

# UNI-SOLAR | Flexible Photovoltaics



Photos courtesy of Volkswagen/Suntimes AG, Ondulit Italiana spa, Army Hawaii Family Housing LLC, Rhein zinc GmbH & Co. KG, Solar Integrated Technologies, 3rd Rock Systems & Technologies and Alwitra

## Solar Energy – The sun really is green

Ever increasing carbon dioxide emissions and their impact on climate changes as well as rising energy costs and diminishing fossil resources necessitate a shift to more sustainable and ecologically sound energy resources.

Because photovoltaics convert sunlight directly into electrical power, this technology offers important advantages compared to other renewable energies, such as silent operation, no moving parts, zero emission, no storage of hazardous fuels, long lifetime, low maintenance, no operating costs and unattended operation.

Many governments promote the installation of photovoltaic systems by offering special feed-in tariffs and/or investment incentives.



## **UNI-SOLAR®** – Thin film technology at its best

*UNI-SOLAR* is the world leader in flexible solar modules. As part of the American technology leader in renewable energies, Energy Conversion Devices, Inc. (ECD) (Nasdaq: ENER), we can draw on extensive and fundamental know-how from materials and production technology to the final product. Together with ECD, we have been selling products for more than 20 years.



## Flexible



## Lightweight



## No Glass



## Durable



## Shadow Tolerant

Flexible *UNI-SOLAR* laminates offer freedom of design to architects as they can conform to curved surfaces and meet the increasing demand for aesthetically pleasing building integrated PV (BIPV).

Lightweight *UNI-SOLAR* laminates weigh less than 1lb/ft<sup>2</sup> and are well suited for buildings where weight and/or wind load are critical to the roof sub-structure.

Glass-free *UNI-SOLAR* laminates hold up to severe weather, including hail, and are resistant to vandalism.

Durable *UNI-SOLAR* laminates are encapsulated in UV stabilized, weather-resistant polymers and have proven themselves over many years and in extreme conditions such as deserts, satellites, ocean buoys and military applications.

Shadow tolerant *UNI-SOLAR* laminates deliver power even when partially shaded or soiled, due to by-pass diodes connected across each cell.



## *UNI-SOLAR*<sup>®</sup> Photovoltaic Laminates – The best solution for rooftop applications

*UNI-SOLAR* laminates are flexible photovoltaic modules for building integrated PV solutions. Flexible *UNI-SOLAR* laminates can be bonded to conventional metal roofing panels, single-ply membranes, modified bitumen roofing materials and others. The resulting modules are exceptionally durable. *UNI-SOLAR* laminates come with a 25 year/80% warranty on power output of the minimum rated power (at Standard Test Conditions).



### Low Light Performance

UNI-SOLAR laminates perform well in low and diffuse light conditions due to their unique triple-junction solar cells, which absorb the blue, green and red light of the sun in different layers of the cell.



### High Temp Performance

UNI-SOLAR laminates perform well at high temperatures. Under real outdoor conditions, module temperature can be up to 80°C. UNI-SOLAR maintains excellent performance at these temperatures, while traditional crystalline modules decline.



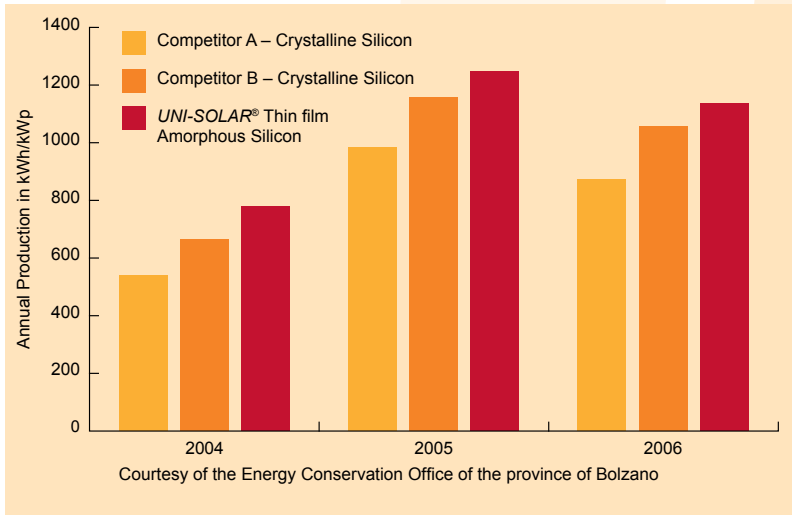
### More kWh

UNI-SOLAR laminates can produce up to 20% more kWh of energy per installed watt than conventional crystalline modules.



Photo Courtesy of Unimetal

Annual Energy Yield of different Technologies, Bolzano, Italy



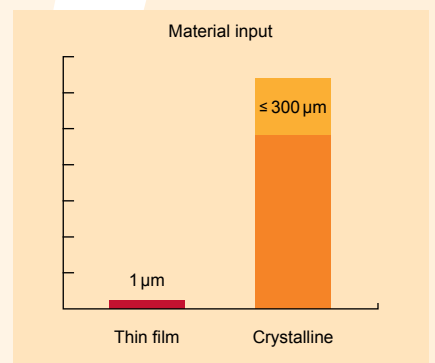
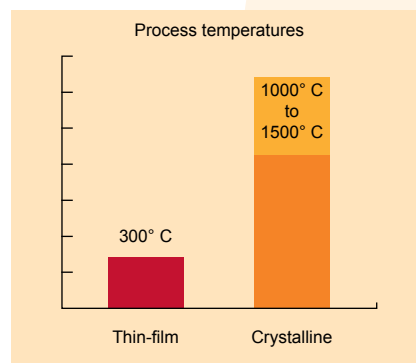
## Our Innovative Technology – Good for you and the environment

UNI-SOLAR® photovoltaic cells are made in a roll-to-roll vacuum deposition process on a continuous roll of stainless steel, exceptionally suitable for high volume production. Cells are made from amorphous silicon and are cadmium free.

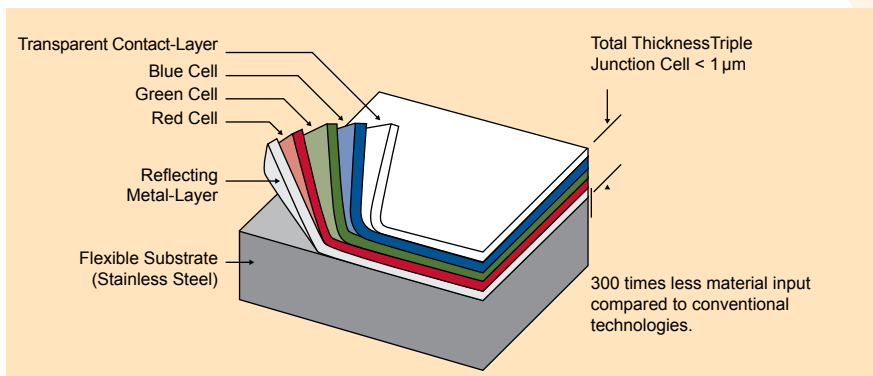
Because amorphous silicon cells can be up to 300 times thinner than crystalline solar cells, less material is required. The vacuum deposition process uses lower process temperatures leading to lower energy consumption during production. Therefore, compare to conventional crystalline PV products UNI-SOLAR solar cells offer a better energy balance, providing a higher contribution to the protection of the environment.



UNI-SOLAR: Efficient and ecological production due to lower material and energy input



### Cross-Section of the UNI-SOLAR® Triple-Junction-Technology



Each UNI-SOLAR photovoltaic cell utilizes unique triple-junction technology. Blue, green and red lights of the solar spectrum are absorbed in different layers of the cell, yielding unprecedented performance. This light spectrum splitting capability is the key to higher efficiency, especially at lower insolation levels and in diffused light.

## Get In Touch – Start generating your own pollution-free energy now

Your United Solar Ovonic team at your disposal

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