

## New World Record Achieved In Solar Cell Technology

ScienceDaily (Dec. 7, 2006) — U.S. Department of Energy (DOE) Assistant Secretary for Energy Efficiency and Renewable Energy Alexander Karsner has announced that with DOE funding, a concentrator solar cell produced by Boeing-Spectrolab has recently achieved a world-record conversion efficiency of 40.7 percent, establishing a new milestone in sunlight-to-electricity performance. This breakthrough may lead to systems with an installation cost of only \$3 per watt, producing electricity at a cost of 8-10 cents per kilowatt/hour, making solar electricity a more cost-competitive and integral part of our nation's energy mix.

"Reaching this milestone heralds a great achievement for the Department of Energy and for solar energy engineering worldwide," Assistant Secretary Karsner said. "We are eager to see this accomplishment translate into the marketplace as soon as possible, which has the potential to help reduce our nation's reliance on imported oil and increase our energy security."

Attaining a 40 percent efficient concentrating solar cell means having another technology pathway for producing cost-effective solar electricity. Almost all of today's solar cell modules do not concentrate sunlight but use only what the sun produces naturally, what researchers call "one sun insolation," which achieves an efficiency of 12 to 18 percent. However, by using an optical concentrator, sunlight intensity can be increased, squeezing more electricity out of a single solar cell.

The 40.7 percent cell was developed using a unique structure called a multi-junction solar cell. This type of cell achieves a higher efficiency by capturing more of the solar spectrum. In a multi-junction cell, individual cells are made of layers, where each layer captures part of the sunlight passing through the cell. This allows the cell to get more energy from the sun's light.

For the past two decades researchers have tried to break the "40 percent efficient" barrier on solar cell devices. In the early 1980s, DOE began researching what are known as "multi-junction gallium arsenide-based solar cell devices," multi-layered solar cells which converted about 16 percent of the sun's available energy into electricity. In 1994, DOE's National Renewable Energy laboratory broke the 30 percent barrier, which attracted interest from the space industry. Most satellites today use these multi-junction cells.

Reaching 40 percent efficiency helps further President Bush's Solar America Initiative (SAI) goals, which aims to win nationwide acceptance of clean solar energy technologies by 2015. By then, it is intended that America will have enough solar energy systems installed to provide power to one to two million homes, at a cost of 5 to 10 cents per kilowatt/hour. The SAI is also key component of President Bush's Advanced Energy Initiative, which provides a 22 percent increase in research and development funding at DOE and seeks to reduce our dependence on foreign sources of oil by changing the way we power our cars, homes and businesses.

For more information, visit the Solar America Initiative website at:  
[http://www.eere.energy.gov/solar/solar\\_america/](http://www.eere.energy.gov/solar/solar_america/).

*Adapted from materials provided by [U.S. Department Of Energy](http://www.eere.energy.gov).*

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