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A New Twist on the 'Smart' Window

By *JIM WITKIN*

RavenBrick Using no electric current, this smart window darkens when temperatures soar during the summer.

The Department of Energy *estimates* that commercial and residential buildings consume 40 percent of our nation's energy. Most of this energy is used for heating and cooling, but much of it is wasted because of leaky walls and windows.

Adding proper insulation can help, but increasing the windows' ability to control the flow of heat in and out of the building is the most effective improvement, according to Wil McCarthy, co-inventor of a new "smart" window technology.

His company, [RavenBrick](#), has developed a smart film that when applied to a window can vary its tint (like transition lens sunglasses) based on the outside temperature. During the cold months, the film remains clear, allowing the infrared spectrum of sunlight to pass through and provide heat. During summer, the window film tints to block unwanted heat, lowering cooling costs.

Based on early testing and computer models provided by the [Lawrence Berkeley National Laboratory](#), RavenBrick estimates that its smart window film can reduce a building's energy consumption by 30 to 40 percent.

Smart windows that can block heat gain from sunlight have *been available* for about two decades, according to the National Renewable Energy Laboratory, but they have always required an electric current to change their tint. Typically, a building manager will manually control the tint based on the outside temperature and amount of sunlight hitting the building.

But Mr. McCarthy suggests that his invention offers a cheaper twist. His window film requires no electric current, which saves money on energy costs. He also says it is easier to install because it requires no control systems. The RavenBrick film has two states, off and on, rather than several transitional states, which also makes the film easier and cheaper to manufacture.

Mr. McCarthy explains: "Human comfort tends to be very abrupt. The dividing line between when people say they are comfortable and when they are too hot is not gradual — there's a threshold."

Even with 54 patents already approved, he is tight-lipped about the materials used in making his smart film. He would say only that it is "an organic, nontoxic polymer which changes its molecular structure in response to temperature."

Mr. McCarthy and his co-inventor, Rich Powers, began their careers as aerospace engineers and credit their invention to “naïveté” more than anything else. “Coming from outside the industry, we didn’t have a lot of preconceived notions about what was or wasn’t supposed to work, and so we just pulled some components together and got the effect we were aiming for, without really knowing it was an innovation.”

Innovation or not, the Department of Energy is interested. It [will be installing](#) windows manufactured with the film this month at the National Renewable Energy Laboratory’s new Research Support Facility, giving the technology its first commercial test run.

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