

# **WHAT WILL THE FUTURE BRING? LOTS OF SOLAR ENERGY!**





## **PERFORMANCE, DURABILITY, COST-EFFECTIVENESS: IT'S ALL A QUESTION OF QUALITY ...**

Anyone who chooses a photovoltaic system has to look far ahead – ultimately this system has to produce as much clean and cost-effective electricity as possible, for 25 years and more. Only if you install a high-quality system will you really achieve the high performance you expect over this prolonged period. In order to help you make the right decisions, we will show you why WINAICO PV modules are better – and the real benefits they produce for your roof, day after day and year after year. WINAICO has a solution for any situation and any scope of project – just ask a WINAICO technician you trust for help.





# What defines a quality module manufacturer? Everything ...

WINAICO has one goal: make sure every single PV system provides maximum performance on your roof for decades, and make it a worthwhile investment for you. We are dedicated to achieving this goal in every single detail and every single module – with plenty of passion and uncompromising consistency.



## Perfection due to documented quality management system

We implemented a seamless quality management system to document the complete production flow.

From incoming material inspection through to packaging the final products, all visual, micro-optic, mechanical and final inspections of each individual module are recorded for quality control and future references.



## 100% error-free thanks to EL testing

All modules are examined with electroluminescence equipment (EL) to check for irregularities in solar cells. This means micro-cracks, hot spots, uneven soldering and other defects that cannot be seen with the naked eye can be screened out before the modules leave the factory. EL is similar to an X-ray examination that is used to confirm the health of every single module we produce.



## Active prevention of hot spots in the field

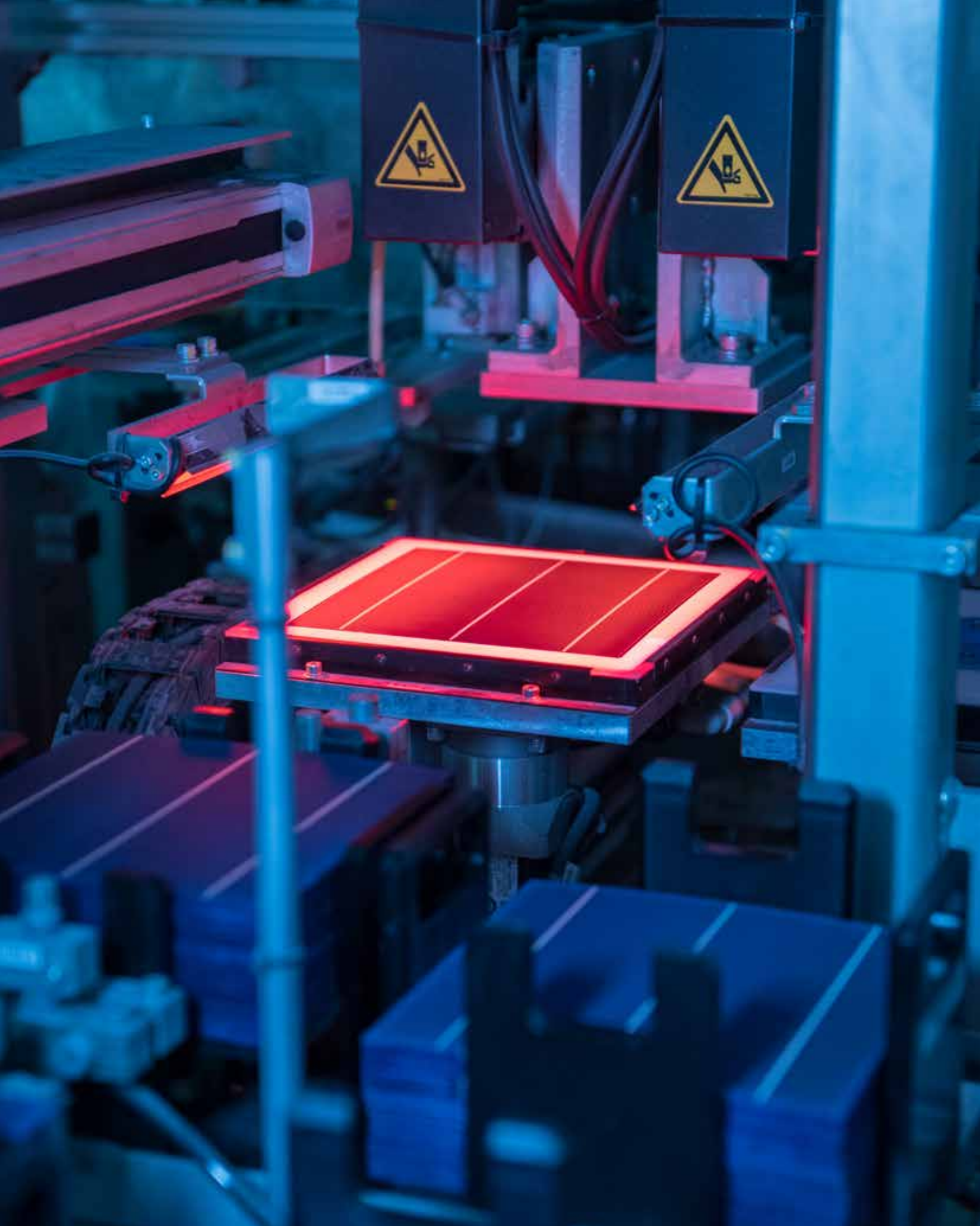
Hot spot defect ranks as the number one fear of all PV system owners – the appearance of hot spots overheat the defective section of the module, and may become a fire hazard if left unchecked. WINAICO inspects all solar cells for the risk of hot spots before assembly. As a result, any damaged solar cell will be isolated from the module production, preventing hot spots in any WINAICO installation.



## Direct sales from the factory for better quality assurance

All WINAICO photovoltaic modules are shipped directly from our own warehouses to local specialist partners. This ensures our specialist partners receive the latest technology and information straight from the source, to bring the best quality solar solution to system owners.





WINAICO places great importance on automated production processes. Every solar cell is screened for defects before being soldered with a high-precision process into strings.

# What makes quality modules outstanding?

## Component selection ...

With WINAICO, you purchase products from a manufacturer who specialises in premium quality solar modules. Combining expertise from the technical and precise semiconductor industry, with

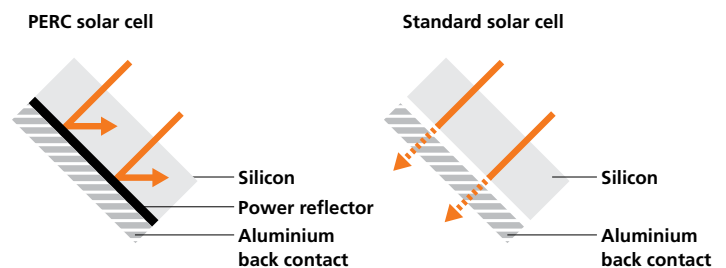
indepth knowledge of components' physical and chemical properties, WINAICO is able to evaluate and select the best component combinations to build the top quality modules on the market.

### The cells: the module's generator.

The solar cell quality is crucial for the module's performance. For the industry's most efficient modules, WINAICO only selects the highest efficiency PERC solar cells from Taiwan. An anti-reflective coating and PID-free technologies increase the cell efficiency and ensure long-term reliability. WINAICO selects cells with minimal variance before production to prevent hot spots and achieve high energy yield even in poor light conditions.

### PERC technology.

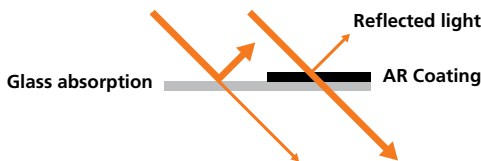
PERC stands for Passivated Emitter and Rear Cell technology, and it adds a power reflector layer to reflect unabsorbed light back onto the solar cells. It pushes the boundary of solar cell efficiencies by improving the cell's thermal and low light behaviour.





### Glass: the transmitter of light.

WINAICO uses highly transmissive front glass to allow maximum light to reach the solar cells. An additional anti-reflective coating (ARC) on the glass reduces the amount of reflected light and improves light absorption of the solar cells by 2.5%. The glass protects the components inside from the weather elements and contributes to the module's superior efficiency and mechanical stability.



### The EVA film: the reliable adhesive.

EVA films connect solar cells to the glass surface and encapsulate the module. If they are of poor quality, they may become loose and turn yellow. The highly transparent EVA used by WINAICO allows the full spectrum of light to reach the solar cells, increasing the module power output up to 3%.

### The backsheet: the protective coat.

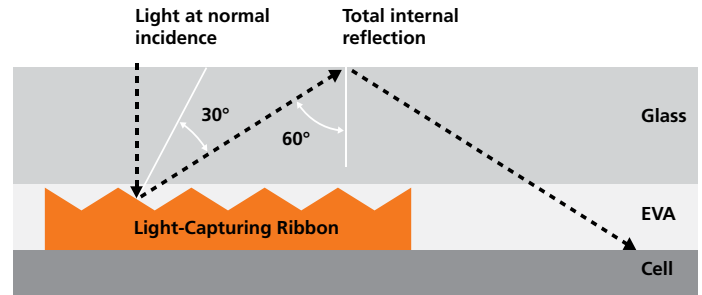
Backsheets protect the components from moisture and other external influences from the backside. The backsheet used by WINAICO is particularly weather-resistant and flame retardant, to protect modules from weather elements and reduce the risk of fire.

### The junction box: connectivity to the world.

The junction box enables the solar module to be connected to the external electrical system. WINAICO's choice of junction box has low electrical contact resistance to ensure efficient energy transfer. The IP67 rated enclosure and connectors can withstand immersion under water for 30 minutes at a depth of one metre, suitable in regions with long rainy seasons. Genuine MC4 connectors are available for regions where MC4-compatible connectors are prohibited.

### Ribbons: the clever transport network.

WINAICO chooses highly reflective ribbons, so the rays of light falling on the strips are reabsorbed by the solar cells after total internal reflection. The result is a light absorption increase of 2.5% – and leads to enhanced module efficiency.



### The frame: the reinforced structure.

The frame protects the module laminate from mechanical stresses. WINAICO's unique WSP frame comes with rounded corner L-key design, and is made from solid aluminium to ensure maximum stability of the module. WINAICO works with leading research institutes to test the mechanical resilience of frame designs and continuously improve them. The latest generation of frame design is capable of bearing more than 1,300 kg of snow deposits, suitable for regions with long winters. As a result, WSP frames carry industry-leading 15-year product warranty.







# What defines high performance? Going beyond expectations!

Lasting high performance is created when high performance solar cells and the best module technology come together. The sum of all parts

is a module that is weather-resistant, good performance even in low light, and low power degradation throughout its expected lifetime.



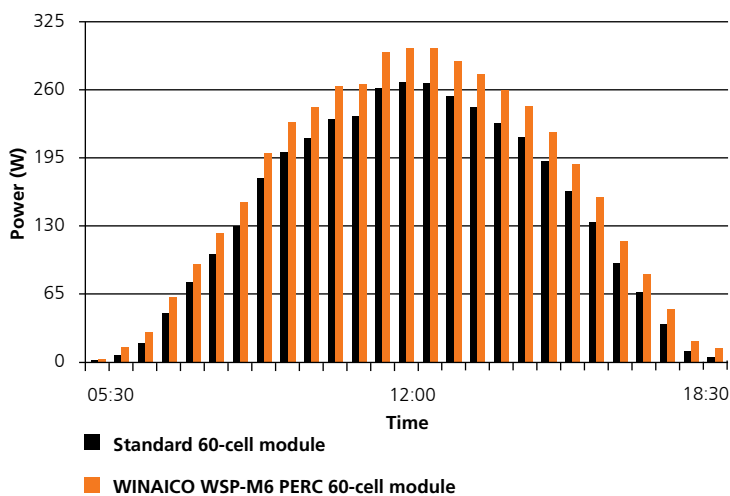
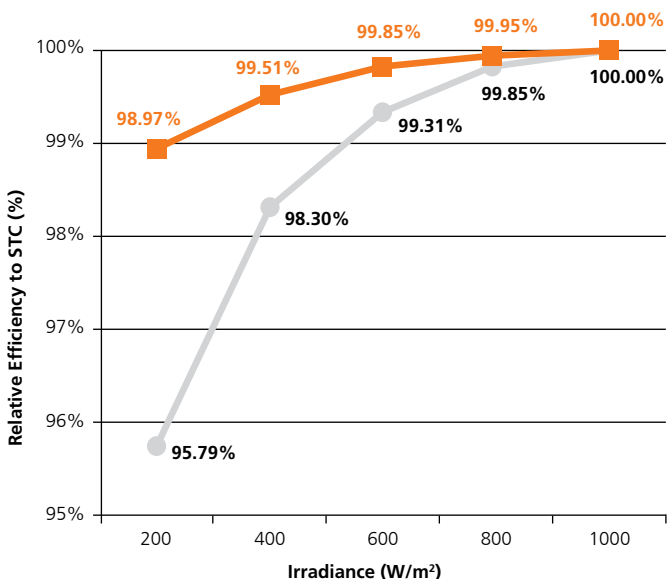
## Strong performance even at low light

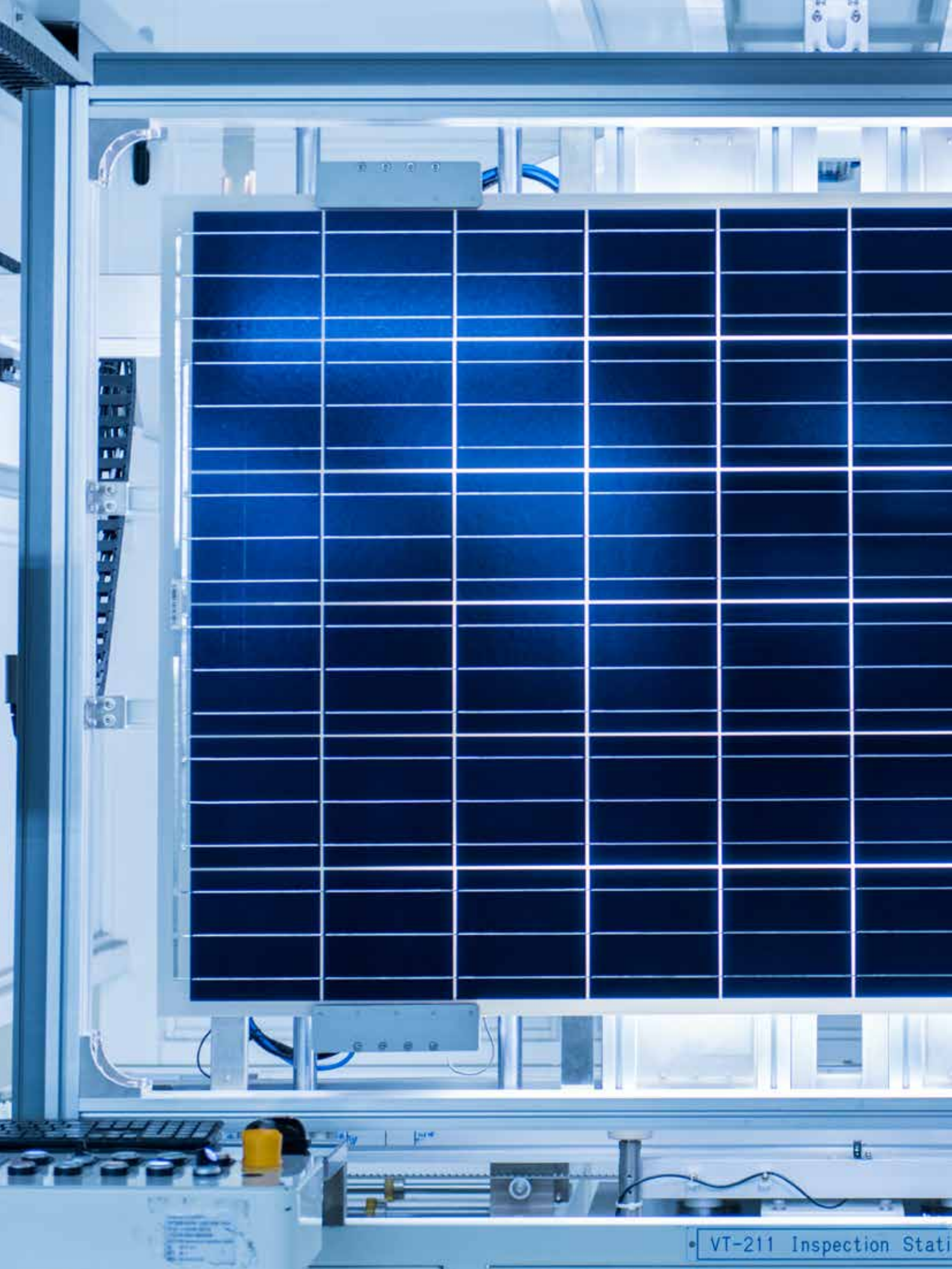
Most photovoltaic systems work best under blue skies with brilliant sunshine – but weather does not always meet our expectations. Around two thirds of the annual solar irradiance is considered to be in the low light range – with irradiance level well below 1,000 W/m<sup>2</sup>. WINAICO's PERC modules have been tested to retain relative efficiency at 99% even in low light. In practice, this means WINAICO systems starts producing electricity earlier in the morning and stops later in the evening. This results in a higher level of power output overall and an increase in energy yield of 3%.



## Low degradation

Components go through wear and tear which result in degradation in module power over time. As a testament to WINAICO's component selection expertise, WINAICO modules are characterised by very low rate of degradation, which means their performance degrade very gradually over the years – ensuring a long-term, stable yield from the system.





• VT-211 Inspection Station

# WHAT DEFINES RELIABILITY IN THE REAL WORLD? SURVIVING THE ELEMENTS!

Rain, hail and snow. Typhoons, storms and hurricanes. Salt spray from the sea and ammonia emissions from livestock. Blistering heat and bitter cold. Photovoltaic modules have to withstand a great deal in the field, and still be expected to deliver top, reliable performance. The major problem, is not so much the visible damage that can be spotted and repaired easily, but the small, almost invisible defects that impact long term performance gradually.

With carefully designed experiments that simulate the environmental impacts, WINAICO can evaluate module components in ways that is similar to the real world. As a result, WINAICO combines the best available components to ensure modules perform beyond expectation throughout their lifetime.





# What defines market-leading quality?

## Exceeding the standards!!

Regulations and standards are designed to help consumers recognise the minimum quality expected of products. However, WINAICO quality is more than meeting the minimum requirements, and we push our modules to the limits by defining a more stringent set of test parameters. The added quality can be seen on your rooftop when our

modules withstand wind, heat, rain and other adverse conditions far better than the competition. The confidence shown in WINAICO modules is reflected in the industry-leading 15-year product warranty, and a 25-year linear performance guarantee.

<b>Thermal Cycling (TC)</b> Cycles between $-40^{\circ}\text{C}$ and $+85^{\circ}\text{C}$	IEC standard	TC 200
	WINAICO	3 times the IEC standard
<b>Damp Heat (DH)</b> Constant $+85^{\circ}\text{C}$ and 85% relative humidity	IEC standard	DH 1000
	WINAICO	3 times the IEC standard
<b>Mechanical Load (ML)</b>	IEC standard	5400 Pa
	WINAICO	10000 Pa
<b>Hail Impact</b>	IEC standard	25 mm ice ball at 83 km/h
	WINAICO	35 mm ice ball at 98 km/h 4 times the kinetic energy of IEC
<b>Dynamic Mechanical Load (DML)</b>	IEC standard	No IEC Standard
	WINAICO	5000 Pa for 200 cycles
<b>Potential Induced Degradation (PID)</b>	IEC standard	No IEC Standard
	WINAICO	$-1000\text{ V}$ bias, $85^{\circ}\text{C}$ , 85% relative humidity, 288 hours

# WHERE CAN YOU SEE TRUE QUALITY? ON YOUR ROOFS!

Photovoltaic professionals know the quality and performance of photovoltaic modules are not simply written on datasheets, but installed on actual roofs. Quality modules are designed to provide a rich and reliable harvest of energy, day after day and year after year. The reference projects are the unbiased evidences that WINAICO modules are vastly superior to other well-known brands.

A good reason why experienced installers recommend WINAICO is because great performance lasts!







# CHECKLIST: HOW TO CHOOSE THE BEST PHOTOVOLTAIC SYSTEM!

The price of a PV system is certainly important but it should not be the only consideration. With a useful lifetime of at least 25 years, the quality of the components and the installation work are also very important factors.

When deciding your purchase you should pay attention to the following points:

- + Ask to see **guarantees** and **certificates**.
- + Pay attention to the quality of workmanship and ask to see **samples**.
- + Ask about **reference systems** that exist in your vicinity.
- + Ask to see the **yield data of existing systems**.
- + Do not buy a system based on a description or a photo.
- + Ask for a **revenue projection of the PV system** to be drawn up and explained to you.
- + Find out more about the components' **origins**.
- + Does the manufacturer have a local warehouse for **responsive product dispatch**?
- + Can you get hold of the manufacturer **in case of a complaint**?
- + Find out more about people's **experiences with solar systems installed by the company**.

**WINAICO supports you in your search for a photovoltaic system from the start.  
Get in touch with us today.**

Your local partner



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