

## Canadian expertise and financing in global geothermal exploration and development

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### Summary

Canadian companies and Canadian experts have made a mark in the global exploration and development of all types of mineral and hydrocarbon resources. Most of the world's exploration funds are raised on the Toronto Stock Exchange that fuels the global search for mineral wealth. This is also true of the geothermal sector. But global ambitions came after focus on the Canadian geothermal resources. The time was the early 1970's when a global oil crisis was spurring increased interest in geothermal resources globally (Figure 1). The crises fostered an increased interest in both the USA and Canada (Hintz 2023). In 1973 a small group of energy professionals, scientists and academics came together in California to explore potential synergies and research projects that might help their countries combat the coming fuel shortages with another way to produce power. This was the nascent beginnings of the US based Geothermal Resources Council.

Three Canadians attended that meeting, Dr. Jack Souther, Geological Survey of Canada, Tim Sadlier Brown and Andrew Nevin, both from Nevin-Sadlier Brown-Groodbrand and Associates. Upon returning to Canada, they established the Canadian Geothermal Association as a not-for-profit technical association to bring together Canadians interested in geothermal energy both domestically and globally. The association is still active today, 50 years later, after rebranding as Geothermal Canada in 2018. During these 50 years Canadians have been active globally in all aspects of geothermal development.

Canadians have been involved in everything from green-field exploration to brown-field development, to building and operating plants, to reservoir management. For more details on the efforts by Canadians in Canada see (Jessop et al. 2024). In addition to the efforts at home in the 1980s and 1990's Canadian drilling expertise was sought after. Canadian drillers, well known from oil and gas exploration in the Western Canada Basin where 1000's of wells had been drilled since the early 1940s, found themselves involved in geothermal exploration project in Japan, USA and elsewhere. Exploration using geophysical methods such as early R&D efforts by Greg Shore, Premier Geophysics, in the use of electromagnetic methods for exploration of high temperature systems, were being deployed in other countries. His methods were developed and first used in Canada at Mount Meager, supported by funding from the Geological Survey of Canada (Shore 1978).

In the early 1980's Polaris Energy became active in Nicaragua, developing an operating asset there (Tiffer et al. 1988). In Nevada, Vancouver based Nevada Geothermal explored and developed the Blue Mountain Geothermal field (Fairbank et al. 1999, Fairbank 2024). The mid-2000's saw a number of

Canadian companies entering the scene, among these Western Geothermal, Siera Geothermal, and Magma Energy Corp.

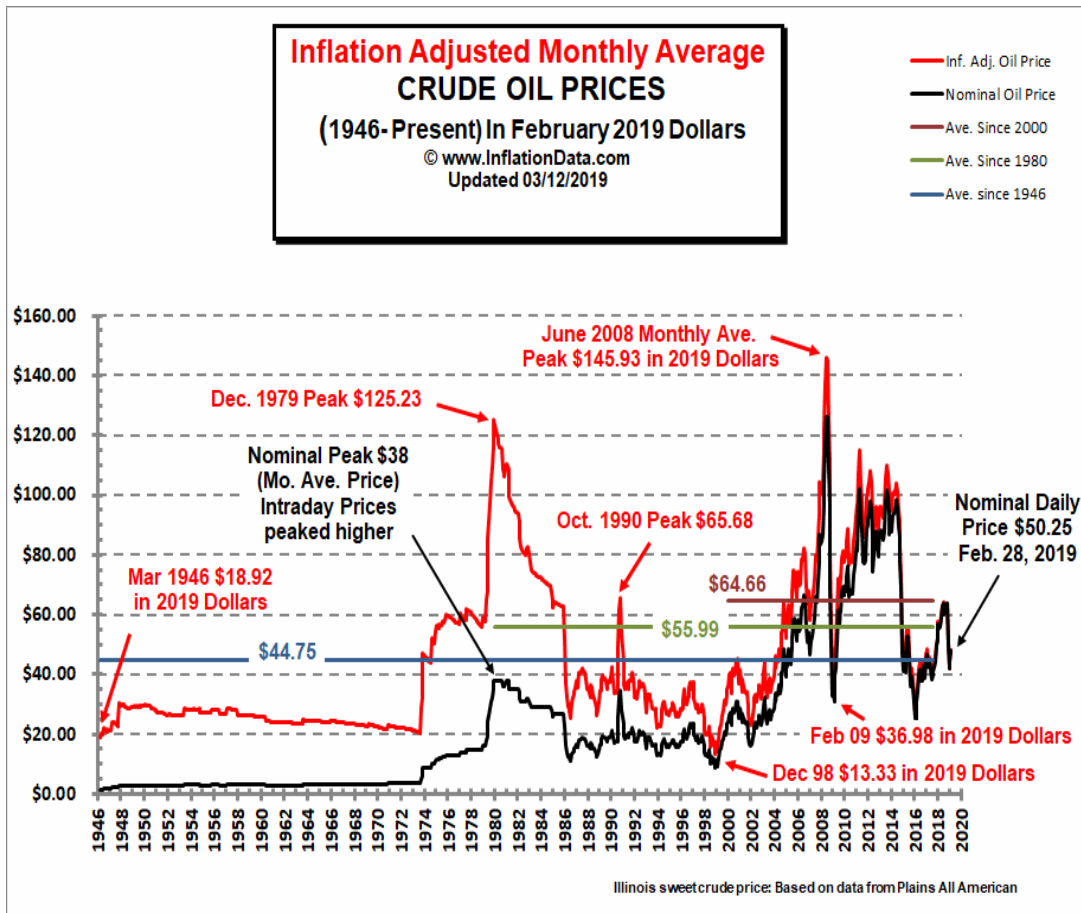


Figure 1: Global oil crises and spikes in the price of oil, fueled geothermal "rushes" in the 1970s and again in 2007-2010 time frame.

Western Geothermal focused on assets in Canada such as Meager Mountain, and Siera Geothermal was involved in exploration in Canada and the USA. Magma energy commenced a global exploration program as well as purchasing operating assets in Nevada (Soda Lake) USA and Iceland (HS Orka Svartsengi and Reykjanes). Headquarters was in Vancouver, Canada and in addition to offices in Reno, Nevada and Keflavik, Iceland, they also established subsidiary companies in Chile (Hickson 2011), Italy, Nicaragua, and Peru. The company merged in 2011 with Plutonic Power, becoming Alterra Power Corp. Eventually the company was bought by Innergex Renewable Energy, who continues developing renewable energy projects, but is not actively engaged in geothermal development.

By 2024, most of the financial and development emphasis for Canadians has been on home grown projects. As the focus in Canada has shifted from low-cost Natural Gas and coal power generation to renewable energy projects, geothermal energy for power production is slowly gaining momentum in

Canada. However, wind, solar and run-of-river hydro, still make up the bulk of renewable electricity projects in Canada. However, the breadth of Canadian expertise and involvement in geothermal projects both national and internationally is evident in the talks and posters presenting at GeoConvention 2024.

## Acknowledgements

The Canadian pioneers who laid the groundwork for the current cohort of geothermal geoscientists and engineers are thanked for their perseverance and fortitude. Innovation and advances in the oil and gas sector have fueled new ways of looking at geothermal development, these pioneers are thanked for their contributions over the decades.

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