2024 **Title Tenets** Webinar Series

Underwriting Geothermal Energy & Associated Subsurface Resources

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When Texas Senate Bill 785 passed in 2023, geothermal energy rights seemed to become a hot button topic almost overnight. Although the use of geothermal energy may have been a relatively foreign concept in Texas at that time, many states, including Texas, have used geothermal or energy resources for a variety of purposes, including the generation of electrical power, for more than 60 years.

Given the explosion of growth of the renewable energy industry and continued focus on development of alternative sources of clean energy in the United States, we can expect to see an increased interest in the use of geothermal energy resources for power generation. If the key to effective underwriting begins with understanding the basic nature of the risk, we first need to understand how geothermal energy resources may be used, and the potential impact of those uses on surface development.

Topics

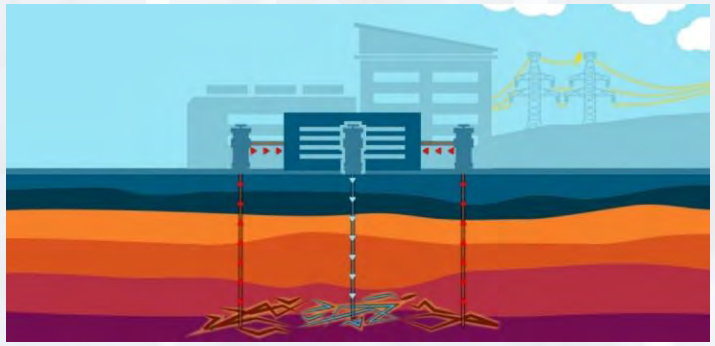
- What is Geothermal Energy?
- Ways Geothermal Rights are Characterized
- Geothermal Energy Legislation
- Texas Senate Bill 785
- Title Insurance Considerations

What is Geothermal Energy?

“Geo” (Earth or Land) + “Thermal” (Heat)

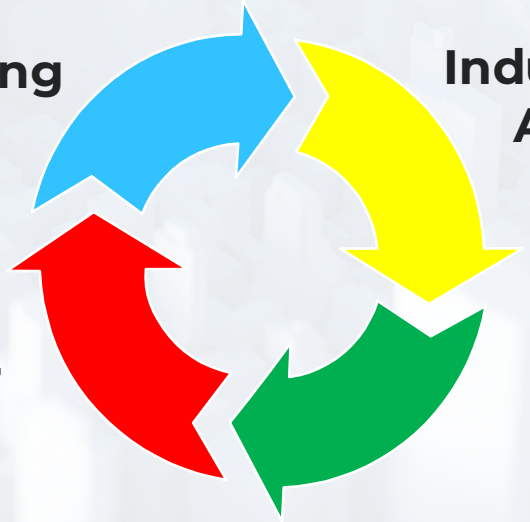
Geothermal literally means “heat from the earth,” and geothermal energy is the use of the earth’s heat, primarily in the form of steam or super-heated water from reservoirs below the surface of the earth as a source of renewable energy.

Wells ranging from a few feet to several miles deep are drilled to tap into these underground reservoirs, bringing the hot water or steam to the surface to be used for various purposes, including:



Heating & Cooling Systems

Industrial Heating Applications

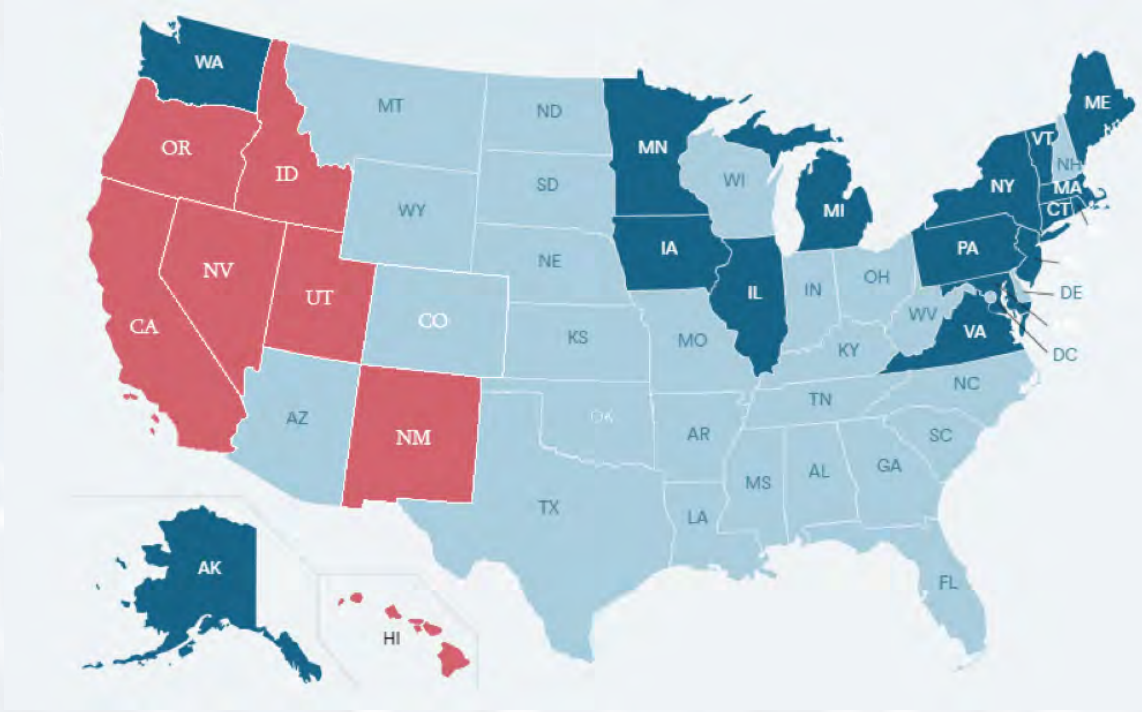


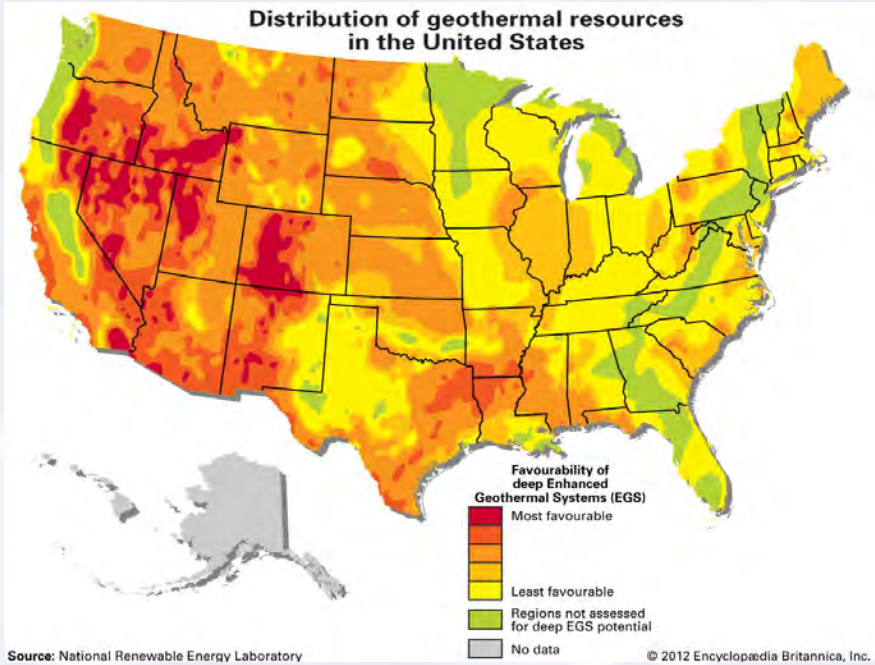
Hot Water for Residential & Commercial

Electricity Generation

States with Geothermal Energy Power Plants

All of the geothermal power plants in the United States are located west of the Rocky Mountains, as this is traditionally where geothermal energy potential is at its highest. The United States is the world's largest producer of geothermal energy, and California and Nevada collectively account for around 93.70% of the nation's geothermal power production.





Ways Geothermal Energy Rights are Characterized:

SURFACE RIGHT

- Oregon
- Texas (unless specifically **reserved**/conveyed)
- Nevada (unless specifically **reserved**/conveyed)
- Washington

MINERAL RIGHT

- California
- Hawaii
- New Mexico
- Nebraska
- Colorado (on state/federal land)

WATER RIGHT

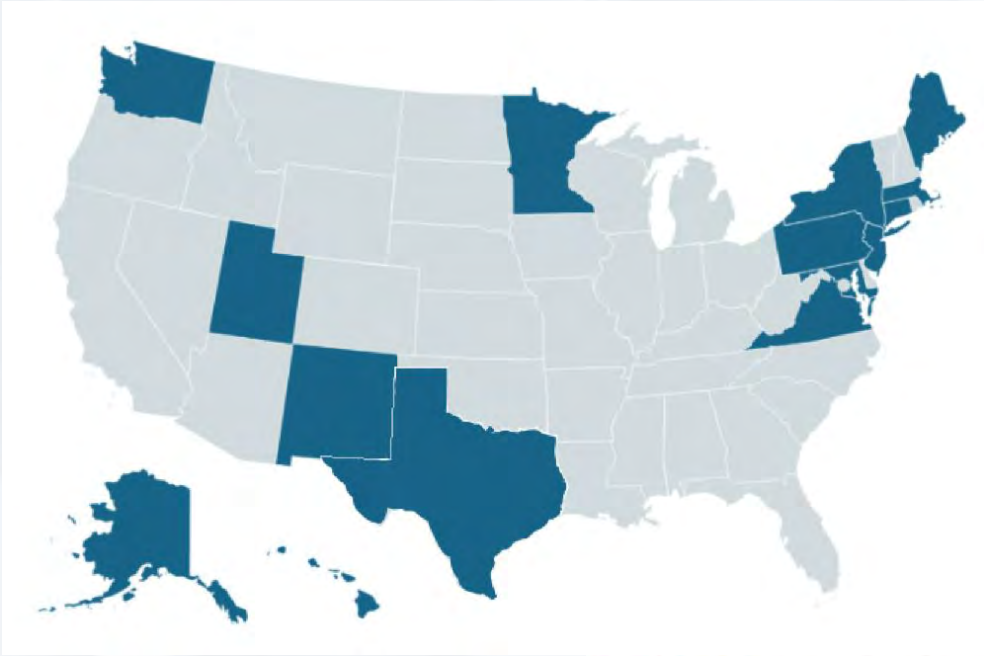
- Alaska
- Utah (depending on the temperature)
- Wyoming
- Colorado (on private land)

Geothermal Energy Legislation

According to information published by the National Caucus of Environmental Legislators, fifteen (15) states currently have some form of pending or enacted legislation regarding geothermal resources:

States with Active or Pending Legislation:

- Alaska (S.B.69)
- Connecticut (H.B.5358)
- Hawaii (H.B.458, H.B.2031, H.B.2569, S.B.2518, S.B.2577, S.B.2650)
- Maine (L.D.2077/H.P.1336)
- Massachusetts (S.2445, S.2509)
- Minnesota (H.F.2855, H.F.3949, H.F.4177, H.F.4423, H.F. 4687, H.F.4688, H.F.4759, S.F.1424, S.F.3607, S.F.4689, S.F.4696, S.F.4760, S.F.4849)
- New Jersey (A.2365, S.244)
- New Mexico (H.B.92, S.B.40, S.B.59)
- New York (A.637, A.701, A.8565, S.7884, S.7889, S.8106A, S.8566, S.8588)
- Pennsylvania (H.R.266)
- Texas (S.B.785)
- Utah (S.B.257)
- Washington (H.B.1836, H.B.2129, H.B.6138)



NCEL National Caucus of Environmental Legislators

Texas General Exception for Geothermal Energy Resources

“All leases, grants, exceptions or reservations of the geothermal energy and associated resources below the surface of the land, together with all rights, privileges, and immunities relating thereto, appearing in the Public Records whether listed in Schedule B or not. There may be leases, grants, exceptions or reservations of the geothermal energy and associated resources below the surface of the land that are not listed.”

S.B. 785 (Texas)

Texas Insurance Code § 2703.056:

Sec. 2703.056. EXCEPTIONS; MINERAL AND GEOTHERMAL ENERGY INTERESTS. (a) Subject to the underwriting standards of the title insurance company, a title insurance company may in a commitment for title insurance or a title insurance policy include a general exception or a special exception to except from coverage:

(1) a mineral estate **or the geothermal energy and associated resources below the surface of the land**; or

(2) an instrument that purports to reserve or transfer all or part of a mineral estate **or the geothermal energy and associated resources below the surface of the land**.

(b) A reduction to, or credit on a premium charge for, a policy of title insurance or other insuring form may not be directly or indirectly based on an exclusion of, or general or special exception to, a mineral estate **or the geothermal energy and associated resources below the surface of the land** in the title insurance policy.

(c) The inclusion in a title insurance policy of a general exception or a special exception described by Subsection (a) does not create title insurance coverage as to the condition or ownership of the mineral estate **or the geothermal energy and associated resources below the surface of the land**.

S.B. 785 (Texas)

Texas Natural Resources Code § 141.003:

Sec. 141.003. DEFINITIONS. In this chapter:

(1) "Commission" means the Railroad Commission of Texas.

(2) "Board" means the School Land Board.

(3) "Commissioner" means the Commissioner of the General Land Office.

(4) "Geothermal energy and associated resources" means:

(A) products of geothermal processes, embracing indigenous steam, hot water and hot brines, and geopressured water;
(B) steam and other gasses, hot water and hot brines resulting from water, gas, or other fluids artificially introduced into geothermal formations;
(C) heat or other associated energy found in geothermal formations; and
(D) any by-product derived from them.

(5) "By-product" means any other element found in a geothermal formation which is brought to the surface, whether or not it is used in geothermal heat or pressure inducing energy generation. **The term does not include:**

(A) a mineral, as defined by Section 75.001, Property Code; or
(B) oil, gas, or a product of oil or gas, as defined by Section 85.001.a

S.B. 785 (Texas)

Texas Natural Resources Code § 141.004:

Sec. 141.004. OWNERSHIP OF GEOTHERMAL ENERGY AND ASSOCIATED RESOURCES. (a) Except as otherwise expressly provided by a conveyance, contract, deed, reservation, exception, limitation, lease, or other binding obligation, the geothermal energy and associated resources below the surface of land are owned as real property by:

(1) the landowner; or

(2) if the surface estate and the mineral estate of the land have been severed, the owner of the surface estate of the land.

(b) Subject to the provisions of this chapter, the property rights described by this section entitle the owner of the geothermal energy and associated resources below the surface of land and the owner's lessee, heir, or assignee to drill for and produce the geothermal energy and associated resources.

(c) This section does not:

(1) apply to minerals dissolved or otherwise contained in groundwater, including in hot brines; or

(2) change existing law regarding:

(A) oil, gas, or mineral extraction regardless of its heat or energy potential;

(B) the rights of the dominant and servient estates; or

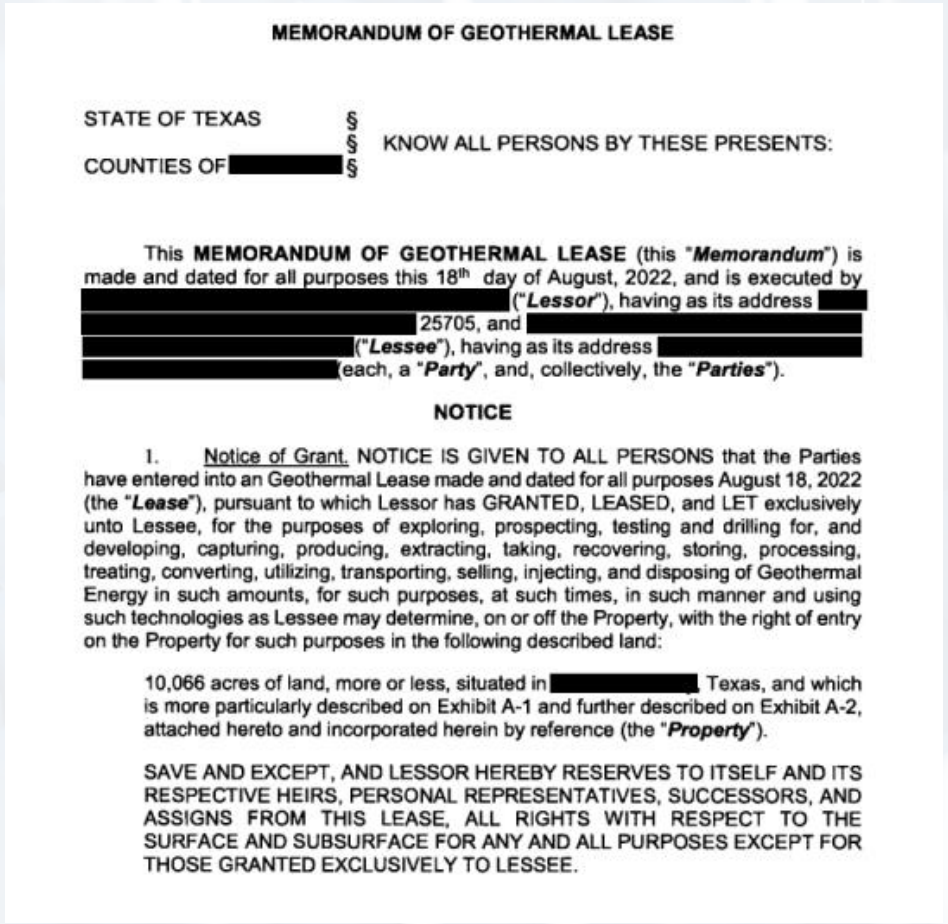
(C) the ownership and use of groundwater.

Title Insurance Considerations

(a) all mineral fee estates, mineral servitudes, royalty, overriding royalty, executive rights and other interests and rights, whether developed or undeveloped, leased or unleased in all (i) oil, liquid hydrocarbons, gas, coal seam gas, coal bed methane and any and all other liquid or gaseous hydrocarbons, as well as their respective constituent products, including condensate, casinghead gas, distillate and natural gas liquids and any other minerals produced in association therewith, (ii) helium, carbon dioxide and other gaseous substances, (iii) lead, zinc, copper, coal, lignite, peat, sulfur, phosphate, iron ore, sodium, salt, uranium, thorium, and other fissionable materials, molybdenum, vanadium, titanium, rulite ilmenite, leucoxene, zircon, monazite, gold, silver, bauxite, precious and semi-precious gems and minerals, industrial minerals and other hard minerals, (iv) limestone, granite, saprolite, kaolin (and other forms of clay), sand, gravel, aggregate and other mined or quarried stone, bedrock and other rock materials, (v) all geothermal energy resources including, but not limited to, hydrostatic pressure, thermal energy, hydropressured reservoirs, geopressured reservoirs, steam and other gases, hot water, hot brine, heat, natural gas and methane dissolved in geothermal formation water and any associated energy found in such geothermal formation water, including hydrostatic pressure and thermal energy, (vi) the right to sequester carbon dioxide or other greenhouse gases or greenhouse gas emissions in, on or under the subsurface of the Assets, including deep saline acquifers, oil and gas reservoirs, unmineable coal seams, basalt formations, and any other type of geologic formations or strata that may be susceptible to carbon dioxide or greenhouse gas storage either presently or in the future, (vii) subsurface water rights, and (viii) ore deposits of any kind or character, whether solid, liquid or gaseous, and without limitation by enumeration of the minerals and substances expressly mentioned above (all of the foregoing minerals, substances and rights being defined as "*Minerals*"), in each case owned, held or claimed by any Grantor, in, to, on or under any of the lands described on **EXHIBIT A** attached hereto and made a part hereof (the "*Mineral Lands*");

Are exceptions in the Title Commitment that would indicate there has been a severance (reservation or conveyance) of the rights to geothermal resources?

Title Insurance Considerations



MEMORANDUM OF GEOTHERMAL LEASE

STATE OF TEXAS §
§ KNOW ALL PERSONS BY THESE PRESENTS:
COUNTIES OF [redacted] §

This **MEMORANDUM OF GEOTHERMAL LEASE** (this "***Memorandum***") is made and dated for all purposes this 18th day of August, 2022, and is executed by [redacted] ("***Lessor***"), having as its address [redacted] 25705, and [redacted] ("***Lessee***"), having as its address [redacted] (each, a "***Party***", and, collectively, the "***Parties***").

NOTICE

1. Notice of Grant. NOTICE IS GIVEN TO ALL PERSONS that the Parties have entered into an Geothermal Lease made and dated for all purposes August 18, 2022 (the "***Lease***"), pursuant to which Lessor has GRANTED, LEASED, and LET exclusively unto Lessee, for the purposes of exploring, prospecting, testing and drilling for, and developing, capturing, producing, extracting, taking, recovering, storing, processing, treating, converting, utilizing, transporting, selling, injecting, and disposing of Geothermal Energy in such amounts, for such purposes, at such times, in such manner and using such technologies as Lessee may determine, on or off the Property, with the right of entry on the Property for such purposes in the following described land:

10,066 acres of land, more or less, situated in [redacted] Texas, and which is more particularly described on Exhibit A-1 and further described on Exhibit A-2, attached hereto and incorporated herein by reference (the "***Property***").

SAVE AND EXCEPT, AND LESSOR HEREBY RESERVES TO ITSELF AND ITS RESPECTIVE HEIRS, PERSONAL REPRESENTATIVES, SUCCESSORS, AND ASSIGNS FROM THIS LEASE, ALL RIGHTS WITH RESPECT TO THE SURFACE AND SUBSURFACE FOR ANY AND ALL PURPOSES EXCEPT FOR THOSE GRANTED EXCLUSIVELY TO LESSEE.

Are exceptions in the Title Commitment that would indicate there has been any leasing of the geothermal energy resources?

Is the land located in a state where drilling for geothermal energy resources is a concern, and, if so, is there any evidence of geothermal drilling activity either on or in the vicinity of the land?

Fun Texas Geothermal Facts

- Since 1960 there are over 534,000 wells drilled in Texas. Some say there are 1,000,000 holes drilled into the Texas ground.
- There are over 140 schools and over 10,000 homes with geothermal heat pump systems in Texas.
- Austin was one of the first cities in Texas to use geothermal energy for heating. In fact, even the State Capitol was originally heated by geothermal water.
- Today a well in Austin supplies warm ground water (97°F) for year-round swimming in the outdoor pool at Stacy Park.
- Waco was known as the “Geyser City” because of naturally flowing water from wells drilled into the Houston/Trinity aquifer.
- Cotulla High School, in 1977, received Department of Energy (DOE) funding to use its 109°F water for heating. By doing so it saves 3.8 GW/h per year in energy.
- San Antonio once had the “Hot Wells Hotel” that used the 106°F well water for a spa. The ground water around San Antonio has temperatures as high as 118°F.
- Under the reservoir of Lake Armistad, along the Rio Grande, are geothermal springs.
- Big Bend National Park has six springs that were used by the Apache and Comanche Indians. Today they are still popular with visitors.
- Geopressure wells in the Texas Gulf Coast are able to flow with pressure to the surface and if not controlled would shoot hundreds of feet into the air.

List compiled by the SMU Geothermal Laboratory, 2008.

Fun Texas Geothermal Facts

- The Marathon area of West Texas is an extension of the Arkansas Ouachita Mountains and considered the last part of the Appalachian Mountains. The deep faults suggest potential for hydrothermal resources hot enough to produce electricity using a geothermal power plant. A well drilled to 10,000 ft had 308°F water.
- Indian Hot Springs in Hudspeth County have been used by people for therapeutic bathing since prehistoric times.
- The municipal water supply for Eden, Texas is 130°F. The city is looking for companies who can use the water for economic benefit, such as fish and alligator farming or a greenhouse.
- A well east of Thorndale, Texas was originally used for the production of “medicinal crystals”.
- An artesian well in Brownwood, Texas, until recently, was extensively used for a large therapeutic clinic and swimming pool.
- Gonzales Warm Springs Foundation for Crippled Children in Ottine, Texas was started because of an oil well that struck warm water. The 98.5°F water was used in a hospital for polio victims starting in 1939. Today the warm water supports medical practice as an energy source, rather than treatment.
- Navarro Junior College in Corsicana, Texas uses the 120°F water from a well for space heating and its hot water needs.
- The hottest well recorded is 510°F @ 23,800 ft (-96.86 Longitude, 28.79 Latitude) east of Victoria, Texas.

List compiled by the SMU Geothermal Laboratory, 2008.

Thank you.
Questions?

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