

Geothermal resources legislation What We Heard

February 2023



Table of contents

About geothermal resources legislation.....	3
Engagement process.....	3
What was proposed.....	4
What we heard.....	5
1. Definition of geothermal resources in the Yukon	5
2. Regulatory regime considerations	6
3. Royalty structures	8
4. Issues surrounding decommissioning and reclamation.....	9
5. Yukon First Nations governments and transboundary Indigenous groups.....	10
6. Other considerations.....	11
What's next?.....	12
Appendix A: Sample engagement letter	14

About geothermal resources legislation

In 2020, the Government of Yukon released *Our Clean Future: A Yukon strategy for climate change, energy and a green economy*. This strategy outlines actions the Government of Yukon will take to address the impacts of climate change while building a green economy and ensuring Yukoners could access reliable, affordable and renewable energy.

One action the government committed to in this strategy was developing a Geothermal Resources Act (Action E11) that would regulate geothermal energy development in the territory to help reduce our reliance on fossil fuels and meet our needs for electricity and heat. The intent of such legislation is to create a regulatory framework to guide geothermal resource development in the Yukon. This includes all phases from the initial issuance of rights through to exploration, development, production and final site reclamation. Shallow, ground-source heat exchange systems would not be subject to this legislation as project scale is significantly smaller and often within the jurisdiction of local building codes. This proposed framework would apply to deeper and hotter resources that could provide utility-scale heat and electricity in certain regions of the territory.

In 2022, the Government of Yukon held an engagement to gather feedback regarding potential new geothermal legislation for the territory and what criteria was viewed as most important.

Engagement process

The Government of Yukon released a discussion document on June 22, 2022, for public comment. The initial deadline for submitting feedback was August 16, 2022.

What We Heard: Geothermal resources legislation

Based on requests, this was extended to September 29, 2022. We received 23 inquiries and 18 interview or written submissions from non-governmental organizations, industry representatives, Yukon First Nations governments, transboundary Indigenous groups, various levels of government and members of the public from the Yukon, western Canada and Iceland.

Thank you to everyone who participated and submitted feedback.

What was proposed

The Government of Yukon proposed to include the following seven key elements within a geothermal resource regulatory regime:

1. a definition of geothermal resources in the Yukon;
2. a description of where the legislation will apply;
3. a geothermal tenure and rights regime;
4. a regulatory regime that encompasses the full spectrum of potential geothermal exploration and development activities that follow principles of environmental sustainability;
5. prescription of decommissioning procedures and reclamation responsibilities;
6. measures to address liability; and
7. a royalty regime.

The Government of Yukon also posed the following two questions during the engagement:

- What are your thoughts on the Government of Yukon administering and regulating the Yukon's geothermal resource sector?
- Are there any topics or areas of interest that are important for the Government of Yukon to consider in developing legislation to administer and regulate geothermal resources in the Yukon?

We asked Yukon First Nations governments, transboundary Indigenous groups, municipal governments, industry professionals, community-based organizations and

members of the public to consider these proposed ideas or questions and to respond via written submission.

What we heard

Overall, the engagement process regarding geothermal resource legislation yielded positive discussion and written submissions from a variety of governments, industry representatives and stakeholders. The responses varied from very detailed submissions to ones focused only on specific points of consideration based on the particular interest of the respondents.

The feedback process yielded 23 inquiries and 18 written and interview responses. Input received during the engagement was organized into the following themes:

- definition of geothermal resources;
- regulatory regime considerations;
- royalty structures;
- issues surrounding decommissioning and reclamation;
- interactions with First Nations governments; and
- other considerations.

1. Definition of geothermal resources in the Yukon

The definition of 'geothermal resources' varies greatly between jurisdictions within Canada and around the world. Some definitions are inclusive of all aspects of geothermal exploration while others are more restrictive depending on the anticipated size and scope of development in their respective region. The Government of Yukon is interested in developing a definition that is flexible enough to respond to the needs of rapidly changing geothermal exploration technology while being realistic about their application in the Yukon context. We also must ensure the definition is respectful and reflective of the Yukon's context.

Below is a summary of the comments we received:

- Language and definitions in geothermal exploration and development vary.
- There is no generally accepted legal definition and the definition varies between jurisdictions.
- Consideration needs to be given to geothermal and ground waters due to potential extraction of trace minerals.
- Determine if mineral byproducts such as lithium are considered part of the geothermal resource or if they qualify as minerals under current mining legislation.
- Create definitions and criteria to include (or exclude) geothermal deposits in the geothermal resource legislation pending results of a multi-jurisdictional legislative review and analysis.

“Extraction and commercialization of by-products may increase the potential revenue of geothermal projects, and therefore enhance their bankability.”

2. Regulatory regime considerations

The Department of Energy, Mines and Resources is the regulator for many industries in the Yukon. Geothermal resources as an industry has not been legislated before in the territory. As such, it’s a new resource for us as a regulator to manage responsibly. As with other industries, we aim to be fair, consistent and transparent. We will be guided by our mission: collaborate, educate, and regulate to manage our natural resources for the benefit of Yukoners now and in the future. The Yukon government also has a responsibility to protect the unique interests of Yukoners. This involves regulatory and permitting requirements that need to be applicable to the Yukon context.

Below is a summary of the key input we received regarding this aspect of legislative development:

- Implement an efficient geothermal permitting and licensing process that involves and considers the entire life-cycle of a project or well.
- Grant geothermal rights through an application process versus an open bid.

- Applications should include an overview of the proposed project, type of technology to be used, proposed uses for the geothermal energy including commercial agreements, target formations, expected risks and mitigations, First Nations government involvement and benefits to Yukon citizens.
- Permits to explore, develop and/or produce geothermal energy should be of adequate size to enable development of viably sized energy production.
- Create a seven-year exploration permit to allow for geothermal resource assessment and drilling/testing wells.
- Create a five-year development permit to allow construction of surface facilities and additional drilling of wells.
- Create an indefinite production lease agreement once the geothermal project is operational to monitor and maintain geothermal reservoirs and produce geothermal energy.
- Grant a production lease to operational geothermal projects to create more flexibility in a 'phased royalty' structure, decrease capital risk and encourage investment.
- Ensure any legislation recognizes the difference between large-scale commercial production and homeowner operation.
- Create a "how to" document for ease of lease applications.
- Include a section regarding waste disposal.
- Ensure surface disturbances are addressed and managed within the legislation or associated regulations and differentiated from linear disturbances (for example, roads or trails) and cumulative impacts (incremental, ongoing and/or combined effects over time).
- Create a 'one stop shop' for all geothermal resource projects and developers where all administrative aspects of receiving applications and delivering permits would be contained within one government entity. Where the licensing authority would also oversee the monitoring of geothermal activities during the validity period of a permit.
- Ensure any legislation is flexible and able to adapt to emerging and changing geothermal technology.

"To prevent developers from [misusing] geothermal incentives for other resources, it is recommended that to maintain a strictly geothermal lease, the operators must be producing geothermal energy (either heat or electricity) at an amount >50% of the annual reported resource value during the production lease."

3. Royalty structures

After the Devolution Transfer Agreement was finalized in 2003, the Yukon Act came into effect granting the government regulatory control of mineral resources and public lands. As a result, the Yukon government has the authority to enact royalty requirements as part of any natural resource development licensing process.

Royalties ensure future generations benefit from the depletion of a specific non-renewable resource. The distinction with geothermal resources is that it produces no emissions and typically does not deplete over time.

As part of the engagement process, the Yukon government sought comments regarding royalty regimes to ensure a balance between the interests of industry and Yukoners, while ensuring environmental sustainability.

A summary of these comments is listed below:

- Royalty rates allow predictability, timeliness and accuracy for geothermal resource developers and investors to move forward confidently in predicting royalty payments.
- Create a geothermal royalty regime that aligns with licensing phases.
- Ensure any royalty regime is not punitive to Yukon ratepayers.
- Consider basing any royalty on the amount of water used and/or amount of energy extracted.
- Propose no royalties should be collected during exploration and development phases due to high upfront capital costs, challenges of raising exploration funds, and high capital expenditures during geothermal facility construction and additional well drilling.
- Assign only minimal yearly licensing fees during exploration and development permit phases.
- Assign only minimal surface land fees during the development phase.
- High royalty fees may negatively impact costs to consumer, the number and pace of geothermal projects and overall 'bankability' of future and ongoing geothermal projects.

“Allowing for an initial operating period, free of up-front royalties, minimize[s] the risk for private sector investors and allows for the developer to begin making a profit earlier in the geothermal lifecycle.”

4. Issues surrounding decommissioning and reclamation

During any natural resource extraction process, the reclamation and decommissioning considerations are of critical importance. The Government of Yukon is focused on protecting Yukoners and our environment from potential costs and issues related to the closure of any geothermal exploration and/or development project in the territory. In general, geothermal liability management would occur throughout the life-cycle of a geothermal project including the associated compliance and enforcement considerations.

The engagement process sought comments regarding this legislative inclusion, which are summarized below:

- When applying for a development permit, developers should provide a risk mitigation strategy and monitoring plan.
- Monitoring activities should be ongoing and throughout a project life cycle and include various considerations.
- Conventional geothermal wells should be evaluated for alternative uses before decommissioning based on ongoing developments and changes in technology.
- Utilize same regulations and requirements as per hydrocarbon (oil) well abandonment and reclamation.
- Adopt a comprehensive liability management plan.
- Ensure adequate financial security is provided prior to any geothermal development and reviewed by an independent third party similar to the Yukon Water Board financial review process regarding mining projects.
- Embed within the regulatory framework the concept of ‘polluter pays’. This would ensure if a company declared bankruptcy, the directors of the corporate entity would be held legally responsible.
- Create important provisions within the legislation that would be part of the decommissioning process beginning when a permit expires or is revoked.

- Determine and define in advance the level of government involvement in the decommissioning and reclamation process. If the government is not interested in this actual process, potentially allow the licensee to transfer the facility to a third party or remove all property and facilities from the area.

“Geothermal projects are capital intensive in the beginning but can maintain operations longer than 40 years. For this reason, it is important to regulate the environmental impact, not only at decommissioning, but throughout the life cycle of the project.”

5. Yukon First Nations governments and transboundary Indigenous groups

Throughout the engagement process, the Department of Energy, Mines and Resources received responses that supported the involvement of First Nations governments and communities in geothermal resource development in the territory. Further government-to-government discussions with Yukon First Nations are part of an ongoing process.

The summary of comments below reflect input received throughout the engagement from Yukon First Nation governments, industry representatives and members of the public:

- Participate in co-development of the legislation with First Nations governments similar to approach regarding the Mining Legislation Steering Committee.
- On Category A and B lands and Traditional Territories, consideration must be given to traplines, cabins, traditional trails, and historic land and sites.
- Regulations regarding access to geothermal areas must include considerations and conditions regarding reclamation of roads and development of any new roads.
- Concerns raised regarding who may have access to mineral related information during and after geothermal studies and exploration are conducted.
- Create a collaborative research and engagement strategy with First Nations governments.
- Develop an ‘Indigenous-led own source revenue carbon credit framework’.

“Over the past decade, [our First Nation government] has stated that we [intend] to take an active role in the development of geothermal energy within our territory.”

“Creating positive socio-economic outcomes for host communities in which we operate is a key priority for [our company]. As with [all our] projects and operations, we steadfastly commit to forging trust and enduring relationships with local Indigenous groups and working collaboratively to advance socially and environmentally responsible projects.”

6. Other considerations

The Yukon government wanted to generate a fulsome, open discussion with interested government, industry and public stakeholders. We wanted to ensure the engagement period would offer an opportunity for interested parties to bring forth new ideas, industry expertise and community input regarding issues that were not listed specifically during the engagement period.

Three key themes emerged and the related comments are listed below:

Geothermal data and access

- Create a digitized record of pre-existing oil and gas records.
- Invest in geoscience data and information to de-risk private sector investment.
- Create detailed geothermal potential map of surface access and subsurface geology linked to the energy requirements of the Yukon.
- Encourage drilling gradient wells to fill geothermal data gaps.
- Support or initiate further scientific research in the Yukon regarding geothermal activity and resources.
- Create a geothermal information record or database that would allow for public access and data management. Information could be obtained from project developers as part of their reporting obligations and include seismic data (for example, events, fractures); deep drilling data (for example, temperature pressure faults and permeability); and ground water resource data (for example, to avoid unnecessary contamination).

Industry and community dialogue

- Create government forums to enable cooperation between industry and regional and local stakeholders and/or governments.
- Establish further dialogue on innovative solutions regarding geothermal power and how private/public infrastructure could be built collaboratively for shared benefit, support of local communities and sustainable mining.
- Utilize various geothermal applications to offset mining emissions (for example, through onsite builds and external utility operations).

Incentives

- Create a geothermal risk-reduction program to mobilize risk capital towards exploratory and production well drilling.
- Diversify the heating industry by focusing and investing in geothermal heat projects.
- Create financial incentives such as direct grants, loan guarantees, well failure insurance and guaranteed power and/or thermal purchase agreements.

What's next?

The Government of Yukon recognizes that developing a clear regulatory process and legislative framework is needed for the eventual use of geothermal heat and energy production in the territory. The Yukon government is committed to developing responsible, sustainable geothermal resources legislation to serve and support the energy needs of our citizens. Further, the legislation will align with the values and goals of *Our Clean Future*.

Overall, the feedback received was positive with a strong support for the development of geothermal resource legislation in the territory. Policy and regulatory framework considerations that received the most interest and input were: the definition of geothermal resources, regulatory regime considerations, royalty structures and issues surrounding decommissioning and reclamation. A number of respondents clearly stated their willingness and interest to work with Yukon First Nations governments and

transboundary Indigenous groups to ensure positive and productive collaboration in any future geothermal resource projects.

This feedback further reinforced the Government of Yukon's interest and commitment to the development of geothermal resource legislation and ongoing government-to-government discussions involving Yukon First Nations that may be interested in geothermal exploration and development. It also further informed and identified options to include in legislation that would be relevant to the geothermal industry.

Appendix A: Sample engagement letter

A sample letter sent to Yukon municipalities in the summer of 2022:

Sent via email and hard copy

Re: Notification of engagement for geothermal resources legislation

I am pleased to announce that the Government of Yukon is conducting an engagement on legislation to administer and regulate geothermal resources. The engagement will run from June 22, 2022, until August 16, 2022, and is an opportunity for the Yukon municipalities to provide input on the proposed legislation.

Creating a regulatory regime for geothermal resources is a significant implementation initiative from the Government of Yukon's climate change, clean energy and green economy strategy: *Our Clean Future*. The purpose of the legislation is to provide the regulatory tools needed to allow for geothermal resource development. Geothermal resources have the potential to increase the Yukon's supply of heating and electricity needs from local renewable resources, and to lower greenhouse gas emissions. A discussion paper, "Developing geothermal resources legislation in the Yukon", is attached and is available for review online on the Geothermal Resources Legislation engagement page at Yukon.ca/engagements, along with some general information about geothermal resources.

The proposed legislation is intended to provide a pathway for geothermal resource development, from the initial issuance of rights, through exploration, development and production, to final site reclamation. This legislation will apply to deeper and hotter resources that could provide utility-scale heat and electricity in certain areas. Shallow, ground-source heat exchange systems will not be subject to this legislation, as the scale of these types of projects is significantly smaller and often within the jurisdiction of local building codes.

We want the Yukon municipalities to participate in the engagement.

Our team would be happy to discuss the proposed legislation with your representative. Our engagement team can be reached at by email geothermalact@yukon.ca or phone (867) 667-3228.

Thank you for your consideration of this important legislative initiative.

