

Talking Technology

Reshaping energy using new fuel cell technology

By Steve Burns, Capital News contributor

Last week we began a series of what I have termed “breakthrough technologies”—technologies that break through traditional methods and provide new and innovative ways of accomplishing the end goal.



From the bleeding edge technology of a ThermoJet printer that produces 3-D wax models to fast track the design and delivery of unique car parts and body designs to biosimulation technology that creates mathematical models of diseases to run virtual tests of their new drug candidates, innovative technologies are all around us.

Never before have we seen such a surge of innovations that have the potential to turn our world upside down.

This week we are going to look more closely at the potential of fuel cell technology.

If industry experts are right, you may soon be using this new energy-saving technology to generate electrical power for almost anything—including more reliable back-up power generators, longer-lasting cell phones and laptop computers and highly energy-efficient, emissions-free cars, trucks and buses.

The technology offers a very strong value proposition to consumers—a means of making power using hydrogen is not only much more efficient but also causes less pollution than traditional methods.

In my opinion, fuel cells and hydrogen has the potential to be one of the most transformative technologies of our time.

The introduction of hydrogen technologies into the marketplace will lead to cleaner air and a healthier environment for our children, as well as significant economic opportunity.

Market experts estimate the value of the fuel cells market to be \$100 billion worldwide by 2010.

You may be surprised to learn that British Columbia is the home to the largest cluster of fuel cell expertise in the world.

The National Research Council (NRC) plays a major role in the development of fuel-cell technology in Canada.

The NRC Institute for Fuel Cell Innovation (NRC-IFCI) and the Fuel Cell Technology Centre in Vancouver provides 3,500 square feet of hydrogen-safe laboratory space.

The centre offers testing facilities specialized for different fuel-cell sizes and different fuel-cell types, demonstration facilities to showcase new technology and incubation space for start-ups.

But what is a fuel cell and how does it work? A fuel cell is simply an electrochemical energy conversion device that converts hydrogen and oxygen into water, producing electricity and heat in the process.

It is very much like a battery that can be recharged while you are drawing power from it. Instead of recharging using electricity, however, a fuel cell uses hydrogen and oxygen.

A fuel cell provides a direct current voltage that can be used to power motors, lights or any number of electrical appliances. There are several different types of fuel cells, each using a different chemistry.

Fuel cells can be used in a number of applications and each raises its own issues and challenges.

Power plants, automobiles and buses

Large fuel cells have the ability to generate electricity more efficiently than today's power plants and could replace them by 2010.

Industry experts predict that fuel-cell-powered cars will start to replace gas and diesel-engine cars in about 2005.

Fuel cells are already being used in buses.

One of the key problems with using fuel cell technology in Canada is that the fuel cell does not operate very well, if at all, in extremely cold temperatures.

Although this could be a major problem for the technology, just over a month ago, Honda Motor Co. Ltd. announced the development of the Honda's FC Stack (Fuel Cell Stack), which is a next-generation fuel cell that is more compact than previous designs, easier to build, and works even in extremely low temperatures—a performance goal no previous fuel cell stack has been able to achieve.

Portable power

Fuel cells have the potential for use in portable electronics such as laptop computers, cell phones, hearing aids, and even your portable walkman.

In these applications, the fuel cell will provide much longer life than a battery would, and you should be able to "recharge" it quickly.

One of the neatest ideas I have seen yet is a fuel-cell-powered mountain bike that uses hydrogen and air as fuel and emits only water vapor as a waste product.

According to its developers, Manhattan Scientifics Inc., the "Hydrocycle" has a top range of 70-100 kilometers along a flat surface and can achieve a top speed of 30 kilometers per hour.

The Hydrocycle could revolutionize how we get to work.

The developers are initially targeting large Asian cities, where bicycles and gas-powered scooters make up a significant portion of all vehicle traffic.

Home power

If either IdaTech or General Electric/Plug Power has their way, you may be using fuel cell technology for your home very soon.

General Electric is going to offer a fuel-cell generator system made by Plug Power that will use a natural gas or propane reformer and produce up to seven kilowatts of power, which should be enough for most houses.

A system like this produces electricity and significant amounts of heat, so it is possible that the system could heat your water and help to heat your house without using any additional energy.

Plug Power also recently joined forces with Honda R&D to provide electricity and heat for the home and hydrogen for your fuel cell vehicle.

While it is interesting to see how the fuel cell industry can revolutionize our world, my research raises some serious questions for us to ponder.

If the fuel cell industry is truly a \$100 billion dollar industry and has such huge potential, why is the Okanagan standing by and watching Vancouver become the fuel cell centre of excellence for Canada?

Why can't we develop a targeted strategy to attract fuel cell research and commercialization opportunities to our neck of the woods?

I know that we are studying potential industry clusters but we need a new approach that creates a radical growth strategy for the Okanagan.

A good start would be to look at the emerging technology clusters worldwide, not just those already here, and ask the question, "Why not here?"

I envision the Okanagan as a world class centre of excellence for emerging technologies, which includes fuel cells.

That isn't thinking outside of the box – it is starting without a box to create a new reality.

Next week we will look more closely at another breakthrough technology that has the potential to completely vaporize our current way of thinking ...

"Some men see things as they are and say why. I dream of things that never were and say why not." —John F. Kennedy

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