A Swiss startup called Insolight has figured out how to take pricey, NASA-worthy solar cells and park them on your rooftop without busting your wallet. It’s a course being charted by several other companies and researchers around the world, but the folks at Insolight are confident that they’ll beat the competition to the market. Their prototype has clocked in at 36.4% efficiency.

That meets or beats similar solar products already on the market. The trick now is to see if Insolight can transfer its prototype to commercial production without losing efficiency, and at a cost that gives it an edge.

High Efficiency Solar Cells: A Little Goes A Long Way

Generally speaking, the more efficient your solar cells are, the more they’re going to cost. That’s fine if you’re working with niche customers like NASA, for example, that can afford to pay whatever it takes to hit that golden combo of light weight, compactness, and high efficiency.

Gunning for high efficiency at any cost is not the best strategy, though, for cracking the market for solar cells a little closer to Earth, especially not in the red-hot rooftop solar market. It’s also not going to help much when you’re competing against low cost fossil fuels.

Insolight, as with similar efforts, is taking a best-of-both-worlds approach. The idea is to use relatively expensive, high efficiency solar cells, but keep them to a size small enough to fit your budget.

Insolight’s solar cells appears to be the multi-junction variety, though the company isn’t providing much detail on that score yet. They put its efficiency at 42%, which is up around...
the range of other multi-junction solar cells.

At that level you really are talking about NASA-level expense, so keeping the size of the solar cell as small as possible is critical.

To make up the difference, Insolight layers on a thin array of relatively inexpensive lenses, which harvest light from a larger area and focus it on the solar cell:

Insolight isn’t saying much about that optical layer either, but a good guess would be that it has something to do with Fresnel lenses.

According to Insolight, its version of the lens-plus-cell arrangement provides for twice as much electricity for the same surface area of the solar cell.

If this is starting to ring some bells among NASA fans, you may be thinking of a similar project that spun out of the agency’s Technology Partnerships program a few years back.

One Word: Plastic

The NASA spinoff appears to have spun out, but Insolight is confident that its version has the right combination of high tech and low cost.

For starters, the lens layer is made of plastic — that helps to cut costs, and its relatively light weight also helps with ease of installation.

Each solar cell is only a few square millimeters, which also helps to keep costs down.

Even more than the solar tech itself, Insolight is banking on a new “microtracking” system to make the key difference between its product and the competition:

The transparent plate, which is injection – molded, is equipped with an array of millimetric lenses, which act as a small network of magnifiers. It is moved several millimeters during the day by a metallic frame.

This slight movement, which takes place in real time as a sensor detects the sun’s position, maximizes the yield.

That sounds like a lot of hardware, but the tracking system fits into a slim frame, so it does not add significantly to the size of the solar panel.

That’s important because, with its thin silhouette, the tracker + solar panel combo can be installed about as easily as any conventional panel.

The team does anticipate that the commercial version of its solar panel will be pricier than average, but they expect that its high efficiency and ease of installation will provide a counterbalance.

The Renewable Hydrogen Angle

Aside from the rooftop solar market, it seems that the Insolight team may also be looking at the nascent solar-powered renewable hydrogen market.

The company’s three co-founders developed their prototype at the Laboratory of Applied Photonics Devices at EPFL (École Polytechnique Fédérale de Lausanne), where renewable hydrogen fan Christopher Moser made space for them.

Images (screenshots): via Insolight.
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