

First Solar: Quest for the \$1 Watt

July 23 2008

Photovoltaic cells, once so costly they could be used only to power million-dollar satellites, are today turning up even on humble parking meters. Now a brash Tempe, Ariz., company called First Solar plans to take the technology to the next level by making it cost-effective enough to compete with coal-fired generation.

Achieving grid parity--selling power to the nation's electric grid at a competitive price--has long been a holy grail of the photovoltaic industry and other suppliers of alternative energy. Yet despite the company's soaring price share and its multimillion-dollar order book, First Solar declines to speak to journalists.

In the August issue of *IEEE Spectrum*, British writer Richard Stevenson combines a journalist's knack for investigation with the expertise of a solid-state physicist to piece together how First Solar has cracked the problem. He concludes that the secret involves not the photovoltaic cell itself but the way in which it is manufactured. Instead of the familiar silicon, the design uses a compound of cadmium and tellurium.

Not long ago it was little more than a laboratory curiosity, largely because nobody had found a practical way to make the cells much larger than a postage stamp. First Solar has now refined the manufacturing procedure to blow up the cells to poster size.

Already the firm has been able to make a profit selling the panels to utilities in a number of countries--particularly Germany--that subsidize alternative energy sources for environmental reasons. Available figures

suggest that the manufacturing cost per watt delivered is still too high to compete with that of power delivered on the grid, but First Solar has told investors that it expects to be able to lower the cost substantially.

It seems likely that such improvements, together with the rising price of fossil fuels generally, will enable the company to reach grid parity within just a few years. Indeed, the technology is so promising that it puts into question whether there will be enough tellurium available to make all the solar panels the world is likely to demand. Stevenson's conclusion is that the answer is yes, because increased demand for the panels will stimulate the search for new supplies of the scarce element.

Meanwhile, other photovoltaic technologies continue to advance, not the least of which is silicon. If, as expected, the current shortage of silicon should abate in the coming years, then First Solar's clear lead on the industry may narrow. In any case, photovoltaic cells seem poised to advance from their current role in niche applications to become one of the more important sources of electricity in the world.

Source: IEEE

Citation: First Solar: Quest for the \$1 Watt (2008, July 23) retrieved 6 May 2024 from <https://phys.org/news/2008-07-solar-quest-watt.html>

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