Stacking solar cells method could be electricity gain

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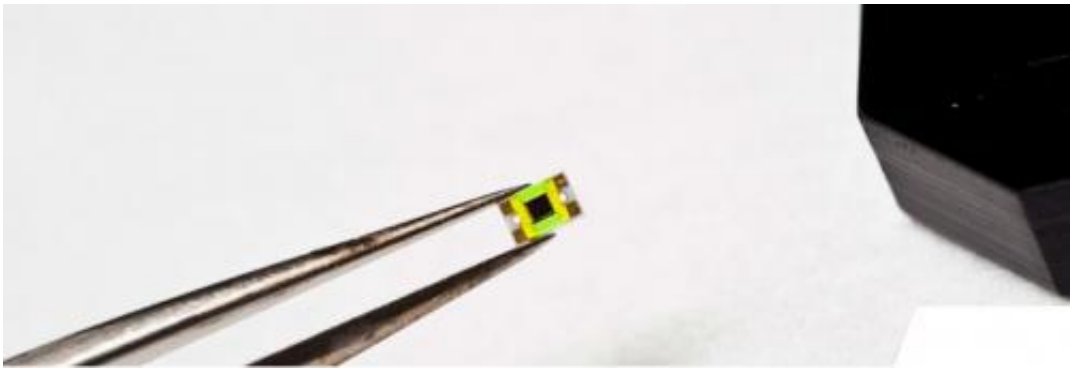

Is there a way to stack solar cells and convert more of the energy in sunlight into electricity? Not only has a company developed a method, but, as a headline said Wednesday in MIT Technology Review, the approach could make solar as cheap as natural gas. The idea involves stacking different semiconducting materials that collect different frequencies of light. This is of note because the company can stack several different combinations, resulting in a solar panel that can capture more energy from sunlight.

The manufacturing technique was discussed by Kevin Bullis in MIT Technology Review. The Durham, North Carolina-based company Semprius has a technique that performs the stacking quickly and inexpensively. Bullis said the method would be opening the door to

efficiencies as high as 50 percent, whereas conventional solar cells convert less than 25 percent of the sunlight's energy into electricity.

The company also has a proprietary way to electrically connect cells and a new type of glue to hold the cells together. Earlier this year, Semprius made news with the announcement of its newly created four-junction stacked CPV solar cell which "brings the industry one step closer to the oft-stated goal of a solar cell with a 50% conversion efficiency," reported CleanTechnica. The company release, issued in April this year, was headlined, "Semprius Demonstrates Proprietary Four-Junction, Four-Terminal Stacked Solar Cell Reaching a World-Class Efficiency Level of 43.9 Percent."

According to Semprius in its release, "By using four junctions, the stacked cell is able to capture light across a broader portion of the solar spectrum and therefore achieve efficiencies much higher than conventional silicon and thin-film single-junction solar cells. Initial trials yielded solar cells with measured efficiencies up to 43.9 percent. This process is capable of achieving solar cell efficiencies greater than 50 percent in the near future."

Bullis said that Semprius demonstrated cells made of three semiconductor materials stacked on top of a fourth solar cell that would not have been compatible otherwise. He wrote, "The conventional way to stack semiconductors is to grow layers on top of each other. But not all semiconductors can be combined this way, because their crystalline structure doesn't allow it."

As for costs, with economies of scale, at a scale of 80 to 100 megawatts a year of manufacturing capacity, a cell with 50 percent efficiency would make it possible to reach costs of less than five cents per kilowatt-hour, according to Scott Burroughs, the vice president of technology at Semprius. The U.S. Energy Information Administration estimates that

new natural-gas power plants will produce electricity at 6.4 cents per kilowatt-hour, added MIT Technology Review.

More information: — Semprius website: www.semprius.com/the-semprius-difference/

— Press release (PDF): www.semprius.com/assets/pdf/pr … ss_releases/Semprius %202014%204J%20Stacked%20Cell-2014-04-28-Final.pdf