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The sun in a hose

Aveda Corp. is testing a new type of hybrid light that could bring a little more sunshine into our lives.

Jackie Crosby, Star Tribune

In a windowless office deep inside Aveda Corporation's manufacturing plant in Blaine, the sun is shining. Well, sort of.

Workers here are testing a hybrid lighting system that pulls sunlight into the room's fluorescent light bulbs when it's sunny outside, but also can use traditional electric power when it gets cloudy.

The technology was developed by the Oak Ridge National Laboratory in Tennessee and has the potential to significantly reduce the energy it takes to light and cool a room. In turn, that could lead to cost savings for consumers and a boost for the environment.

"It's quite mysterious," said Aveda's president, Dominique Conseil, who split the $25,000 cost to install the system with Xcel Energy Inc. "You have captured the sun in a hose."

For Aveda, a maker of high-end beauty products, the solar light project fits with its longtime goal to help slow global warming, generate less waste, support natural habitats and reduce air and water pollution. Aveda was started in 1978 by beauty guru Horst Rechelbacher, who believed in creating plant-based products that didn't come at the expense of Mother Nature. He sold the company to international cosmetics giant Estée Lauder in 1997 for $350 million. Sales have doubled since 2000.

The company strives toward a lofty aim of becoming zero-waste and relying only on renewable energy.

Aveda already is the state's largest purchaser of wind energy, completely powering its manufacturing plant with the energy of three wind turbines. The company's products are made using 83 percent organic essential oils and are bottled in plastic made from at least 80 percent post-consumer recycled content.

"We're on a long journey towards sustainability," Conseil said. "You always have to break rules, you always have to rethink the traditional ways of doing things.

And sometimes you have to put money on the table for things that may work or may not."

A challenging test site

Aveda is one of 10 sites in the United States and England currently testing the hybrid solar lighting system. Other sites include a furniture store in Knoxville, Tenn., a "green" Wal-Mart in McKinney, Texas, and a school in Redcar, England. By year's end, a total of 25 test sites are expected to be operating.

Aveda's role in the research and development of the hybrid lights was sparked by an electrician at the company who happened upon a website about it. He mentioned it to Jim Gausman, a mechanical engineer who is now one of six employees toiling away under the lights.

Unlike traditional solar power, which converts sunlight into electricity, hybrid solar lights capture sunlight from a rooftop dish and then pipe it directly into a room. The ultraviolet rays get filtered out (so you don't get sunburned working at your desk), as do the heat-producing infrared rays.

"I call this my science fair experiment," Gausman said. "They weren't thinking Minnesota with this kind of technology. I convinced them it was a great place to torture-test this on the roof. It's also a place where people tend to get seasonal affective disorder, so bringing sunlight into the offices is a great thing to do in the winter."

Minnesota has indeed turned into a challenging test site -- which is a good thing. The system was installed in May and ran for about a month before one of the mirrors on the rooftop dish melted. More recently, gusty winds caused the lights to flicker, making office workers queasy.

Those problems have been fixed, said Duncan Earl, a researcher at Oak Ridge National Laboratory in Oakridge, Tenn. He's the chief technical officer for the spinoff company, Sunlight Direct, that's testing the system. If all goes as planned, Earl said the system will be commercially available for industrial use in the first quarter of 2007. Testing for residential systems could begin in 2008.

So far the results have been encouraging. The site in San Diego has seen a 67 percent energy savings at the peak of the day, Earl said, enough to pay for itself in two or three years.

And workers really like the color of the lights. At Aveda, the office glows a moody blue -- enhanced by a bundle of clear fiber-optic cables that run along the wall just under the ceiling tiles.

"It was 100 percent developed just to save energy," Earl said. "But it's the quality of light that's really catching people. It definitely has a different feel. You notice it's easier to read things, there's not as much eye strain, and it's a connection to the outside."

New life for old technology

The technology has been around since the 1970s, but was expensive to mass produce. Advances in plastics and low-cost electronics such as global positioning system technology and smart microprocessors have brought costs down. The "Internet-ready" design also makes it easy to diagnose problems and monitor energy savings.

While various components of hybrid solar lights are currently available, the entire system, which includes the solar dish and other components, is not yet on the market.

The U.S. Department of Energy has invested $15 million to develop the product over the past six years, Earl said. The test site customers are paying for their equipment.

Xcel Energy financed its half of the Aveda project out of a $400,000 fund dedicated to conservation research and development.

"It wasn't a hard decision to get involved in," said Ralph Dickinson, an Xcel product developer, who said he's "known as a dreamer around here."

Dickinson said solar hybrid lighting could have an important impact on peak electricity loads during the hottest days of the summer. Not only are air conditioners working overtime to cool the air, but they're also trying to overcome the heat that's put out by the light bulbs themselves.

"As you think about the future, and putting these fiber-optic tubes around buildings and homes, it does create some exciting possibilities," Dickinson said. "If you can manage peak demands, it keeps rates lower because it keeps capital costs lower."

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