

Environmental & Energy Insights

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The Solar Power Show-down

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Quite often, that noisy debate that goes on in this country about how to meet our increasing energy demand revisits the nascent clean energy industry. Will there ever be a true power player? Doubters should take a look at the newest wave of technology. Looking at the solar industry, we have found some very promising projects that could change the game. Some of us doubters may become believers after reading about Semprius, a startup that recently announced it has made the world's most efficient solar panel, a claim apparently validated by the U.S. Department of Energy's National Renewable Energy Laboratory.

Semprius makes highly efficient microscopic solar cells that, among other things, do not need expensive cooling or tracking systems, which account for a good portion of the costs of a solar installation. Indeed, their panels use solar cells made from gallium arsenide, which is evidently far better at absorbing sunlight than silicon, the material used in most solar cells. Gallium arsenide solar cells have another advantage: silicon solar cells only absorb a narrow band of sunlight, while gallium arsenide cells capture a much larger band of sunlight. Third party testing shows the efficiency of Semprius' solar panel at 33.9%, whereas conventional silicon solar panels typically convert less than 15% of light into electricity, and the high end range for a silicon panel is 22.9%.

But, Semprius is building its factory at a particularly difficult time in the industry. An oversupply and reduction in costs has led to a rapid drop in prices for solar panels, making it difficult for new companies entering the market. In response, Semprius is focusing on improved efficiency, which lowers the cost per watt of solar panels. More importantly, it lowers the cost of installation and other equipment. In short, Semprius thinks it can generate solar power for less than 10 cents per kilowatt-hour, even without government subsidies!

Just days after Semprius' announcement, scientists at Cambridge University say they developed a solar cell which could harvest energy from the sun at a increased efficiency of 25%. This technology also takes advantage of absorbing different ranges of the spectrum. The Cambridge team has developed a hybrid cell which absorbs red light and harnesses extra energy from the blue light spectrum to boost conversion efficiency. This is accomplished by adding pentacene, an organic semiconductor. But, even with greater efficiency of the solar panel itself, much of the cost of a solar plant is in the land, labor, and hardware. So, these costs have to come down as well.

My bet is on some type of hybrid cell which is much smaller than the typical cell (such as the Semprius cell) and requires much less in fixed costs. In any event, a new dawn is clearly approaching, and solar energy will finally be peaking its head over the horizon.

