

# TECHNICAL PAPER

## ENERGY CONVERSION TECHNOLOGY

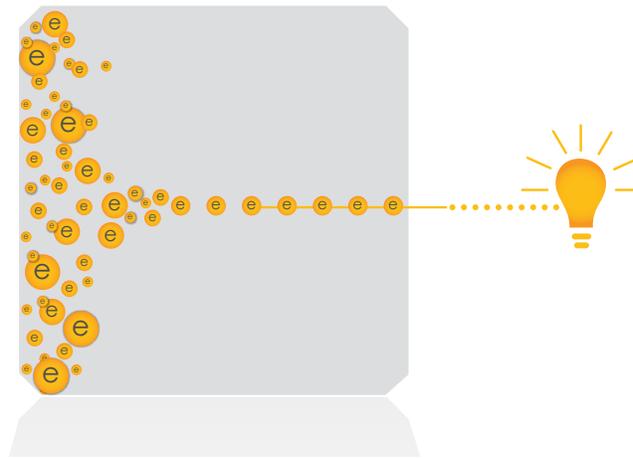
February 3, 2015



That's where our SolarWorld energy conversion technology outshines all of the competition.

We are tirelessly working to make sure no electron is left behind; that each one makes its way to the grid lines and, ultimately, the power lines. Electrons on other solar panels will recombine and sometimes even escape. **SolarWorld is using precise lasering and custom cell design to ensure we have the highest energy conversion possible.**

*We increase the amount of light we convert to energy and decrease the amount of electrons that recombine or escape*

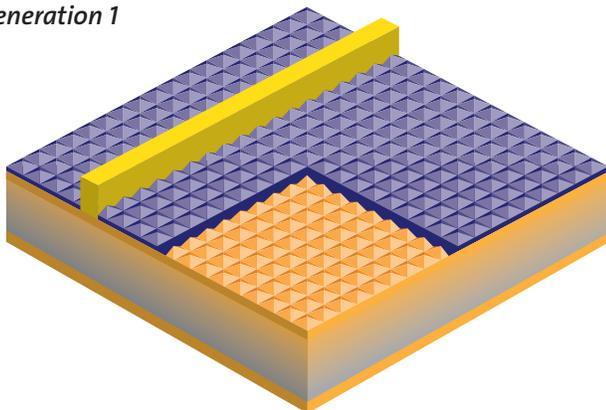


### *No Electron Left Behind*

#### Cell level

SolarWorld is continually improving our technology to increase the power of our modules and enhance their real-world energy performance. The SolarWorld energy conversion technology platform enables SolarWorld to advance our cell architecture by several generations. Our original architecture was a modest cell design that has been proven over time.

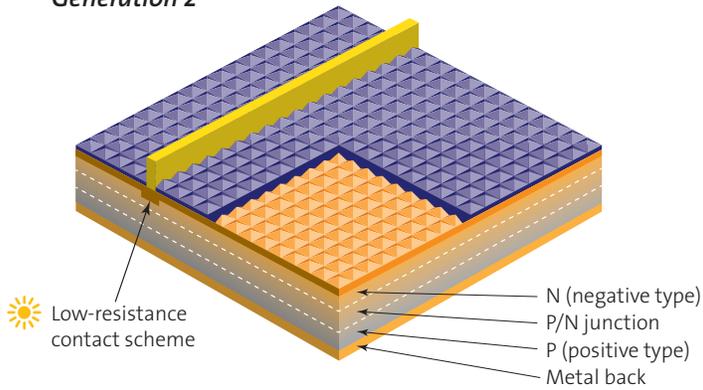
#### *Generation 1*



In our 2nd and 3rd generations of cell architecture, SolarWorld has added several key features to help ensure electrons are converted to usable electricity and do not recombine or escape.

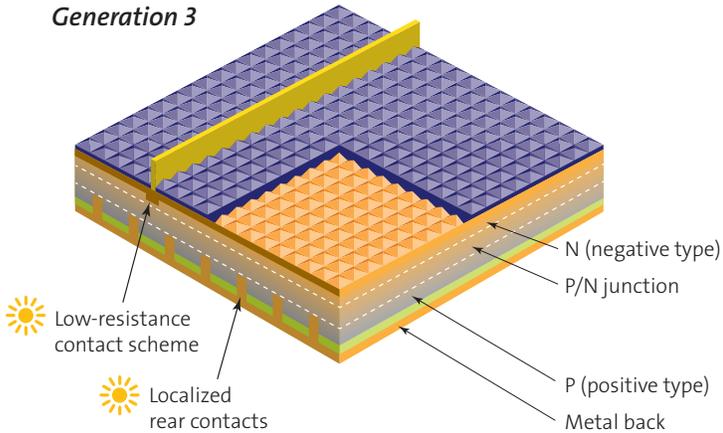
***Selective emitter*** – Sometimes, the coatings that work to optimize light capture, can cause electrons to recombine. Using precise lasers in just the right places, we can strategically reduce the coatings to capture electrons before they recombine and channel them to the printed grid lines and bus bars.

## Generation 2



**Localized rear contacts** – By precisely placing rear contacts on the back of the cells, we can further increase our energy conversion by preventing the recombination losses that typically occur at this surface.

## Generation 3



## Module Level

On the module level, it is critical to select the best possible materials. It can be a long journey for an electron to travel from the cell to the junction box and connectors. Only the best material will minimize losses along the way.

**Custom specifications** – Unlike most manufacturers, we don't accept off-the-shelf products from our suppliers. Instead, we work side by side with our vendors to ensure that the materials we receive are specifically created to reduce the loss of electrons and deliver the most power in real-world conditions. By deliberately engineering each component, the performance of the module will be greater than the sum of its parts.

- 1 Tempered glass
- 2 High UV-resistant ethylene-vinyl acetate (EVA)
- 3 Solar cell matrix
- 4 High weather-resistant backsheet

