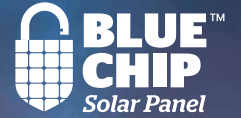




BUILT TOUGH.
THE KNOWN SOLAR BRAND
AUSTRALIA TRUSTS.



25
YEAR PRODUCT
WARRANTY



**SHINGLED
MODULE**

84.8% GUARANTEED ELECTRICITY
PRODUCTION AT YEAR 25





 **HYUNDAI**
ENERGY SOLUTIONS

What is the value of a Brand?

Hyundai is one of the biggest consumer brand names in the world.

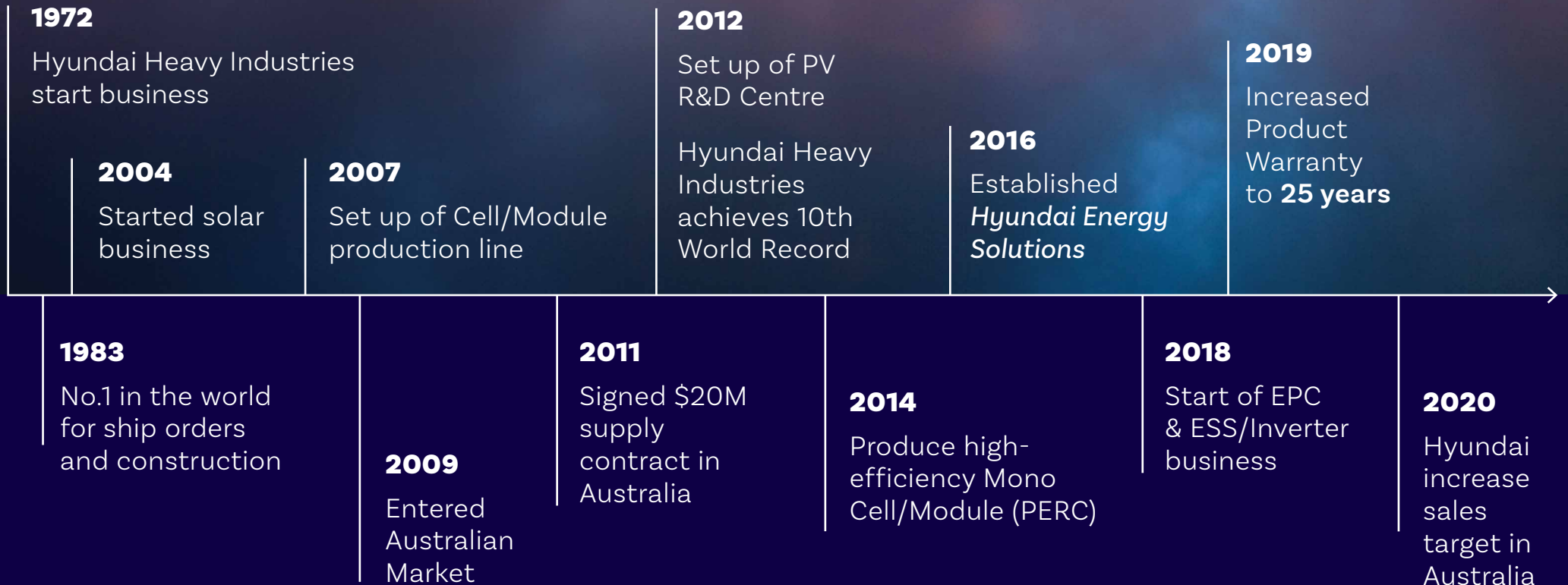
As a long established international brand, Hyundai Energy Solutions solar panels have been installed within Australia for over 10 years. In 2019 we increased our product warranty to 25 years.

By purchasing panels from a trusted and well known consumer brand, you're making a safer investment for the long term.

No. **94** **Forbes**
2019 WORLD'S MOST
VALUABLE BRANDS



Our History



Introducing the next generation

350W SHINGLED MODULE



Outstanding performance under the hot Australian sun!



Enjoy the peace of mind of long-term performance and reliability from Hyundai's superior technology

- 1 Low temperature coefficient and reduced risk of hot spots
- 2 Electrically Conductive Adhesive for higher reliability
- 3 Improved shade resilience
- 4 Better space utilisation delivers higher efficiency
- 5 Improved mechanical load resilience



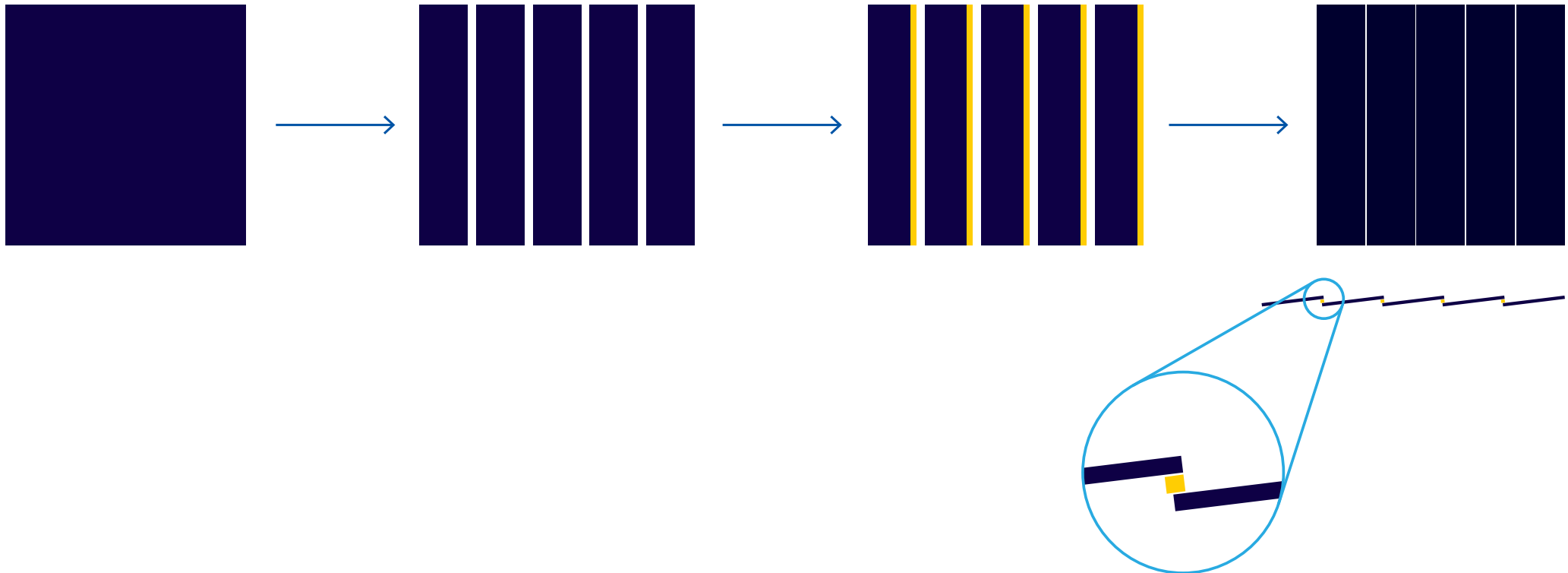
What is Shingled Cell Technology?

Start with a high performance Mono PERC cell

Laser cut the cell into five strips

Apply Electrically Conductive Adhesive to each strip

Overlap the cells in a shingled arrangement in the module



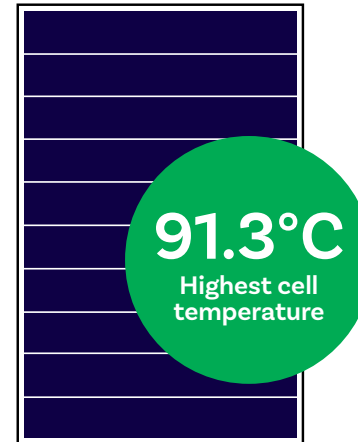
① Lower Hot Spot Risk

Hyundai shingled cells carry just 1/5 the electrical current of the original full cell, meaning that every circuit **operates at a lower current** and hence a **lower temperature**.

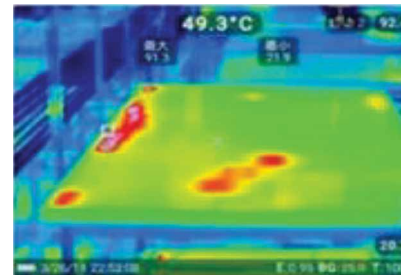
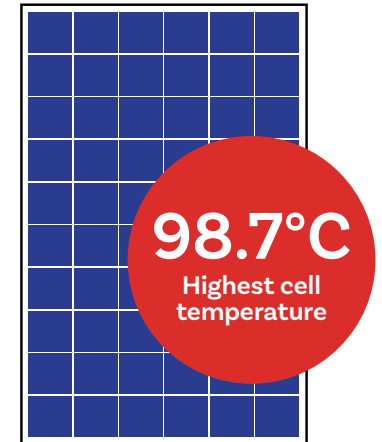
There are two **critical outcomes** of this lower temperature operation,

- a) **outstanding performance in high temperatures**, and
- b) **reduces the risk of hot spots**.

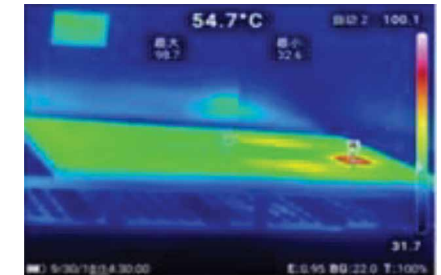
Shingled Module



Standard Module



IR Image



Lower current per cell means **lower hot spot risk...**

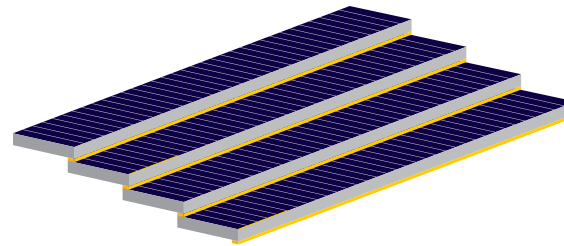
and a **low temperature coefficient** of power of $-0.34\% / ^\circ\text{C}$

② ECA for higher reliability

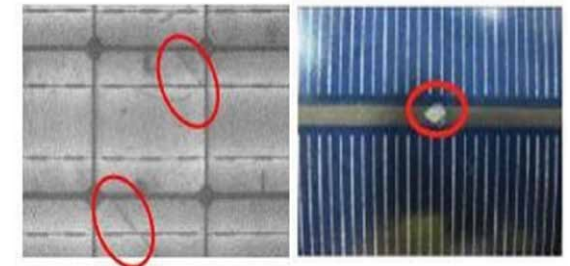
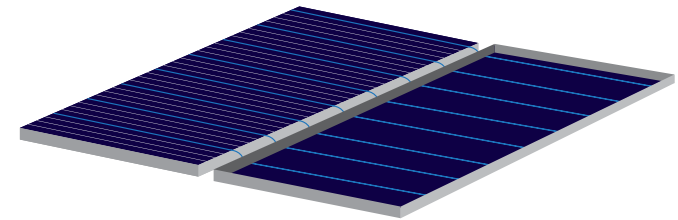
Shingled modules use **Electrically Conductive Adhesive** instead of solder ribbon to electrically connect the cells. This **reduces stress on the cells** during manufacturing.

As panels **get hot in the day and cold at night**, traditional solder ribbon expands and contracts but the silicon cells don't causing more stress.

Hyundai Conductive Adhesive Method



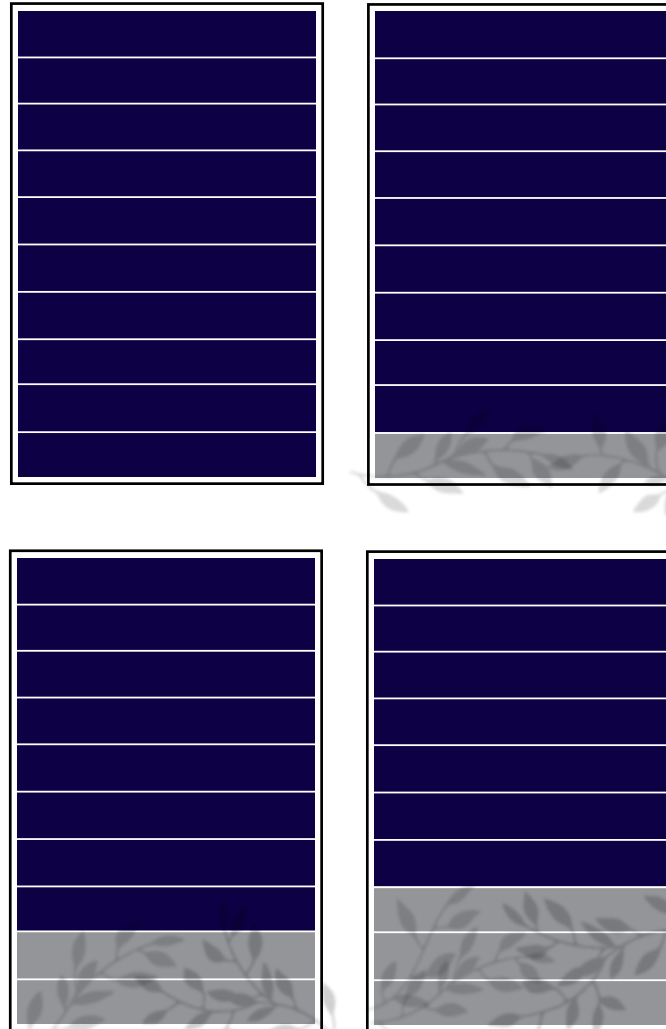
Conventional Welding Method



3 Better Shade Resilience

Hyundai shingled solar modules are made in parallel with a brickwork layout circuits design.

The optimal layout results in lower impacts from shade as compared to common full cell modules.



Parallel
circuits...

means **lower
loss of power**
in rising shade

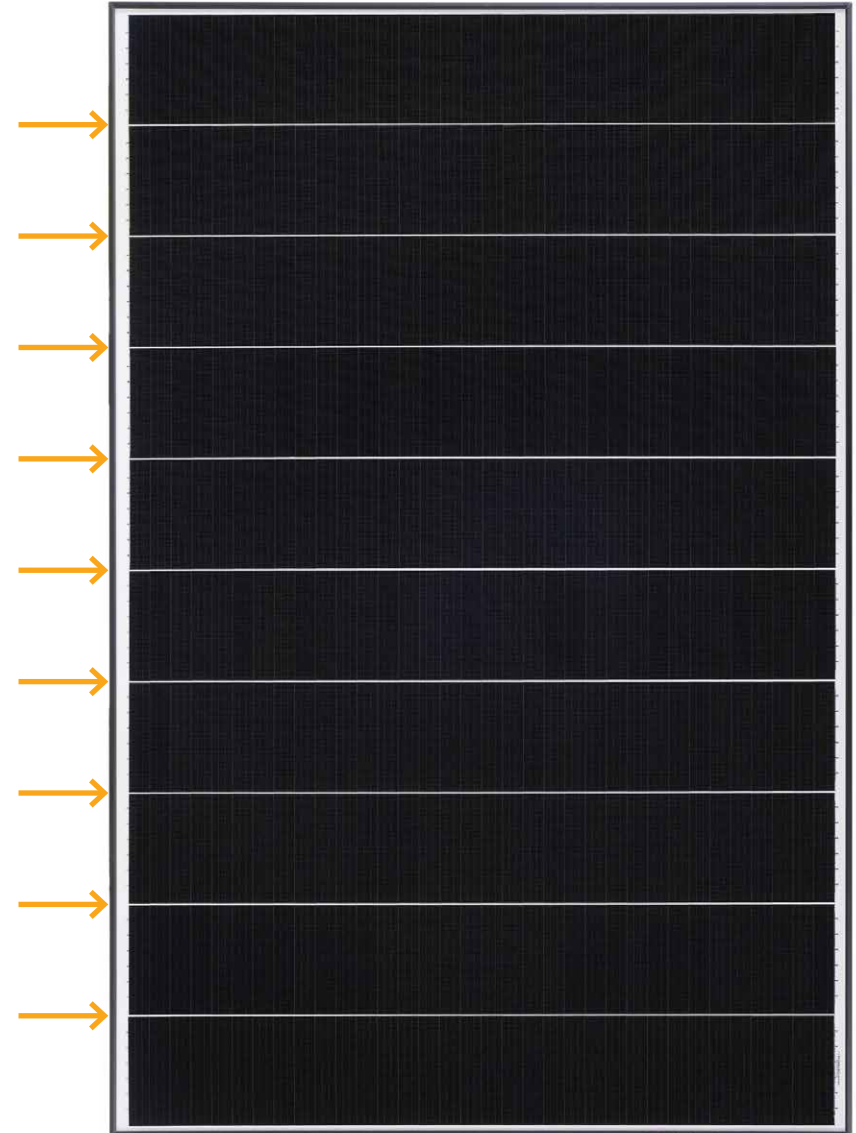
④ Better space utilisation

Nearly 100% of the module is covered with solar cells to deliver higher power and outstanding **20.2% efficiency**.

Higher efficiency means that **less total solar panel area** is required to deliver a given power output, **leading to savings** on balance of systems components and labour.

Less space
between the
cells...

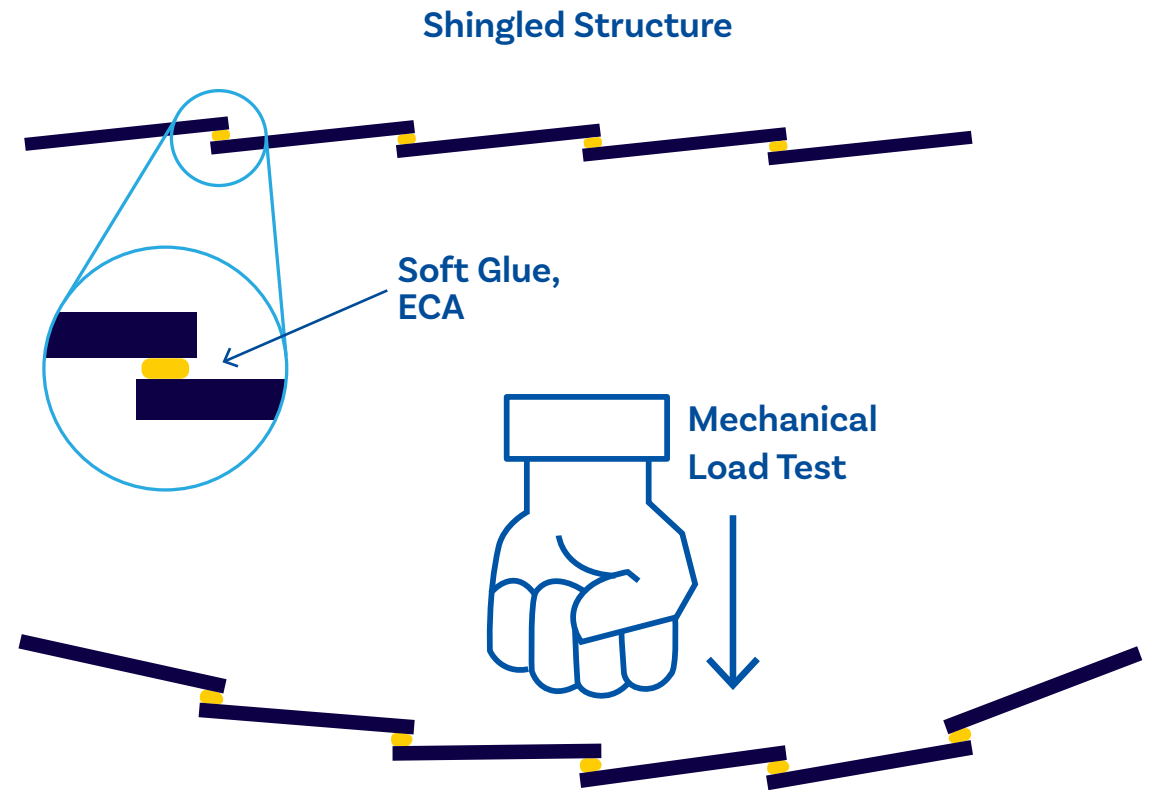
means
**more power
per panel**



5 Improved Load Resilience

Hyundai shingled module cell joints have **superior flexibility** compared to standard solder ribbon with the Electrically Conductive Adhesive absorbing bending energy.

During periods of high wind or under mechanical loads such as snow, Hyundai modules are **less likely to develop cell cracks** that hamper long term reliability.



Less cell cracking under pressure...

means **better long term reliability**



There has been no noticeable drop in electricity production in 8 years!

K. BENN - 2019
60KW Ground Mount
St George, QLD Australia

Why choose Hyundai shingled solar panels?



PERC SHINGLED TECHNOLOGY

PERC Shingled Technology provides ultra-high efficiency with better performance in low irradiation. Maximises installation capacity in limited space.



ANTI-LID / PID

Both LID (Light Induced Degradation) and PID (Potential Induced Degradation) are strictly eliminated to ensure higher actual yield during lifetime.



MECHANICAL STRENGTH

Tempered glass and reinforced frame design withstand rigorous weather conditions such as heavy snow and strong wind.



25 YEAR PRODUCT WARRANTY

Hyundai Energy Solutions have a market leading product warranty for all our solar panels.



CORROSION RESISTANT

Various tests under harsh environmental conditions such as ammonia and salt-mist passed.



UL / VDE TEST LABS

Hyundai's Research and Development Centre is an accredited test laboratory of both UL and VDE global safety certifications.



SUPERIOR TEMPERATURE COEFFICIENT

Lower internal cell current results in superior performance in hot climates.

A safer, more efficient
solar system built for
Australia

**You deserve Hyundai
Energy Solutions**

Rural Solar Pumping Site, Australia



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