Pre-Budget Consultations - 2025
Cascade Institute – Geothermal Energy Office
August 28, 2025

Recommendations

Recommendation 1: Invest $550M to establish a Geothermal Science and Technology Research Authority (GEOSTRA) with four Canadian ultradeep geothermal test centres.

Recommendation 2: Establish a roadmap in collaboration with industry, civil society, universities, provinces and territories, and Indigenous Peoples. The roadmap could be launched on a global stage when Calgary hosts the 2026 World Geothermal Congress.

Recommendation 3: Amend the Clean Economy Investment Tax Credits to expand eligible expenses to include drilling costs – which is often the largest single cost for a geothermal facility. Failing to do so creates a major barrier to investment in geothermal and distorts the market.

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Context

Geothermal power represents an opportunity for Canada to leverage its world-class oil and gas industry to compete in a global power market worth at least $1.7T / year by 2030. At the nexus of conventional and clean energy, geothermal power supports both prudent energy security and ambitious climate policy. It has the potential to unite Canadians and leverage regional strengths.

Geothermal power is a perfect fit for utilities racing to meet new demand from electrification and AI. It provides secure, flexible baseload power that runs 24/7. Studies by leading modellers show that baseload power reduces the cost of the entire electricity system. Geothermal's environmental impacts are minimal, with zero operational emissions, a minor land footprint, and negligible visual profile.

By drilling into the Earth's crust and circulating fluid to capture massive quantities of heat, geothermal systems convert thermal energy into electricity. Until now, geothermal power was limited to unique locations with high temperatures and underground bodies of water (aquifers) within several kilometres of the surface. These resources exist in Canada, particularly in western provinces and territories. Conventional geothermal can be deployed today, particularly in areas with strong geothermal resources like British Columbia. However, the need for these rare conditions creates high upfront risk and limited scalability, so geothermal has so far failed to match the growth of wind and solar.

The true opportunity for Canada and the world lies in next-generation geothermal technologies. These systems reduce risk and massively expand potential by creating artificial aquifers. Firms are currently demonstrating two key technologies:

1. **Enhanced Geothermal Systems (EGS)** create networks of fractures in the rock to allow water to flow. U.S.-based Fervo Energy has demonstrated this technique and achieved major advancements in 2024.

2. **Advanced Geothermal Systems (AGS)** circulate water through wells that form a continuous loop, like a radiator. Canadian firm Eavor demonstrated this in Alberta and is expanding in Germany.

A recent report by the International Energy Agency (IEA) found with continued innovation, cost-effective geothermal capacity could increase from just 15 Gigawatts (GW) worldwide today to 800 GW by 2050. That is nearly 10 percent of the world's current installed capacity. The associated investment would be USD$2.1 Trillion by 2050.

The IEA also found that 80 percent of the skills and expertise needed for a geothermal project are directly transferable from the oil and gas sector. Canada's oil and gas expertise positions us to compete and win in this rapidly evolving space.

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Recommendation 1: Invest $550M to establish a Geothermal Science and Technology Research Authority (GEOSTRA)

Test centres are the ideal platform to convene industry, academia, and the public sector to solve well-defined, high-impact problems. And they have a track record of success.

GEOSTRA would build on this track record by leveraging the highly successful test centre model used by the Alberta Oil Sands Technology and Research Authority (AOSTRA) to commercialize the technology that underpins in situ oil sands. GEOSTRA would act as an independent, technology-neutral research authority led by experts with a mandate to reduce geothermal capital costs through innovation. Priorities would include drilling, wellbore materials, artificial aquifers, sensors, data, and modelling.

The four test centres would:

- **Target** a cost of $50 per Megawatt-hour (MWh) or lower. At these costs, geothermal power would be competitive with unmitigated gas-fired power. The associated innovations are expected to generate spillover benefits for existing energy industries, critical minerals, and carbon management.
- **Allocate up to $125M per site** for infrastructure (e.g., resource assessment, test wells), technology innovation, and operation. Test centres could be sited across Canada, including the Arctic, to de-risk geologies, as well as technologies. Sites would be selected competitively to ensure research complementarity, so that results serve to accelerate innovation, rather than replicate it. Funding would be stage-gated at critical milestones to manage risk.
- **Crowd-in private capital** by de-risking early-stage, high-risk activities, like the U.S.' Frontier Observatory for Research in Geothermal Energy (FORGE). Since partnering with FORGE, Fervo Energy received at least $375M in private financing as it builds the world's largest EGS project.
- **Seek to amplify provincial leadership** such as the Alberta Drilling Accelerator, a $50M public-private initiative to establish an open-access, industry-led hub.
- **Fund federal and academic laboratories** (up to $50M) to perform early-stage science in support of industry-led activities at the four field laboratories. Public laboratories have been an essential component of initiatives such as FORGE in the U.S.

The proposed program/initiative would vault Canada to a world-leading competitive position in what is poised to be an essential technology underpinning Canada's energy security and continued prosperity.

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Recommendation 2: Launch a Canadian Ultradeep Geothermal Roadmap

Innovation is vital to unlocking Canada's geothermal opportunity; but technological breakthroughs do not guarantee success. Canada must take a comprehensive approach that connects innovation in the lab to commercialization in the market.

The Cascade Institute's Geothermal Energy Office (CI-GEO) calls on the Government of Canada to develop a Canadian Geothermal Roadmap that charts a path towards global leadership.

The CI-GEO recognizes the support that the Government of Canada has provided to date, including funding for pilot and demonstration projects. However, we need a more strategic approach as nations around the world partner with industry to seize leadership in new markets. A continued dependence on passive funding undermines Canada's ability to compete in a world where governments are taking a more active role.

By mobilizing expertise across sectors, a Canadian Geothermal Roadmap could create a shared understanding of the opportunities and challenges. Key focus areas could include:

- **Calculating benefits to Canada** including global markets, local jobs, lower electricity costs, links with emerging industries such as AI, and reduced emissions.
- **Identifying R&D Priorities** to position Canada at the leading edge of next-generation geothermal through a series of test centres.
- **Assessing policies and financing tools** to de-risk projects, attract private investment, and accelerate commercialization as technologies mature.
- **Defining best practices** to ensure responsible and sustainable development.
- **Facilitating Indigenous leadership** to ensure Indigenous rights, knowledge, and priorities shape Canada's geothermal future.

A Canadian Geothermal Roadmap would send a clear signal that Canada intends to compete in this critical sector. By setting shared priorities and aligning policy, research, and investment, the Roadmap could position geothermal alongside wind, solar, nuclear and hydro as a cornerstone of Canada's clean energy future. Other nations are moving quickly—Canada must act now to avoid being left behind.

With strong coordination, we can transform our natural advantages and world-class expertise into a thriving geothermal industry that delivers economic growth, strengthens sovereignty, and accelerates the transition to net zero.

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Recommendation 3: Expand ITC Eligibility to Include Drilling Costs

The Clean Economy Investment Tax Credits represent a key element of Canada's strategy to attract investment and accelerate the commercialization of low-carbon technologies.

However, the exclusion of drilling costs for geothermal power projects is a major barrier to Canada's geothermal industry that must be addressed.

Wells are often the largest cost in geothermal power projects (see below). CI-GEO analysis indicates that wells make up 40-60 percent of project costs, which aligns the US National Renewable Energy Laboratory's finding of 30-57 percent (Akindipe & Witter, 2025). Creating a geothermal well is a complex activity that consists of two general phases:

I. Drilling the well to remove the rock, and;
II. Completing the well, by lining it with layers of cement and steel.

There are many elements to drilling activities, including equipment, materials, labour, and energy, but only the costs of completion materials (cement, steel) are eligible for the ITC.

CI-GEO assessed the costs for a 50 Megawatt EGS project in British Columbia's Garibaldi Volcanic Belt, with a depth of 4 km. The total cost of drilling, completing, and stimulating the wells is estimated at $231M, making up 59 percent of total capital costs of $390M. Of this, CI-GEO estimates that only $48.5M would be eligible for the ITC, with the remaining $182.5M excluded from the ITC. **With nearly half of total capital costs ($182.5M of $390M) ineligible for the ITC, geothermal energy is at a significant disadvantage.**

CI-GEO welcomes to opportunity to work with the Government of Canada to re-assess the eligibility of drilling expenses. By including drilling costs under the ITC, Canada can level the playing field, unlock private investment, and lead on next-generation technologies.