UVic knowledge

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Fuel for the future

Pitt, left and Djilali look on as campus security officer Nathan Appenheimer holds a hydrogen fuel cell-powered flashlight.

Tired of your cell phone batteries dying? Pass the hydrogen, please

by Jessica Gillies

You're trapped in a car with a driver who has horrible taste in music and your iPod battery just died. Or maybe you're on the side of the road with a flat tire when you realize you haven't charged your cell phone in a few days and it's dead.

We've all been there—batteries never last as long as we want them to. But the University of Victoria's Institute for Integrated Energy Systems (IESVic) and Angstrom Power have just finished testing a micro fuel cell that could revolutionize the way we look at portable electronic devices—and perhaps, eventually, the way we look at cars.

Angstrom Power, a company started by former IESVic director Ged McLean, has developed a micro fuel cell that runs on hydrogen. With funding from Sustainable Technology Development Canada, Angstrom ran a demonstration project using flashlights to see how the fuel cells worked in the real world.

Since Angstrom has close ties with UVic—a number of engineering grads work for the North Vancouver company—it was only natural to use campus security at UVic as one of four testing sites.

"We needed to get the difference between the lab and the real world—if they get dropped, if someone throws them in the back of their truck for a week," says Angstrom's Annalise Czerny, the project director. "That's one benefit. The other is a kind of consumer feedback. We're not able to be objective; we made the flashlights, so we think they're great."

Campus security staff tested the flashlights during fall and winter 2006/07.

"There were some issues with them. They didn't work right off the bat and they had a few failures, but that's the expectation with new technology," says Dr. Lawrence Pitt, IESVic's research coordinator.

The flashlights were just a vehicle to test the fuel cell; Angstrom doesn't plan to market them. But rechargeable batteries have reached their limits, says Pitt, and fuel cells could be used in other portable devices, such as cell phones, cameras, iPods or Blackberries.

Fuel cells can power devices for much longer than batteries—the fuel cell flashlights lasted about four times as long as battery-powered flashlights—and they can recharge in about half an hour.

"It's a nice market," says Dr. Ned Djilali, IESVic's executive director, "because the competing technology, the rechargeable battery, is limited in terms of its performance. It's also quite expensive, so fuel cells can potentially compete with these things and at the same time provide a performance advantage."

Angstrom and IESVic also have their eyes on a larger goal.

"We're hoping that in the longer term, getting the technology commercial and being innovative will lead to developing bigger fuel cell systems," says Pitt. They might eventually be deployed in transportation, for example.

"The processes are taking place on a very small scale right now," says Pitt. "The idea is that as we come to understand the process better, we can scale up to larger systems so that we run cars and buses on fuel cells more economically."

EDGEwise

Fuel cells take a fuel (in this case hydrogen) and an oxidant (in this case oxygen) from the air, and have them react electrochemically to produce electricity. The only other by-product of a hydrogen fuel cell's reaction is water.

This flashlight has hydrogen stored in its handle. At the front end of the flashlight, there's a mesh screen to help air get in and to help water vapour get out. In between the two sections is the fuel cell, which is about the size of a quarter.

Angstrom's fuel cell is notable because its simple design and micro structure allow it to be much smaller than other fuel cells, but with the same power output.

The Institute for Integrated Energy Systems at the University of Victoria was founded in 1989 and focuses on researching and developing key technologies for sustainable energy systems.

UVic researchers were awarded more than $82 million in external research grants and contracts in 2005/06, up nearly 150 per cent since 2001/02.

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