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## Photovoltaics with full concentration

### New manufacturing concept lowers costs

The development of photovoltaics is far from over. The prices are dropping and their external appearance today ranges from textiles furnished with thin-film cells to large-scale free-standing plants based on silicon. Progress is also being made with the technology. The BINE-Projektinfo brochure "Energy from a thousand suns" (02/2014) presents modules made of multi-junction solar cells, which are combined with optical concentrator systems and track the sun. This concept focuses the sunlight by up to a thousand times and a solar cell has reached a record efficiency of 44.7% in the laboratory.

With multi-junction solar cells, layers of different semiconductor materials are stacked on top of one another. The current standard is the triple-junction cell that consists of three sub-cells. Each of them can convert a different spectral range of the incident sunlight into electricity. The entire cell reaches its high performance through the interaction of the sub-cells. Because it is complex and expensive to manufacture multi-junction solar cells, the cells are still combined with focussing optical systems. For this purpose, comparatively cheap mirror systems or Fresnel lenses are deployed. This results in highly efficient modules at competitive prices, which are particularly suitable for regions with a high proportion of direct solar irradiance.

The research project is being conducted by the Fraunhofer Institute for Solar Energy Systems (ISE) together with partners from industry. An industrial production plant for these cells has now commenced operation.

The BINE Projektinfo brochure, which can be obtained free of charge from the BINE Information Service at FIZ Karlsruhe, is available online at [www.bine.info](http://www.bine.info) or by calling +49 (0)228 92379-0. The brochure cover and an additional image can also be downloaded from the press section in this web portal.

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