

# Canada should take advantage of a new power innovation

By Todd Hirsch

May 20, 2016 – *The Globe and Mail*

What do you get when you combine orphaned oil and gas wells, nanotechnology, 3-D printing and a bunch of really smart geologists? Throw in a government committed to eliminating carbon-fired electricity, and you get the perfect conditions for some mind-blowing innovation in power generation.

Geologists and engineers at the University of Alberta are developing something called “low temperature micro-geothermal engines.” It may be an awkward name, but what they’re working on could be an innovative breakthrough for Alberta’s power generation aspirations. The provincial government has announced intentions to eliminate all coal-fired power by 2020 – an aggressive goal that has been applauded by many. Yet the question of how we are going to get there looms large over an economy mired in recession.

The geothermal engines at the U of A are basically a redesign of something that’s been around for more than two centuries: the external combustion engine. Using nanotechnology – which enables scientists to construct things at the molecular level – the engines can be designed to be about the size of an inflatable kids’ pool and a couple of metres high. In the words of Dr. Jonathan Banks, the geologist and lead researcher at the university, “we’re going to optimize the bejeezus out of it” using nanotechnology.

Built at the molecular level using 3-D printing, the units would be placed atop orphaned oil and gas wells – something Alberta has in abundance – pulling up boiling hot brine water from more than two kilometres below the Earth’s surface. Unlike natural gas, which loses a tremendous amount of heat while it is being brought to the surface, water loses very little of its heat energy while it’s pulled to the surface. The water’s heat

can be converted to electricity by the micro-geothermal units, and pushed onto the grid.

No carbon. No nuclear waste. No ruined caribou habitat.

One engine could produce enough electricity to power 100 homes. And the best part of it is that using 3-D printing, the cost of producing one will be a few hundred thousand dollars, not millions or billions. They’d be compact, easy to install and simple to connect to the electricity grid.

If this innovation had taken place at the University of Copenhagen, we’d think “Oh those Danes are so clever!” If it had been in China, we would say “There goes China again, eating our lunch on innovation.” But it’s happening right here in Canada – and our response is dangerously close to a yawn. Few Canadians are even talking about the technology or the enormous opportunities it creates for geothermal energy.

There are at least two reasons why we should be jumping for joy at the prospect. The first is the potential for the province to replace coal – at least partly – as the largest source of electricity generation. That could go a long way in improving Alberta’s image, which has suffered in a world at war with carbon.

But the second reason is even more important, at least economically. The development and innovation of such power systems here in our own backyard provide the opportunity to sell the technology to the rest of the world – a world that is also keen to move away from coal, hydrocarbons and nuclear. That can provide long-lasting labour market opportunities and could help establish Alberta as a leader in renewable energy.

There are many definitions of “innovation,” but the one I use is this: the application of an existing technology to a new and very useful purpose. Here we are seeing true innovation take shape. For a very long time, it seems nanotechnology has been an invention waiting for something useful to do. But now we are seeing the emergence of something not only useful, but crucial to solving our power needs.

We need to be innovative, but we also need to recognize and capitalize on innovation when it

happens. The advances in nanotechnology, 3-D printing and geology must not remain trapped in university labs. Commercializing the technology is the next step, but this is where Canadians have often fallen short. We’ve innovated something amazing – now let’s capitalize on it.

*Todd Hirsch is the Calgary-based chief economist of ATB Financial and author of The Boiling Frog Dilemma: Saving Canada from Economic Decline.*