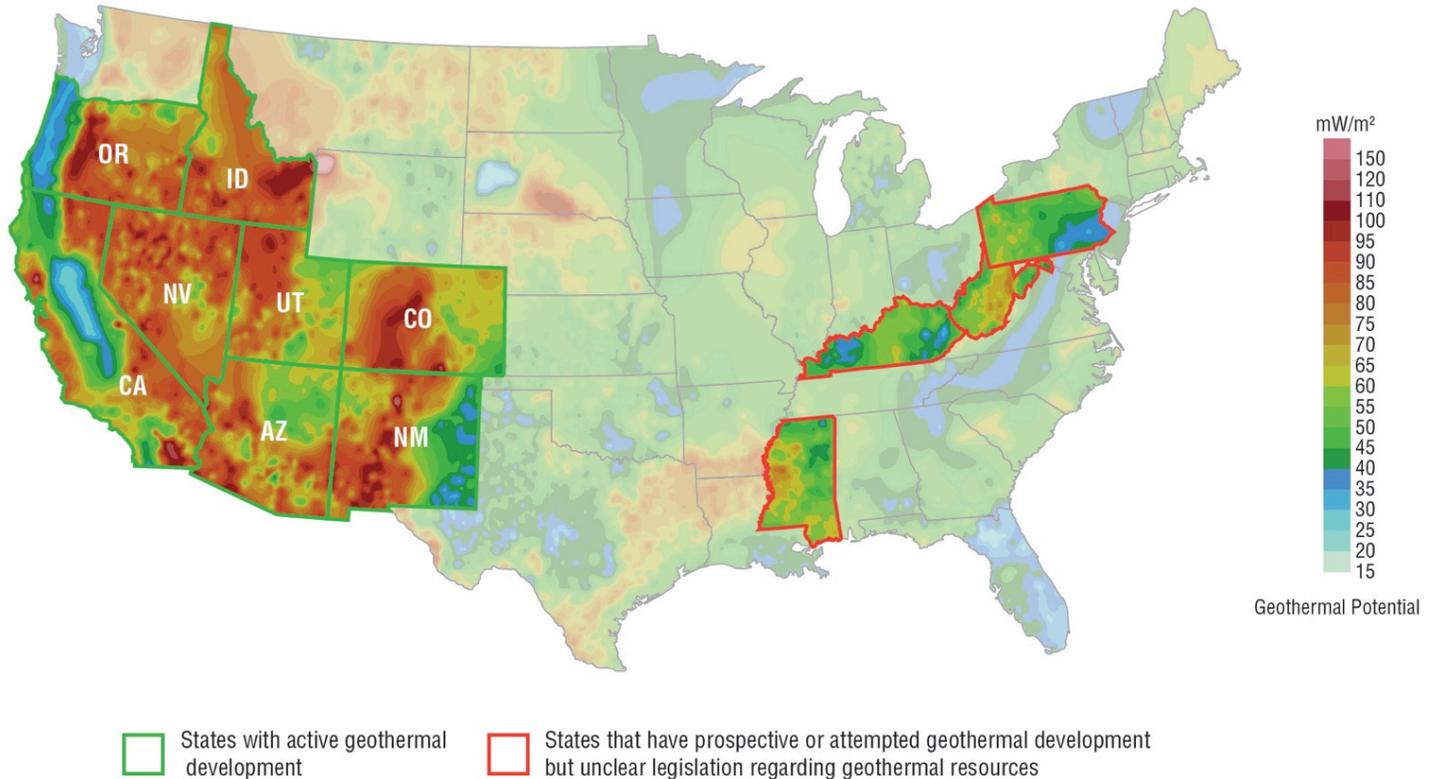


Geothermal Resource Classification



While many states have geothermal energy potential, several also have conflicting state legislation which makes exploiting these resources difficult.

From a policy perspective, simplifying geothermal energy resource definitions across federal and state government agencies can help streamline development and position geothermal as a global competitor in the race for clean energy. As the graphic above shows, while many states have the potential for geothermal energy development, several have legislation on the books that leaves the nature of the resource unclear. How this resource should/can be exploited, including establishing definitively who the primary regulator is, needs to be clarified.

Some solutions to this issue are already being implemented. Most notably, DOE's Geothermal Regulatory Roadmap (GRR) initiative (available at <http://en.openei.org/wiki/GRR>) attempts to streamline the geothermal permitting process for developers by identifying state and federal agencies involved in the development process, estimating timelines for different stages of the process, and identifying potential areas of overlap and concern. Improving communication across stakeholders can better inform the process and facilitate understanding of the various definitions of geothermal resources and water resources.

Visit the Geothermal Technologies Office website at geothermal.energy.gov for more information on geothermal development and policy, or contact geothermal@ee.doe.gov.

¹ Schroeder, Jenna N., Christopher B. Harto, Robert M. Horner, and Corrie E Clark. 2014. *Geothermal Water Use: Life Cycle Water Consumption, Water Resource Assessment, and Water Policy Framework*. Argonne National Laboratory. (ANL/EVS-14/2). <http://osti.gov/scitech/biblio/1155056>
Map: Blackwell, D.D., Richards, M.C., Frone, Z.S., Batir, J.F., Williams, M.A., Ruzo, A.A., and Dingwall, R.K., 2011, "SMU Geothermal Laboratory Heat Flow Map of the Conterminous United States." Supported by Google.org. Available at <http://www.smu.edu/geothermal>

State	Geothermal Resource Water or Mineral?	Temperature Divide between Water and Geothermal Water (if applicable)	Relevant State Statutes	Groundwater Management System
Arizona	Geothermal resource not considered water unless development creates water impacts	NA	<i>Arizona Revised Statutes:</i> (ARS) Chapter 4, Article 4, Sections 27-651.6 and 27-667	Prior Appropriation
California	Mineral	Boiling point at the surface elevation of the resource when it comes out of the ground. (Example: The Geysers sits at ~2,400 ft, where water has a boiling point of 97.6°C, or 207.7°F)	<i>California Public Resource Code:</i> Division 3, Chapter 4, Sections 3701 and 3703.1	Correlative Rights
Idaho	Neither a mineral nor water (<i>sui generis</i>), though managed under the Department of Water	Resource temperature of 212°F (or 100°C)	Idaho Geothermal Resources Act in <i>Idaho Statutes</i> 42-4002(c)	Prior Appropriation
Nevada	Defined as a mineral but managed as a water resource by the Department of Minerals	NA	<i>Nevada Revised Statutes:</i> (NRS) 534A.010	Prior Appropriation
New Mexico	Mineral and Water	Above 250°F, the resource is classified as a mineral. At or below 250°F, it is classified as water.	<i>New Mexico Administrative Code:</i> (NMAC), 19.41.7(o) and 19.14.17(r)	Prior Appropriation
Oregon	Mineral and Water	Above 250°F, the resource is classified as a mineral. At or below 250°F, it is classified as water.	<i>Oregon Revised Statutes:</i> (ORS) Sections 522.005.11 and 522.019.2	Prior Appropriation
Utah	Geothermal fluids classified as groundwater, though managed similar to minerals	Resource temperature of 120°C (or 248°F)	Utah Geothermal Resource Conservation Act in <i>Utah Code</i> Title 73, Chapter 22, Sections 3 and 4	Prior Appropriation

Management at the state level comes down to whether the state classifies geothermal resources under legal doctrines that govern groundwater appropriation, whether they classify the resources according to oil, gas, and mineral principles, or whether they use a hybrid system. This yields insight into how such categorization of geofluids can shape regulatory requirements as they pertain to geothermal energy development activities.

Federal Geothermal Policy

While relevant state definitions are defined above, there is also one, overarching federal definition for geothermal resources:

43 CFR 3200.1 – “*Geothermal steam and associated geothermal resources* as, “(1) All products of geothermal processes, including indigenous steam, hot water, and hot brines; (2) Steam and other gases, hot water, and hot brines resulting from water, gas, or other fluids artificially introduced into geothermal formations; (3) Heat or other associated energy found in geothermal formations; and (4) Any byproducts.”

This definition has been interpreted by the Bureau of Land Management (BLM) to focus on the heat energy as being the commodity of value, and its classification of the resource as being mineral in character. In their 2008 Programmatic Environmental Impact Statement (PEIS) for Geothermal Leasing, they state:

“The geothermal lease is for the heat in the federal mineral estate. Unless specifically owned in fee, the fluid part of the resource falls under state laws. Therefore, the amounts of fluid that can be extracted or injected is subject to the individual states’ allocation programs, as is the use of other groundwater or surface water sources.”

There are, in fact, many factors that determine whether a geothermal operator will need an allocation permit to use or consume geofluid in a given state, such as the character of a geothermal resource, i.e., whether or not it is classified as a water or a mineral right under the applicable state scheme. Other factors include not only the definition of “geothermal resource” under state and federal law, but also the historical nature of the resource (as water, mineral, or *sui generis*), who owns the groundwater, how ownership of both water and minerals is derived (i.e., in some states, the surface owner has title to some subsurface resources), which state agencies manage the resource, and many others.

In general, although the right to use hot fluids present in the resource is among the rights granted in a federal lease, lease rights are always subject to applicable state and federal laws; the BLM considers itself the manager of the heat in a geofluid, and acknowledges that states have primacy in managing the quality and quantity of water resources, which may or may not include geofluid. To date, there has never been a conflict between state and federal geothermal laws, nor has any state declined an allocation permit to use geofluid.

