

Geothermal Energy Exploration and Development for Remote Community in Ft. Liard, NWT

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Geothermal power is an economically viable, clean, renewable, and plentiful source of power and heat for Northern Canada. Recent work performed by the Geological Survey of Canada (Grasby et al. 2009 and Jessop et al. 2005) has delivered preliminary results regarding the subsurface heat flow in Canada's North. This work is informed with and confirmed by a long history of oil and gas drilling activity in the Northwest Territories; over 1,500 wells have been drilled and documented. Using a variety of subsurface datasets, including bottom hole temperatures, geological interpretation, faulting systems, and formation permeability, Borealis Geopower has continued the research to isolate specific remote communities with geothermal resource capable of power production.

As excess extracted heat resource cannot be economically exported from remote communities; a key aspect of this exploration program was to develop a resource screening model for exploration and mapping that involves aspects of both sub-surface (geological, down-hole engineering et al.) and surface (economics, market, infrastructure, et al.) analysis. With the correct combination of heat resource opportunity and electrical and heat revenue, project opportunities may become apparent. The next key step is to integrate unique geological and engineering solutions to extract the heat resource. In the end, each potential project needs to be designed as a tailored heat and power solution for that individual remote local community.

One remote location is the community of Ft. Liard, Northwest Territories which is home to the Acho Dene Koe First Nations. There are a number of delineation and gas wells in the Fort Liard area that have bottom hole temperatures $> 150^{\circ}\text{C}$, which when combined with the right hydrothermal features, is more than hot enough to deliver economic geothermal power for the local community. To develop the geothermal resource effectively, Borealis is currently developing a complete picture of the property's subsurface qualities (porosity, permeability, heat flow, fluid flow etc), which will help to differentiate between engineering solutions for heat extraction.

A demonstration project to drill and harness the geothermal resource has recently been approved for Clean Energy Funding through Natural Resource Canada. The "ADK/Borealis Geothermal Demonstration Project" will consist of a geothermal plant which will deliver a minimum of +/- 1 MWe of electrical power (sufficient for ~750 homes or the entire community of Ft. Liard) and also +/- 1 MWth of direct heat, sufficient to power a local greenhouse complex. This power and heat will be sustainable power solution with minimal emissions of any air pollutants or greenhouse gases, and is expected to be indefinitely renewable. Geothermal energy will be a welcome substitution to the current diesel generators that currently powers the community.