

What are geothermal resources?

Geothermal resources contain the heat energy generated and stored in the earth. Geothermal resources can be divided into 2 categories - shallow and deep – which reflect their different uses. Shallow geothermal resources are used for geo-exchange purposes (i.e. heating and cooling of buildings) whereas deep resources can be used as sources of direct heat or power production. Alberta's legal and regulatory framework also distinguishes between shallow and deep geothermal resources using the base of groundwater protection (shallow=above and deep=below).

There is a legal definition of **geothermal resources**: "the natural heat from the earth that is below the base of groundwater protection".¹ The base of groundwater protection varies throughout the province (see the [BGWP Query Tool](#)). For instance, in the mountains it is deemed to be 600 m below ground whereas the City of Calgary requires a licence from the Alberta Energy Regulator where a bore will be more than 150 m below ground (see City of Calgary's [website](#)). These are **deep geothermal resources**.²

Although there are some legislative references to heat from the earth used for heating purposes (as opposed to geothermal resources), there is no specific legal definition for **shallow geothermal resources**.

Who owns geothermal resources?

There is a legislative statement regarding ownership of **deep geothermal resources**:

The owner of the mineral title in any land in Alberta has the right to explore for, develop, recover and manage the geothermal resources associated with those minerals and with any subsurface reservoirs under the land.³

There is no legislative statement regarding the ownership of **shallow geothermal resources**. There are arguments for ownership by either the surface landowner, the subsurface owner or the Crown. If questions arise, this issue will have be resolved by the Courts.

¹ *Geothermal Resource Development Act*

² *Environmental Protection and Enhancement Act*

³ *Mines and Minerals Act*



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How are geothermal resources regulated?

The regulatory framework varies for **deep geothermal resources** versus **shallow geothermal resources**.

Deep Geothermal Resources

(below base of groundwater protection)

Tenure

Tenure System: Administered by Alberta Energy

Mines and Minerals Act establishes tenure framework for geothermal resources (although note there is some private ownership which is not subject to this framework and would be dealt with via private lease arrangements). The details for obtaining tenure via leases are set out in *Geothermal Resource Tenure Regulation*, A.R. 251/2021

Licensing and Operational System

Administered by the Alberta Energy Regulator (AER)

The GRDA sets out the licensing and operational framework for geothermal resource operations. This framework is supplemented by the *Geothermal Resource Development Regulation*, A.R. 250/2021 which exempts certain facilities from application of the Act and by the *Geothermal Resource Development Rules*, A.R. 116/2022 which governs licensing and operating standards, and incorporates by reference several AER directives including *Directive 089*. The AER's requirements for geothermal wells, facilities and pipelines are detailed in *Directive 089*.

Other provincial laws that may apply to deep geothermal resource operations: Administered by AER

Water Act, R.S.A. 2000, ch. W-3 requires licenses be obtained for diversions of water and approvals be obtained for activities impacting water.

Geothermal wells are subject to EPEA's conservation and reclamation requirements as set out in the *Conservation and Reclamation Regulation*, A.R. 115/1993.

If geothermal resources are being used for power plant operations, then EPEA's requirements relating to approvals, environmental assessment, and conservation and reclamation apply. As well, the *Electric Utilities Act*, R.S.A. 2000, ch. E-5.1 and other legislation overseen by the Alberta Utilities Commission apply to geothermal power plants.

Municipal bylaws may apply to deep geothermal resource operations

Municipal bylaws dealing environmental matters, water, and/or planning and development may be made pursuant to the *Municipal Government Act*, R.S.A. 2000, ch. M-26.

Shallow Geothermal Resources

(above base of groundwater protection)

Overview

With the limited exception of vertical closed-loop geoechange systems, there is no specific legislation for shallow geothermal resources. However, laws of general application administered by Alberta Environment may apply.

Water

The *Water Act*, R.S.A. 2000, ch. W-3 requires licenses be obtained for diversions of water and approvals be obtained for activities impacting water. There is a specific *Directive for Water Wells and Ground Source Heat Exchange Systems* which sets out requirements for vertical closed-loop geoechange systems. It does not apply to horizontal or submerged closed-loop ground geoechange systems.

There is potential for EPEA requirements for approvals, registration, or notification and a specific code of practice to apply since EPEA's Schedule of Activities includes structures related to using the natural heat from the earth for the purposes of heating. There are no such requirements currently in place.

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