a chapter of the laws of 2023 amending the Environmental Conservation Law relating to exempting certain geothermal boreholes at depths beyond 500 feet from certain requirements, as proposed in legislative bill numbers SB 6604 and AB 6949, in relation to regulation of certain closed-loop boreholes installed for the purpose of facilitating a geothermal heating and cooling system.	Passed (2024)