

Opinion

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Geothermal Energy Resources: An Antidote to the Unbridled Extraction of Fossil Fuels

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An answer to the conundrum of fossil fuels development, and in oil sands development in the Canadian context, lies right beneath the feet. By turning the innovative capacity of the global oil and gas sector on its head - extraction of heat from the ground rather than carbon - geothermal energy is a cost-effective option ready for advancement on a large scale. It is an abundant resource, widely available across globally quality of available heat varying with depth. Focus here on the Canadian context, and, development of a major oil sand project in Alberta. Of all the non-carbon sources of energy, geothermal energy has been an overlooked energy option that has enormous potential for helping Canada meet its international aspirational targets for reduction of greenhouse gas emissions. If only the oil and gas sector could be nudged to embrace the resource with the same level of enthusiasm it has shown towards oil sands development, we would be on a clear and compelling path to sustainable wealth creation, social peace and responsible stewardship of the environment.

Geothermal energy is a powerful antidote to our pre-occupation with use fossil-fuels. It is a perfect fit, not only for effective utilization of the strong geotechnical expertise of the oil and gas sector, but it can be developed without any significant disruption to the existing business model and financial practices of the sector. The engineering and technical attributes of geothermal energy projects would allow a relatively easy transition from the current activities of the oil and gas sector because the skill sets of the existing work force are within the range of transferable skills. Development of geothermal sites offers meaningful economic and employment prospects in smaller communities, distant from urban centers, thereby, minimizing the threat of social dislocations. The transformation can be painless, but it does require alignment of enlightened corporate interests with provincial and national objectives. For example, the current

deployment of capital in the oil and gas sector is massive - in the order of \$40 to \$50 billion annually - all dedicated to the search and extraction of carbon beneath the ground and support for operating assets. By re-directing even 10 percent of the annual capital outlay in the first year, with a similar commitment over an additional two to three years - approximately \$10 -15 billion over five years - would create a new industry in Alberta capable of meeting the demand for heating services in the industrial, commercial and residential sectors and electrical generation for the power grid.

Cancellation of the 260,000 barrels per day of crude oil extraction at the Teck Mine project will prove to be a blessing in disguise, a decision that will be judged by shareholders as a triumph of corporate financial prudence. It was a timely abandonment of a march down a path that would have resulted in nothing more than tears and needless exercise in massive shareholder value destruction. Pursuit of the project made no sense from the outset. Eventually, and almost at the penultimate hour, smart money did recognize that a \$20 billion gamble within an evolving global energy market responding to the threat of climate change would not yield oil prices stable enough, or, high enough, to support a profitable investment.

Our preliminary assessment of an investment in a geothermal plant equivalent to the investment levels of the Teck Mine project yields an energy output significantly larger than the output of the Teck Mine project on a thermal energy basis. The economic value of a geothermal plant, as a combination of electricity and heat energy, would yield cash flows that far exceed that of the Teck Mine project and at a far lower level of financial risk. This is before any consideration of the "shadow price" of carbon emissions. If we add the monetary benefit of carbon emissions avoided, at even the most modest level, then the geothermal option is a compelling choice in

economic terms and more so because it avoids disruption of large areas of land and impacts on fragile eco-systems.

Although I have highlighted the potential of geothermal energy - partly because it is an excellent fit for the oil and gas sector - there are several additional energy supply options that can be integrated into the system to achieve a low carbon economy. The options include hydro, solar and wind combined with storage, hydrogen, small modular nuclear reactors, and development of smart energy networks. All this requires a desire to change the lens through which we can re-assess the shortcomings of an energy future dependent solely on oil and gas as the primary focus. Geothermal energy resources - five to seven kilometers below the surface - is a perfect substitute for fossil fuels, a bonanza in waiting. An opportunity exists for the oil and gas sector to lead the way to a low carbon energy future and this can be achieved through a framework of business practices that can embed some of the existing financial incentives, depreciation allowances and tax credits available to the sector for drilling activities.

To recognize that an albatross around one's neck is nothing but dead-weight is a sign of wisdom: If the corporate sector - Teck Mine Resources - gets it, is it not also about time for the reigning politicians to come to the realization that development of new oil sands projects is a 'fool's errand' that will yield nothing more than a stranded asset in the long run. The assumption that Canada's oil resources will always have a place in the global marketplace, at a price and in quantities of supply at favorable terms for decades beyond 2030 is as dubious a proposition as 'Midas gold'. And this will be the emerging reality for fossil fuel extraction in any jurisdiction anywhere in the world where the cost of extraction is non-trivial in relation to the prevailing oil prices on the international markets. The truly consequential unintended positive benefits of widespread development of geothermal energy projects would give rise to a new political dialogue reducing conflict and help defang the confrontational politics of regional grievance and alienation masquerading under the 'jobs vs environment' slogan and move us well away from a toxic debate on national unity.

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