

High hopes for a solar water heater

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by Cameron Smith

He calls it "the big lamp." And he speaks with that special affection engineers have for things that work. In this case, it's a powerful light generator that mimics the sun. It can throw out 1,100 watts per square metre, exactly the strength of the sun at ground level on a good day, and it can do it in a spectrum identical to the sun's. But that only partly explains Alfred Brunger's affection. "I've had my whole career in solar energy research," he says. And here, at the National Solar Test Facility in Mississauga's Sheridan Park research complex, he has the perfect research tool. With the title of account manager, the 45-year-old Brunger is responsible for the big lamp -- owned by Natural Resources Canada and operated by ORTECH International, a provincial crown corporation.

ORTECH doesn't initiate its own research. It works with paying customers, many of whom simply want to certify that their products will perform properly through a wide range of weather conditions.

What really animates Brunger, however, is the work being done to dramatically cut the cost of solar hot water heaters. The target is a one-third reduction. When that happens, he enthuses, it will become economic for electric utilities to lease them to customers, just as they now lease electric hot water tanks.

And for individuals who install their own solar heaters, it means savings in electricity charges that will give them a payback in five years.

A solar hot water heater has two parts: a panel on the roof through which water or glycol circulates. The circulating fluid is warmed by sun, easily reaching temperatures of 60° Celsius. It is then redirected to the second part: a heat exchanger at the hot water tank that heats the water in the tank.

Electric utilities are eager to see cost-competitive solar heaters, because natural gas companies are winning away their customers with much cheaper, gas-fired hot water heaters.

When a customer transfers, it's a big hit to a utility. For an average family of four, an electric hot water tank accounts for about 28 per cent of a monthly electricity bill. Only swimming pools or high-powered air conditioners draw more power.

Also, when a customer switches to a gas-fired water heater, the gas company, of course, suggests switching the electric stove to gas as well. And stoves rank just behind hot water heaters in electricity consumption. They account for about 24 per cent of a monthly bill.

The electricity utilities want to keep these customers, and a solar powered hot water heater that would cost \$1,700 to buy and install, instead of the current \$2,700, would be the answer to their prayers.

A \$1,700 heater could very well be in production within two years, says Douglas McClenahan, research and development manager for active solar at the energy technology branch of Natural Resources Canada.

"We're ahead of the rest of the world on this, and we're going to take everybody else by storm. There isn't a development in any other country that will be able to compete." He expects sales in Canada will have reached 100,000 by the year 2010. In other words, a short-term market of close to \$200 million.

Among the innovations are a pump no bigger than your thumb for moving the circulating fluid, "a bundle of tubing and wiring" that will cost about \$6.50 a metre instead of the current \$20 to \$23 a metre, a super-compact heat exchanger, and a design that turns on its ear conventional methods of circulating fluid.

This summer, the big lamp, and Brunger's computers, will decide whether a prototype lives up to expectations. If it does, it'll be field tested.

"We're going to get there," says Brunger. "There's no question." And with more than seven years of research standing behind this project, anticipation resonates through every word. "I'm feeling really good about how the technical research is going."

For all the rest of us who see renewable energy as the solution to so many problems, Brunger's anticipation is sweet music to our ears.