

January 28, 2018

**Written Submission for the Department of Finance Canada's
Pre-Budget Consultations 2019**

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CanGEA
CANADIAN GEOTHERMAL ENERGY ASSOCIATION



Recommendation 1: That the Government of Canada should commit to procuring 100% of the heat used in federal buildings from clean sources by 2030 as part of the Greening Government Services Plan.

Recommendation 2: That the Government of Canada should create a geothermal energy drilling risk reduction program to support increased project developments in Canada.

Recommendation 3: That the Government of Canada should allocate further funding to Environment and Climate Change Canada for public geothermal energy literacy education initiatives and for youth geothermal energy curriculum development.

Recommendation 4: That the Government of Canada should create a one-stop shop for government funding and financing options that would allow companies to develop and build a profile consisting of past applications, any completed due diligence processes and other relevant information; all in one accessible portal.

Recommendation 5: That the Government of Canada should increase the amount of funding for all existing renewable energy funding programs.

Introduction:

The Canadian Geothermal Energy Association (CanGEO) is the collective voice of Canada's geothermal energy industry. As a non-profit industry association, we represent the interests of our member companies with the primary goal of harnessing Canada's vast and diverse geothermal energy potential.

CanGEO would like to thank the Government of Canada for the recent tax expense provisions brought about by the Fall Economic Statement 2018. More specifically, the Full Expensing for Clean Energy Equipment provision, which will undoubtedly assist clean energy developers in attracting capital.

CanGEO would also like to thank the Government of Canada for acknowledgement and acceptance of the recommendations set out by the Standing Committee on Natural Resources in their report titled "Rethinking Canada's Energy Information System: Collaborative Models in a Data-Driven Economy." CanGEO hopes to see provisions to address the Committee's recommendations in Budget 2019.

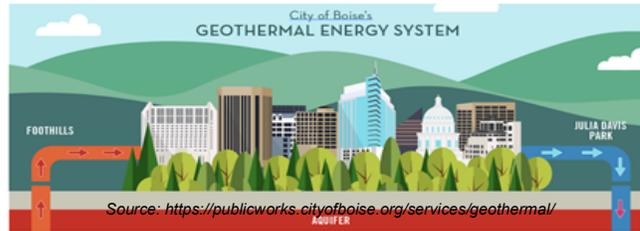
In anticipation of the 2019 Federal Budget, CanGEO is putting forward these 5 recommendations for the Department of Finance's Pre-Budget Consultation with the goal of enhancing existing support mechanisms, streamlining government funding programs and increasing available information for Canadians to assist in bringing Canada's geothermal energy industry online.

Recommendation 1: That the Government of Canada should commit to procuring 100% of the heat used in federal buildings from clean sources by 2030 as part of the Greening Government Services Plan.

Takeaway: Sourcing clean, renewable heat for all federal buildings and operations, in addition to clean electricity, is a realistic and achievable option for the Government of Canada to meet its GHG reduction goals.

In 2016, the Government of Canada announced that by 2025, 100% of the electricity used in their buildings and operations will be sourced from renewables to support the target to reduce federal GHG's by 40% by 2025. This represents a positive step forward for reducing emissions from federal buildings and operations; **however, there is still a significant opportunity for the Government of Canada to further reduce its emissions from its buildings and operations through the procurement of clean, renewable heat.**

The City of Boise Geothermal Energy System Case Study:



The City of Boise's geothermal heating system, which has been in operation since the early 1980s, withdraws 79°C water from its well field located along the toe of the Boise Foothills, and currently delivers it to about 50 customers throughout the downtown area, including the government buildings, on the north side of the Boise River.¹ The City's geothermal system provides clean, renewable heat for around 6 million square feet of office space, which reduces emissions by around 4.34 million Mt of CO₂ per year.² The City of Boise case study demonstrates the significant reductions in CO₂ emissions that can be realized through the use of geothermal heat in building heating.

To further bring this recommendation into context, there are 5 federal facilities (Administration Building, Visitor Centre, Fleet Garage, etc.) located in the Town of Banff, a town known for its geothermal resources (i.e. the Banff Hot Springs), which have the potential to utilize geothermal heating for their operations. Banff represents one of many opportunities where the Government of Canada could look to utilize geothermal heat or other clean heat sources such as biomass for their facilities, thereby further reducing the impact of federal operations.

The federal government should commit to procuring 100% of heat from carbon-free geothermal energy sources for federal buildings, where geothermal resources exist, as well as other clean sources like solar and biomass, to help the federal government meet or exceed their 2030 GHG reduction target. The procurement process could source as much clean heat as possible from local sources and could be supplemented by the purchase of renewable (heat) energy certificates from projects developed elsewhere in Canada, similar to how the government will source 100% clean electricity by 2025.

Recommendation 2: That the Government of Canada should create a geothermal energy drilling risk reduction program to support increased project developments in Canada.

Takeaway: Geothermal drilling risk reduction programs have a proven record for increasing project developments globally; developing a drilling risk reduction program, in Canada could help accelerate the development of Canada's geothermal energy industry.

To promote further investment, many of the leading countries in geothermal energy development have created drilling risk reduction programs that provide insurance for the exploration and exploitation phases of geothermal energy development. Unlike other forms of renewable energy, geothermal energy development has significant upfront costs associated with the drilling that is required to locate and confirm geothermal resources.

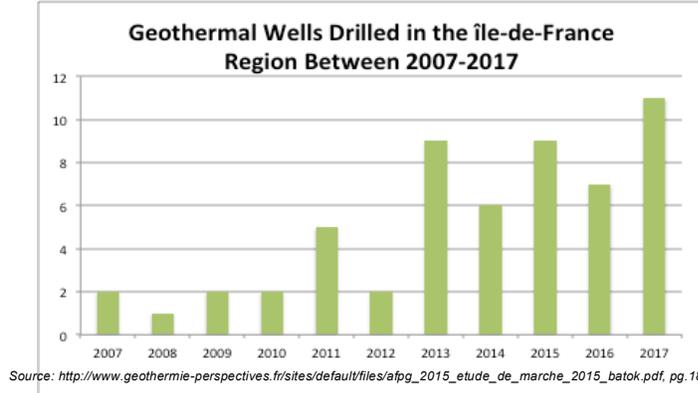
Currently in Canada under the Canadian Renewable and Conservation Expenses (CRCE) program, geothermal energy developers may claim the drilling costs in full in the year incurred, carry the costs forward indefinitely for use in future years, or renounce the costs under a flow-through share agreement. The CRCE measures are extremely valuable to Canada's geothermal energy industry; however, they offer limited support in the form of drilling risk mitigation, which can be extremely useful to help in securing early-stage capital. Creating a geothermal drilling risk reduction program would provide a much-needed risk mitigation system for geothermal developers, which has a proven track record globally for advancing geothermal energy development.

France – National Geothermal Risk Guarantee System Case Study:



The French geothermal risk guarantee system offers financing to cover geological risk and is based on two complementary mechanisms, short-term risk (STR) and long-term risk, where this case study will focus on the STR program.³ The STR program covers geological risk in the event of total or partial failure of the first drilling operation of a geothermal project. Success measures are based on flow rate and temperature, which are useful to gauge a project's potential feasibility and profitability.⁴ Eligibility for the STR program requires the project to be accepted by a technical committee and for the developer to pay 1.5% of insured cost upfront.⁵ Recoverable costs are based on three main potential project outcomes: (1) If the project is successful, no compensation is paid; (2) If the project is partially successful, a partial compensation is paid to ensure profitability; and (3) If the project is unsuccessful, the full compensation is paid (up to 90% of costs).⁶ The graph above illustrates how project success and measured, where X-axis is the flow rate (Q - cubic meters per hour) and the Y-axis is temperature (T - Celsius).

Graph source: <https://www.geothermalenergy.org/pdf/IGStandard/GeoFund/Germany2008/>, pg 28.



France's STR program has contributed to a significant increase in the number of drilled geothermal wells, as is evidenced by the chart above depicting the number of wells drilled in the Île-de-France region between 2007 and 2017. The significant increase in drilled wells has assisted in propelling France to becoming a global leader for installed capacity for the direct use of geothermal energy (i.e. geothermal heating applications).⁷

CanGEA recommends that the Government of Canada create a drilling risk reduction program similar to the program in France to help advance geothermal energy development in Canada. CanGEA would be pleased to assist in assembling the technical review team necessary for the program's creation.

Recommendation 3: That the Government of Canada should allocate further funding to Environment and Climate Change Canada for public geothermal energy literacy education initiatives and for youth geothermal energy curriculum development.

Takeaway: A well-informed populace is key to moving forward with geothermal energy project developments and to meet Canada's GHG reduction goals; providing support for geothermal energy literacy workshops and for youth curriculum development will go a long way in bringing Canadians on board with our current plan to mitigate climate change.

CanGEA recommends that the Federal Government increase available funding for geothermal energy literacy public training sessions. With the Government of Canada's demonstrated commitment to increasing renewable energy power generation and the *Pan-Canadian Framework on Clean Growth and Climate Change*, Canada is on a path to a greener future. Part of moving forward on this plan successfully relies on the Canadian populace being involved and informed every step of the way.

Canada does not produce any geothermal electricity and has very few examples of projects that utilize geothermal heat (direct use of geothermal heat), which is a contributing factor to the low level of public knowledge regarding geothermal energy and its benefits that CanGEA has identified.

The Canadian Geothermal Energy Association (CanGEA) is the collective voice of Canada's geothermal energy industry. As a non-profit industry association, we represent the interests of our member companies with the primary goal of unlocking the country's tremendous geothermal energy potential. Geothermal energy can provide competitively priced, renewable, round-the-clock energy to the Canadian and U.S. markets.

CanGEA has recently launched an introductory geothermal energy workshop series that is currently being piloted in Alberta with support from Energy Efficiency Alberta. CanGEA would like to expand on our “What about Geothermal in Alberta?” educational series to all of Canada with an early stage focus on Western and Northern Canada to further promote the benefits and potential applications for geothermal energy throughout all of Canada. CanGEA also recognizes the importance of an informed and knowledgeable youth, as they will become Canada’s future leaders.

CanGEA recommends that the Government of Canada should allocate further funding to Environment and Climate Change Canada for public geothermal energy literacy education initiatives and for youth geothermal energy curriculum development.

Recommendation 4: That the Government of Canada should create a one-stop shop for government funding and financing options that would allow companies to develop and build a profile consisting of past applications, any completed due diligence processes and other relevant information; all in one accessible portal.

Takeaway: Allowing companies with proven merit to be fast-tracked through government financing and funding application processes through the creation of a one-stop shop portal would increase accessibility and reduce the amount of work for applicants and applicant reviewers.

The current model for most financing application processes in Canada requires that companies start fresh with each new application regardless if they have previously gone through technical and financial due diligence processes in previous government applications. The necessity to be subject to technical and financial due diligence processes for every new application can become quite challenging for small and medium-sized enterprises (SME) as each new funding application requires a significant amount of time and effort. Companies should be able to utilize past successful government funding applications as proof of the project’s technical viability and their ability to manage the project financially in order to reduce the amount of duplicated work.

This recommendation could be realized through the implementation shop model for financing or funding options that would allow for governments (provincial, territorial and federal) to centralize their funding sources of similar nature (i.e. clean energy grants), thereby increasing accessibility for interested parties. Additionally, the one-stop shop financing and funding portal could track previous applications (successful or not) and allow for government review panels to access completed technical and financial due diligence reports through the company’s established profile.

Emissions Reduction Alberta (ERA) and Business Development Bank of Canada (BDC) recently signed a Trusted Partner Memorandum of Understanding with the goal of streamlining support

for innovators through easier access to multiple streams of funding and support.⁸ The agreement represents a step towards the one-stop shop that CanGEA is proposing federally as it will help ease the administrative burden for innovators to apply for and receive funding. According to the CEO of ERA “[The agreement] gives entrepreneurs and innovators access to the right support at the right time, giving them more time to focus on developing ideas...rather than filling out applications.”⁹

CanGEA urges that the Government of Canada work with relevant provincial, territorial and federal funding or financing agencies to enable the creation of a one-stop shop for clean energy funding and financing options, past company applications and other relevant information to improve accessibility and reduce the repetitious nature of applying to multiple grants.

Recommendation 5: That the Government of Canada should increase the amount of funding for all existing renewable energy funding programs.

Takeaway: Further funding and intake rounds for the existing renewable energy funding programs will promote the development of more opportunities for all developers and will contribute to reducing GHGs in Canada.

In general, geothermal energy exploration is more capital-intensive than other renewable industries as extensive fieldwork and drilling is required to confirm the resource. The majority of federal funding programs available are geared for the deployment and demonstration of renewable energy technologies (i.e. Emerging Renewable Power Program, Clean Energy for Rural and Remote Communities, the Clean Growth Program, the Low Carbon Economy Challenge, etc.) To qualify for these programs, geothermal energy projects must have either previously completed the exploration phase or have access to a significant amount of data in order to be competitive with other renewable energy applications within the same funding stream. Increasing funding for all renewable energy funding programs would create more opportunities for all renewable energy developers, at all stages of development.



Source: CanGEA

As discussed, geothermal development is capital-intensive in the exploration phase. Further funding for renewable energy funding programs could be used to increase the opportunity for geothermal developers to conduct resource assessments, thereby increasing the potential for project developments in Canada.

Case-in-point, Nunavut recently conducted a geothermal energy feasibility study, where a few communities were identified as being worthy targets for future research; however, there are currently few geothermal energy resource assessment (capacity building) funding programs open for regular intakes. Geothermal energy development represents a large opportunity for Canada and our north to reduce reliance on diesel and other fossil fuels, however, further capacity building is needed for projects to reach a demonstration or deployment stage.

CanGEA recommends that the government increase the amount of funding available for all renewable energy funding programs. Increased funding would allow for further application rounds to be opened for all project-funding streams, including capacity building streams. This recommendation would be complementary to CanGEA's first recommendation because it would promote further geothermal energy data collection, as well as provide the support needed to bring early-stage geothermal energy projects to a stage where they can apply for deployment and demonstration funding programs.

Conclusion:

These recommendations will go a long way in supporting further exploration and data collection, accessibility for private sector participants, and enhance public knowledge on geothermal energy and its potential applications within Canada. **CanGEA urges that the government consider the 5 recommendations put forward in this document to help bolster Canada's burgeoning geothermal energy sector.**

Sincerely,



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Canadian Geothermal Energy Association (CanGEA)



References:

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- ¹ Neely, Kenneth *et al.*, “City of Boise Geothermal District Heating System,” *Idaho Department of Water Resources*, accessed December 7, 2018, <https://publicworks.cityofboise.org/services/geothermal/>.
 - ² Redmond, “Energy Emissions Calculator,” <https://www.redmond.gov/common/pages/UserFile.aspx?fileId=15532>
 - ³ Bézèlgues-Courtade, S. and Jaudin, F, “The French Geothermal Risk Guarantee System,” *BRGM France*, for the *Workshop on Geological Risk Insurance within the World Bank Geothermal Energy Development Program*, 2008, 27-28, <https://www.geothermal-energy.org/pdf/IGAstandard/GeoFund/Germany2008/Bezèlgues-Courtade.pdf>.
 - ⁴ *Ibid*, 28.
 - ⁵ *Ibid*.
 - ⁶ *Ibid*.
 - ⁷ Lund, John *et al.*, “Worldwide Geothermal Energy Utilization 2015,” *GRC Transactions 2015* Vol. 39, 83, <http://pubs.geothermal-library.org/lib/grc/1032136.pdf>.
 - ⁸ Emissions Reduction Alberta, “BDC and ERA Partnership Creates Access to Another Funding Avenue for Innovators,”
 - ⁹ *Ibid*.