J. SCOTT CHRISTIANSON

# New breakthrough raises efficiency of solar energy

For years, the environmental wisdom of generating electricity from the sun has been unable to surmount the realities of cost-effectiveness — for most applications it is cheaper to use fossil fuels than to invest in solar panels. A new technique for making solar cells that convert sunlight into electricity — known as photovoltaic cells — promises to finally make the cost of solar energy competitive with that of fossil fuels.

Photovoltaic cells can be manufactured in several ways. The most efficient cells are made from crystallized silicon. Purified silicon is melted, formed into a large crystal ingot and then cut into thin wafers. These wafers are then coated with boron and phosphorous and sandwiched together. A cell made from crystallized silicon is 10 percent to 12 percent efficient, that is, 10 percent to 12 percent of the light that hits a cell is converted into electrical energy.

Making photovoltaic cells from silicon crystals is expensive because of the high precision and high temperatures required.

Photovoltaic cells can be manufactured less expensively by coating a surface, such as glass, with non-crystallized, or amorphous, silicon. Cells made with amorphous silicon have been used for years to power calculators and solar watches, but their low efficiency — typically about 6 percent — has prevented them from being cost-effective for producing power.

A scientist at United Solar Systems in Michigan has perfected a technique for making amorphous photovoltaic cells that is much more efficient — more than 10 percent. This technique involves depositing a layer of silicon and germanium on a ribbon of stainless steel. The cells are flexible, cheap and produce a decent amount of power.

"The Department of Energy predicts that the United Solar panels could bring down the cost of photovoltaic power down to 12 to 16 cents per kilowatt-hour, less than half its current cost," Tim Beardsley reported in Scientific American. "Power companies usually now charge between 6 and 20 cents per kilowatt-hour for fossil-fuel-generated electricity."

Although this breakthrough still might not make solar electricity practical in Missouri because of our high number of cloudy days, it will make solar a competitive energy source in sunnier places. In fact, United Solar Systems is building a new production plant that will use this technique to produce 10 million square feet of solar panel every year.

For more information about solar-powered electricity or solar heating, write the Missouri Department of Natural Resources, Division of Energy, PO Box 176, Jefferson City, Mo., 65102. The Center for Sustainable Living at 804-C E. Broadway in Columbia also has information on solar energy.

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