Solar Cells with 60% Efficiency?

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Lonnie Johnson with his invention of the Super Soaker, the top-selling toy in the US in the early ´90s.

Nuclear Engineer Lonnie Johnson, best known for his invention of the super soaker squirt gun, has recently designed a new type of solar energy technology that he says can achieve a conversion efficiency rate of more than 60 percent. Considering that the best solar energy systems today have an efficiency of 30-40 percent, Johnson´s method could cut the cost of solar energy nearly in half.

A recent article in *Popular Mechanics* describes how Johnson´s system would work. Rather than use photovoltaic cells, where silicon converts light into electricity, the new system works like a heat engine. But

instead of using heat to turn an axle, it uses heat to force hydrogen ions through a membrane-electrode, and create electricity.

The system, called the Johnson Thermoelectric Energy Converting System (JTEC) consists of two stacks of electrodes - a high-temperature stack heated by the sun (and by concentrated mirrors) and a low-temperature stack.

An electrical jolt triggers a voltage across the electrode stacks, with the low-temperature stack pumping out hydrogen from low to high pressure in order to maintain the pressure differential. As the hydrogen passes through the high-temperature stack of electrodes, it generates power. In a sense, the system works similar to a fuel cell.

Johnson plans to build a system whose high temperature reaches 600 degrees centrigrade, within the current solar concentration ability of parabolic mirrors, which can produce temperatures of more than 800 degrees centigrade. At 600 degrees, the system would have an efficiency of close to 60 percent. At higher temperatures, the efficiency would increase even more.

The system should be able to produce several megawatts of power, according to Johnson. It could also harvest waste heat from internal combustion engines, turbines, and even the human body.

Johnson, a former NASA employee, funds his work with the millions of dollars he made from inventing the super soaker.

via: Popular Mechanics

https://phys.org/news/2008-01-solar-cells-efficiency.html