

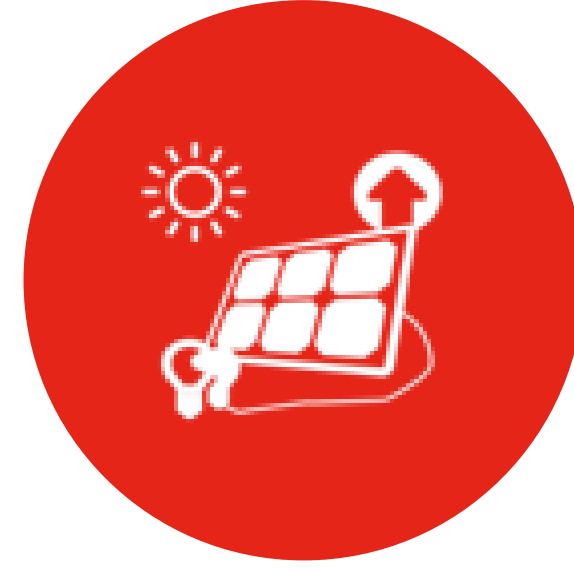
Meeting Rooftop System Performance Needs with Superior Solar Module Aesthetics

2020 July

SERAPHIM® / A Global Leading Solar Module Manufacturer



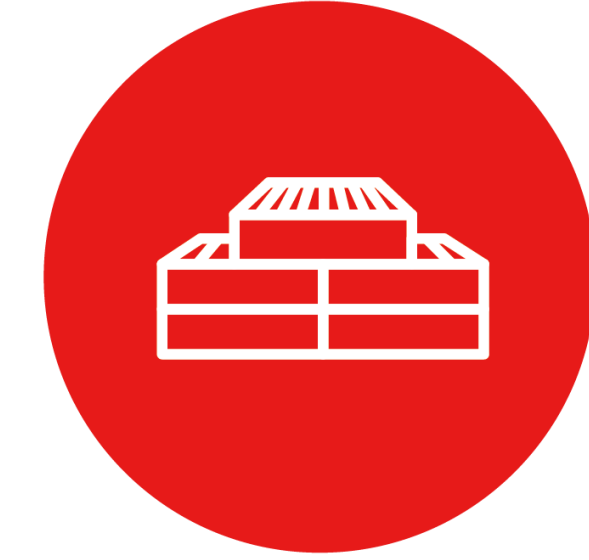
**Tier 1 Solar Module
Maker Listed by BNEF**



**Top Performer
Listed by PVEL**



**5GW
Global Capacity**



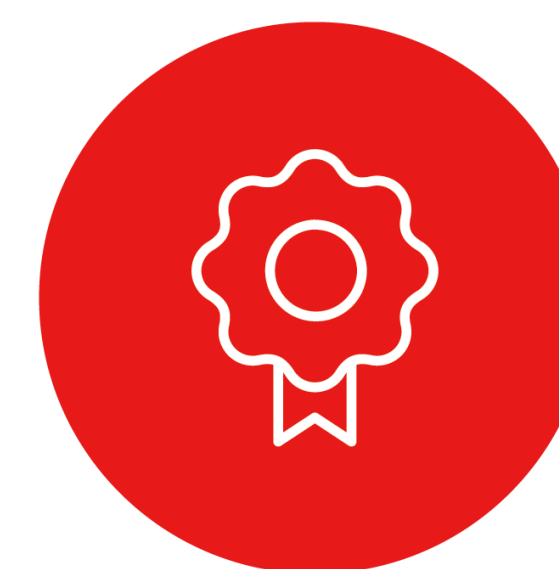
**40+ Destination
Countries
8 GW + Shipment**



**1500+
Global Employees**



**100+ R&D
Technicians**



**100+
Technical Patents**



**50+ Global
Financial Partners**

Global Sales and Manufacturing Network



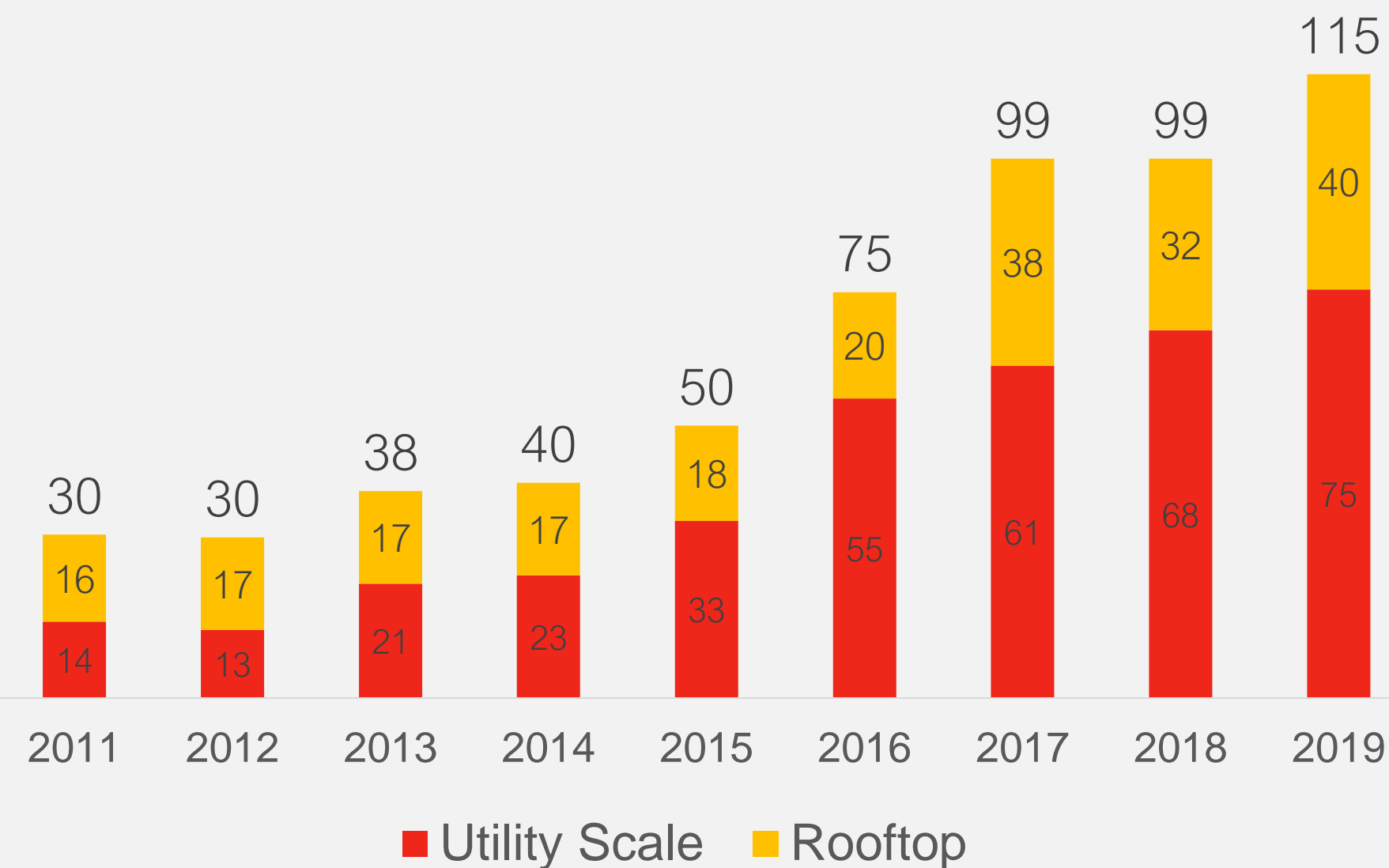
01

Growing Rooftop Market

More than 1/3 of the newly built PV systems were installed on the rooftops in the past 10 years.

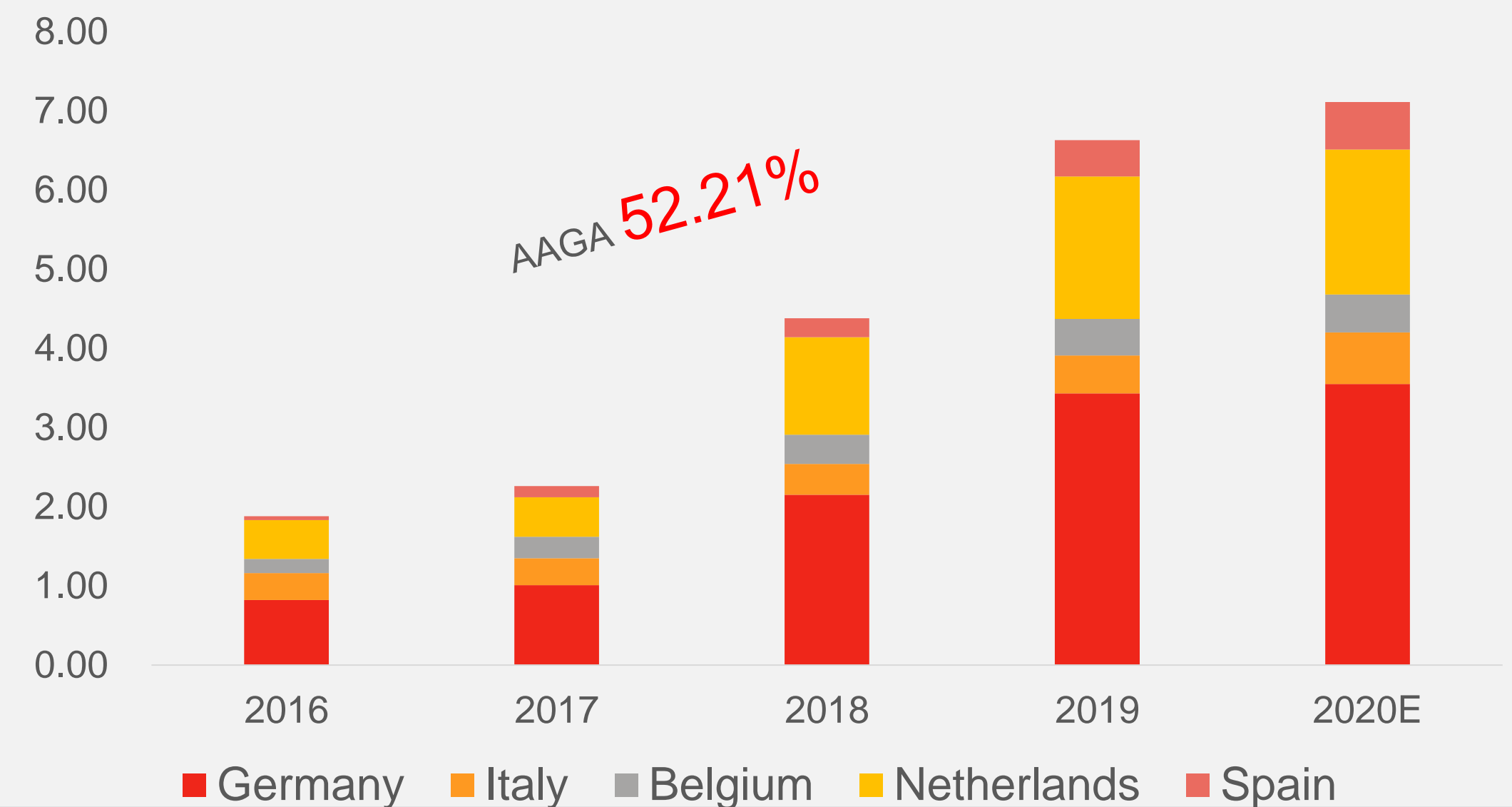
Construction requirement policies are driving the rooftop segment in advanced markets like Europe, U.S., etc.

Global PV Installation 2011-2019 (GW)



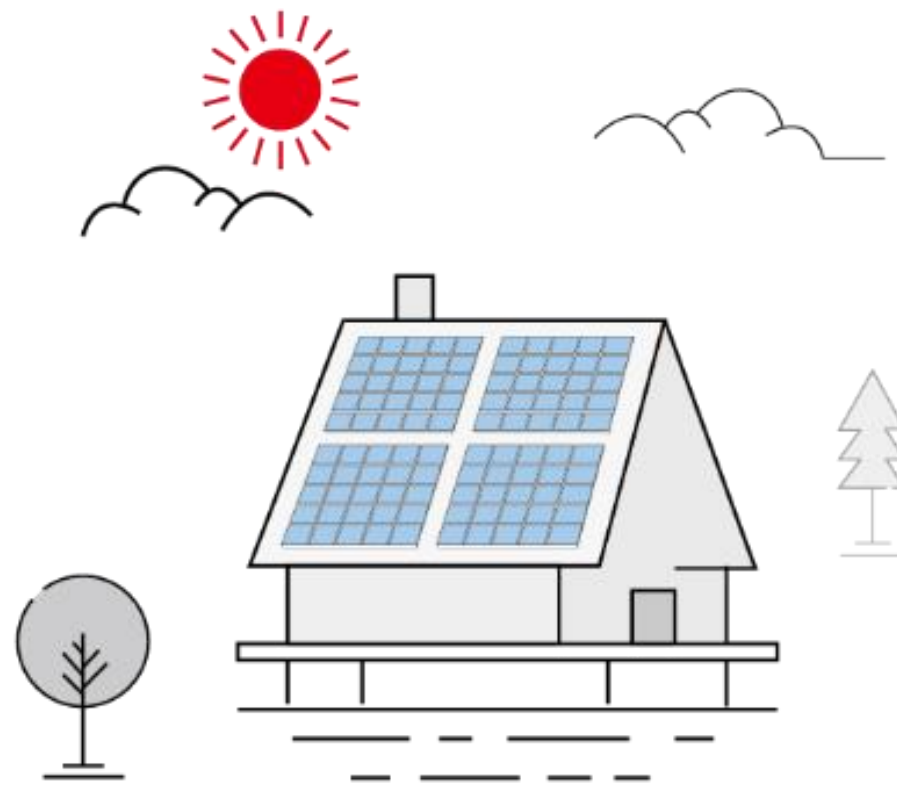
Source: IEA PVPS

Rooftop PV Installations and Forecast of European Key Market (GW)



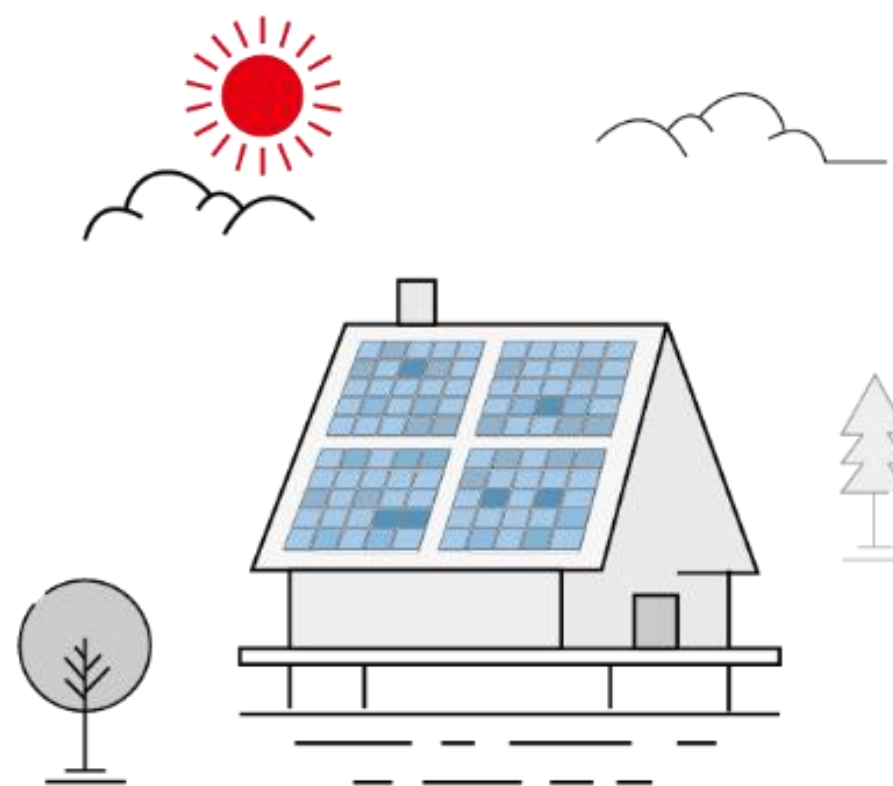
Source: BNEF, SPE

Can it Be Better on Traditional Rooftop Systems?



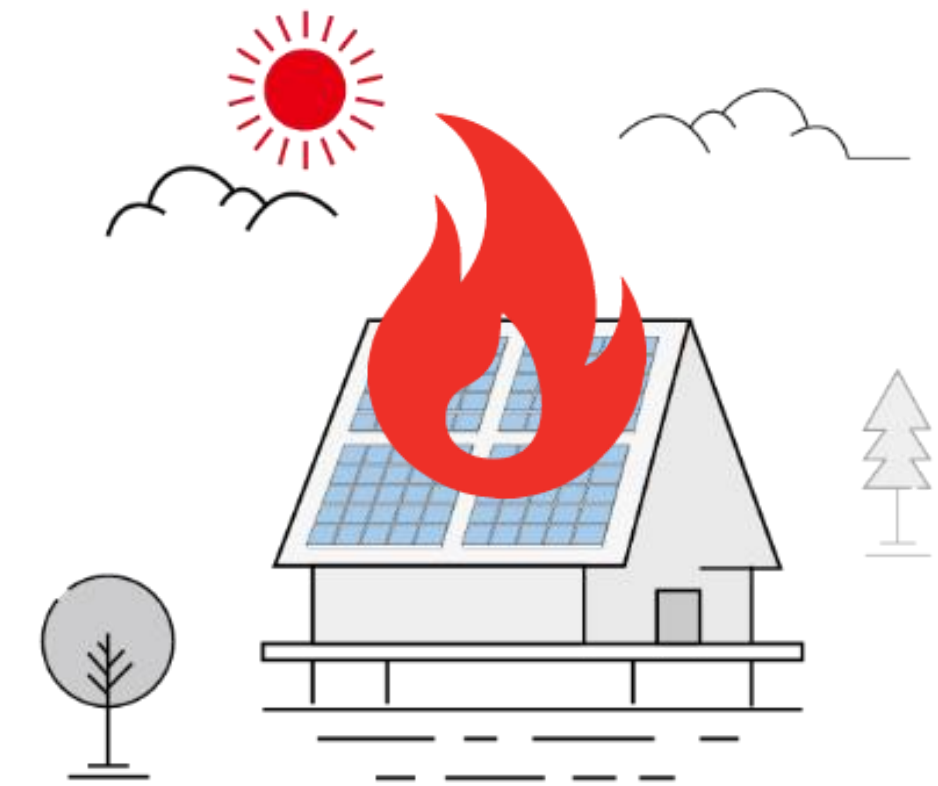
Style Mismatch

The obtrusive color clashing installed on residential roofs caused by regular module in silver frame and blue cells.



Color Deviations

In one single PV system, even within the same piece of solar panel, color deviation can be very obvious.



Safety Reliability

Compare with earlier stage of the Roof-top market, much higher Safety Regulation introduced by every country.

**Real Black
or
Dark Blue?**

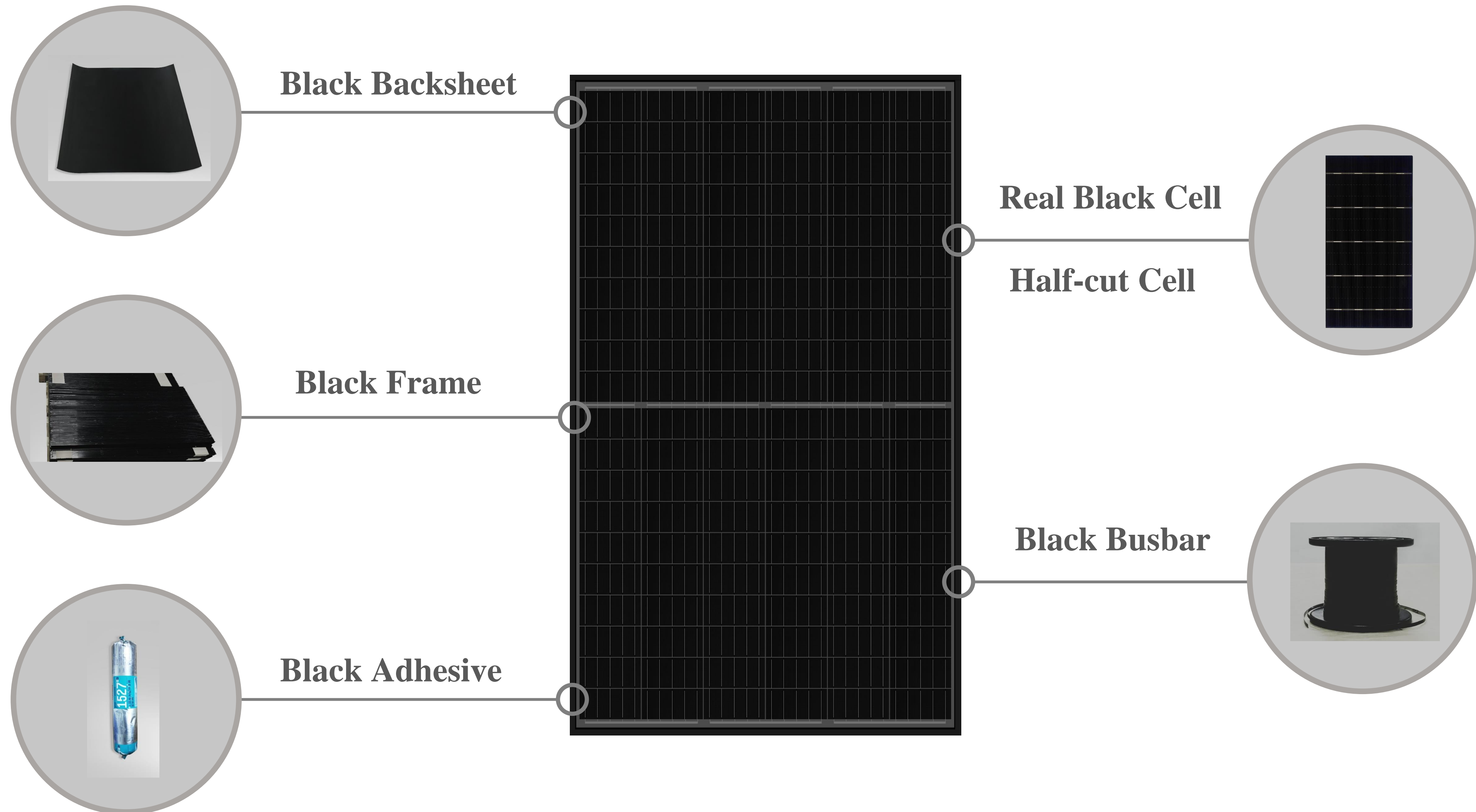
Color difference is a common problem in the solar industry, is there a possible solution to that?

**As Reliable
as
Traditional
Module?**

Compared with white backsheet, black backsheet is born with disadvantages on heat radiation in hot weather, and this has raised a question mark in customers' mind.

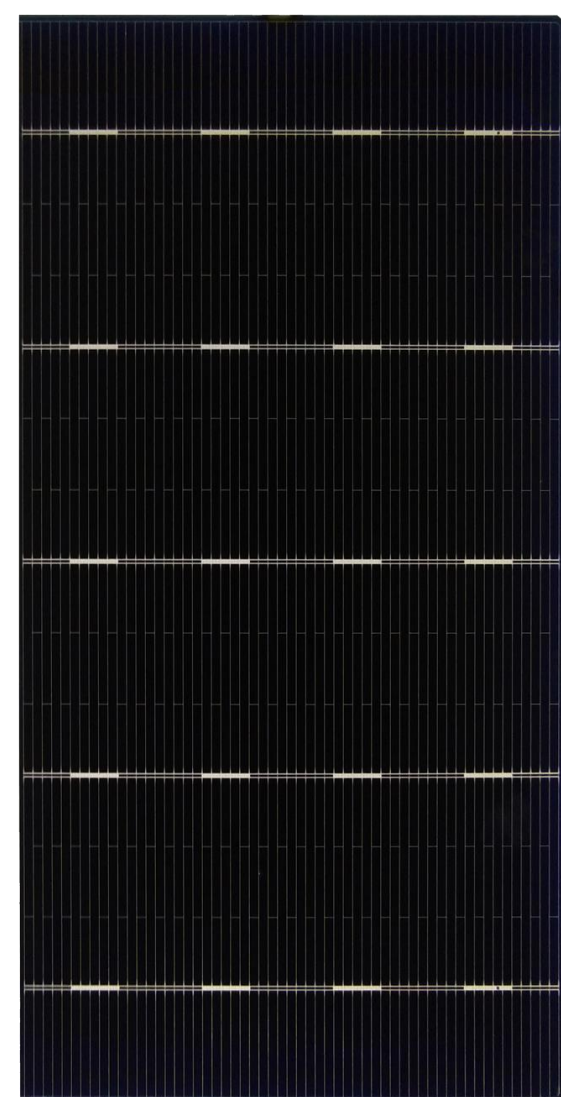
02

Seraphim Full-black Module

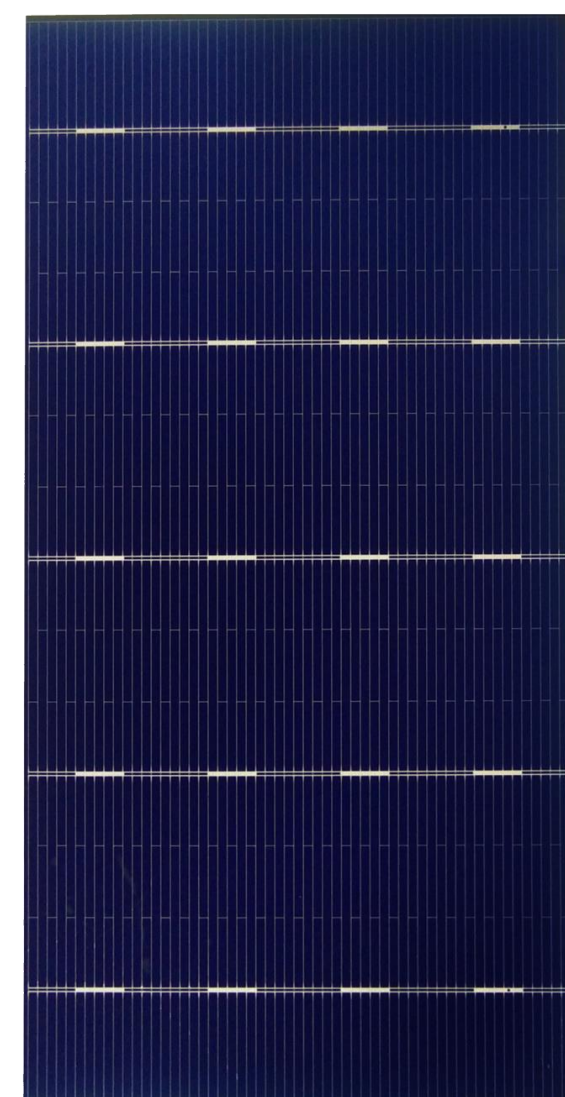


Seraphim in-house black cell production lines adjust the silicon nitride film specification by adding the nitrous oxide, to secure the color uniformity

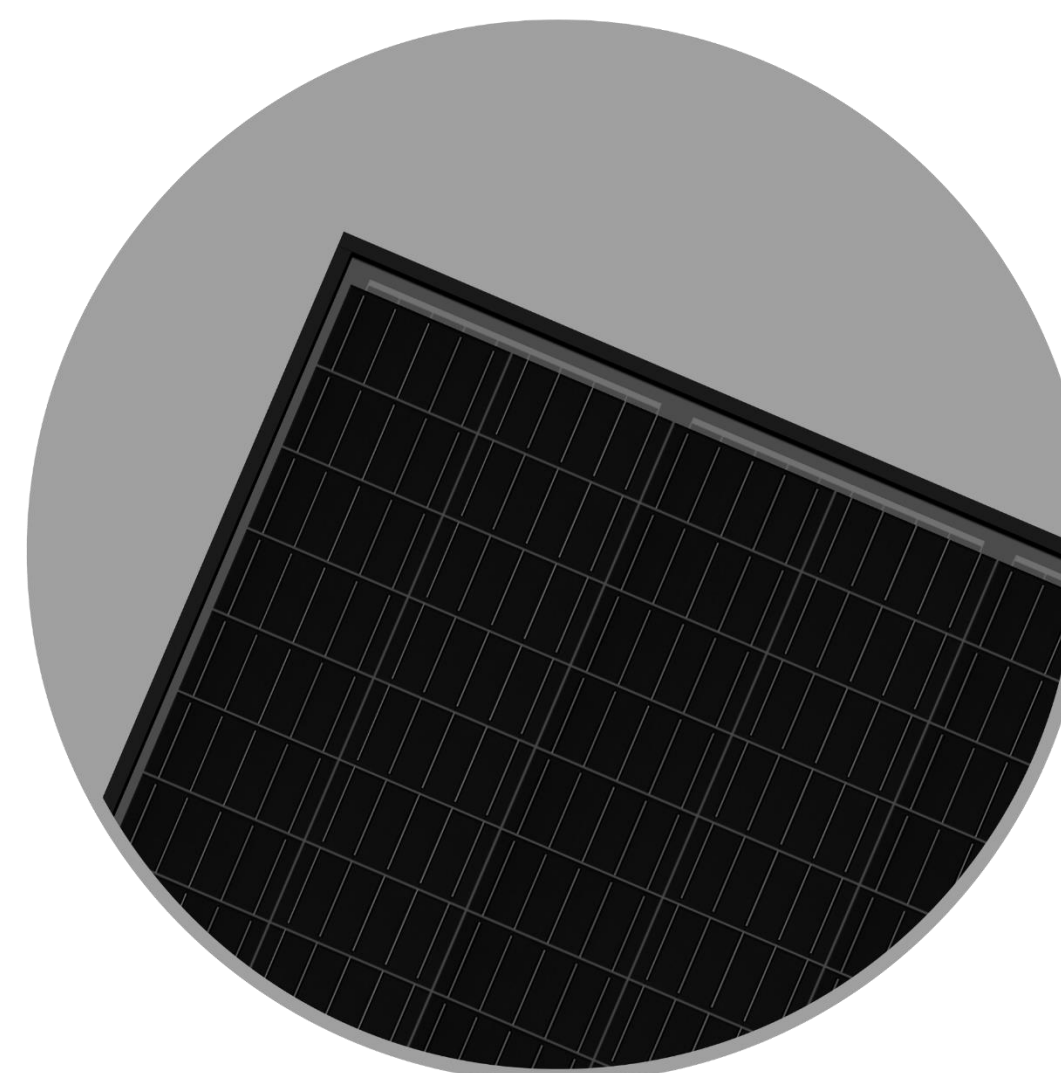
Black coated busbar design to ensure the full black appearance



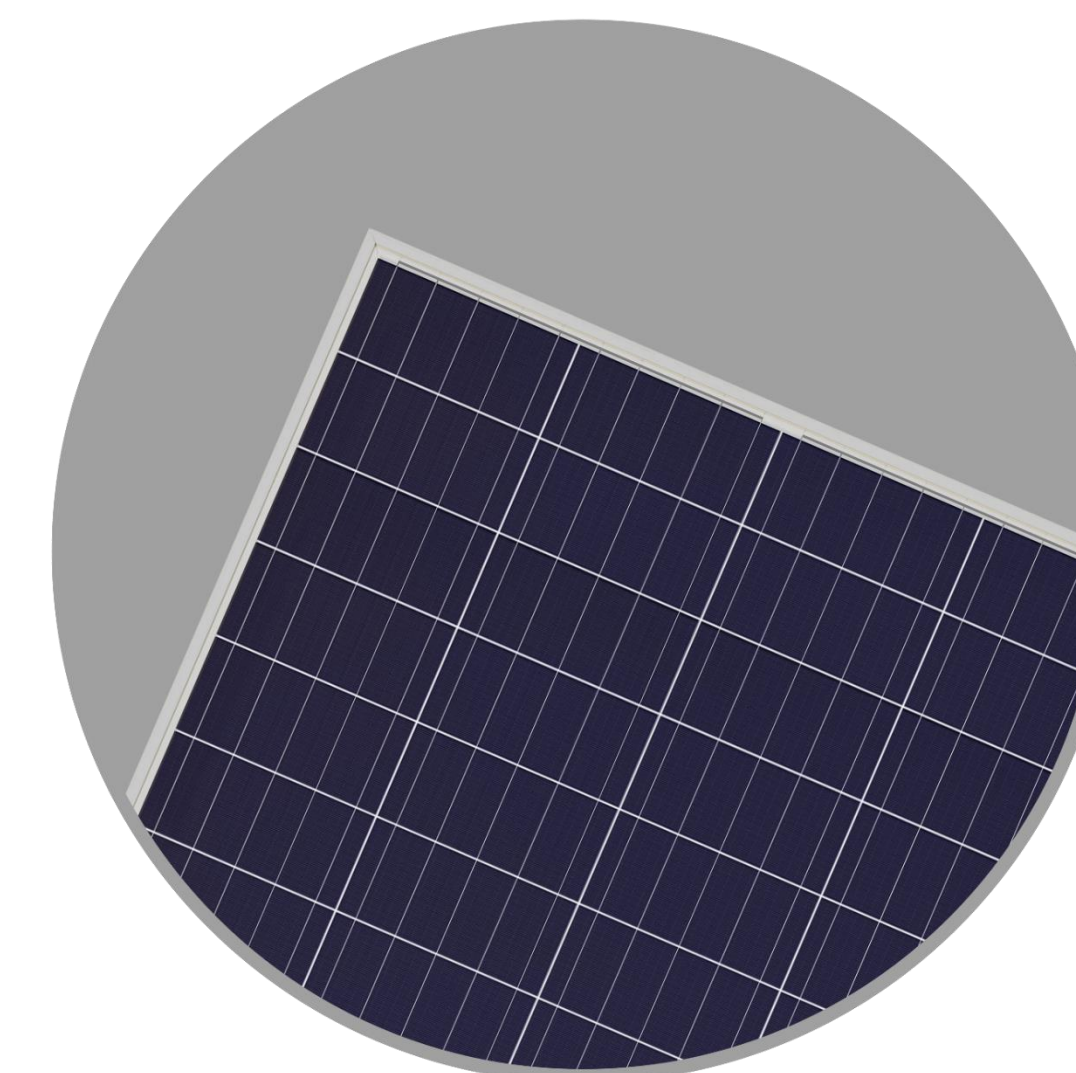
Black Cell



Standard Cell



Black Coated Busbar



Traditional White Busbar



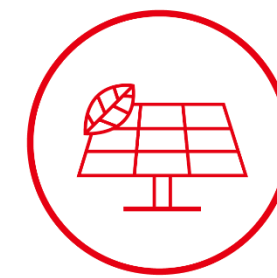
Module power: **365W**
Module efficiency: **19.67%**



Extreme aesthetic
appearance



Extensive rooftop
applications



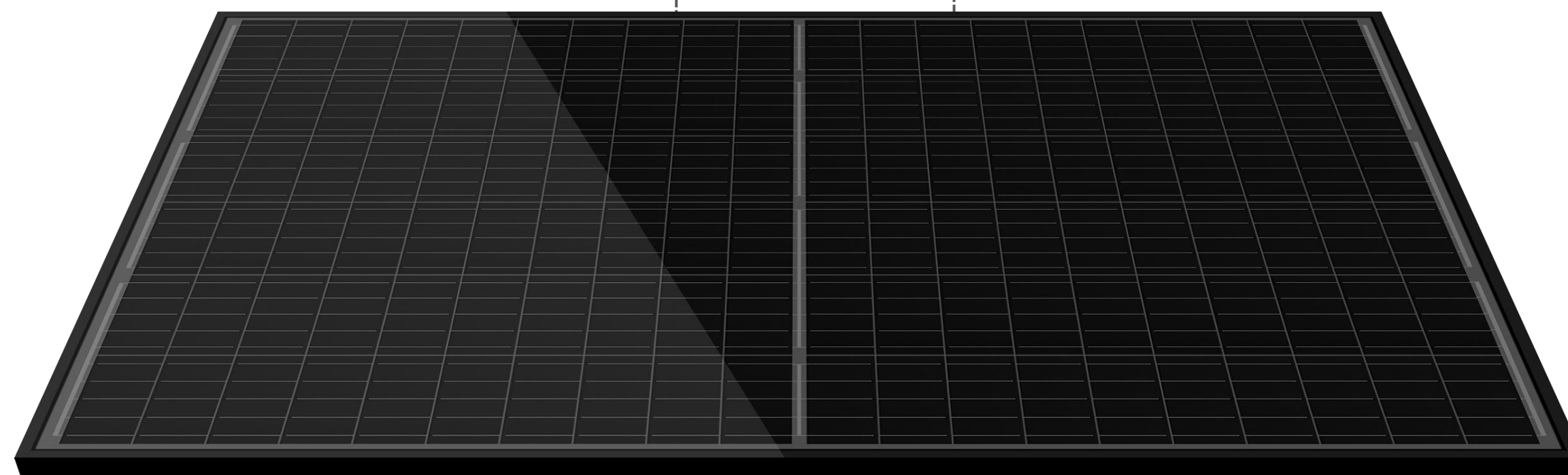
Less power loss by minimizing
shading impact



Safer and more reliable

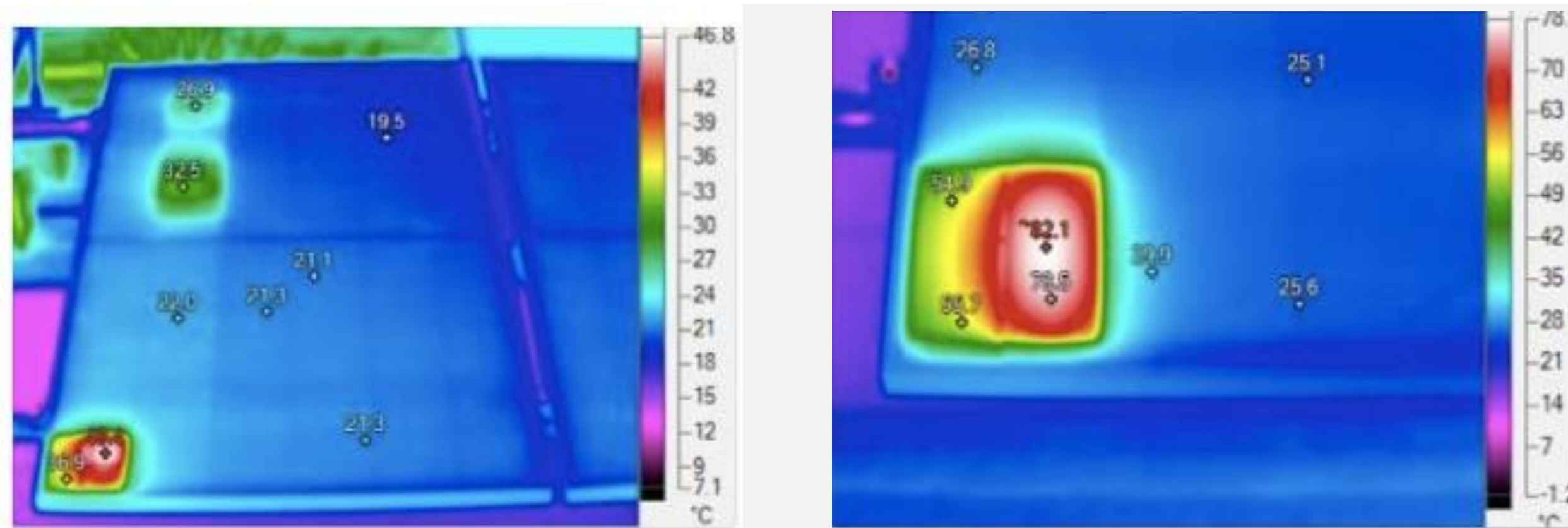


Reduced BoS and installation cost



Improved Reliability on Real Black in Half-cut

● 1/4 full solar cell Shaded



Hotspot
TEMP

Power
Loss

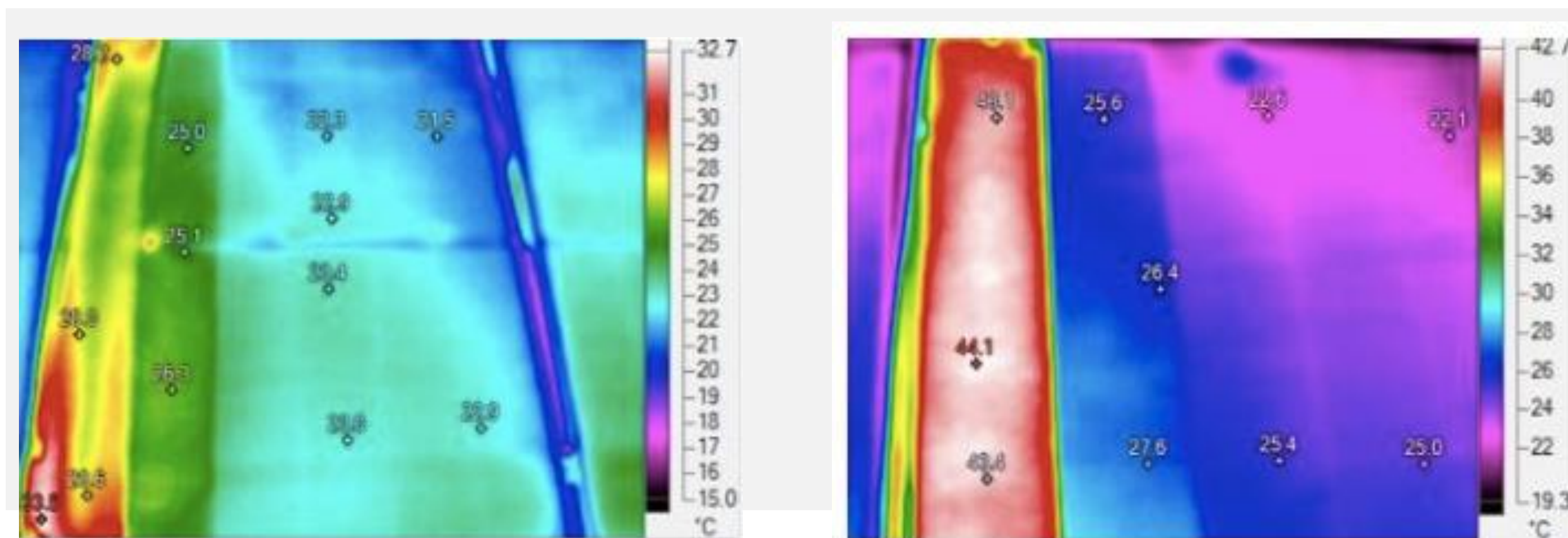
48.4°C

18.4%

82.1°C

34.1%

● A whole solar cell string shaded



Hotspot
TEMP

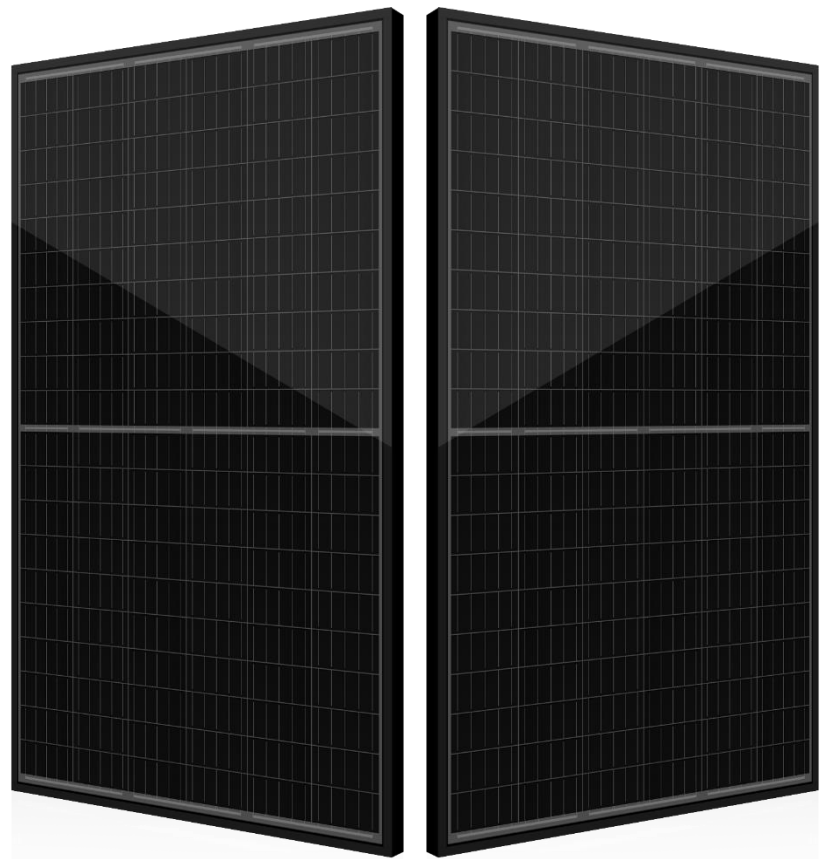
Power
Loss

33.5°C

34.29%

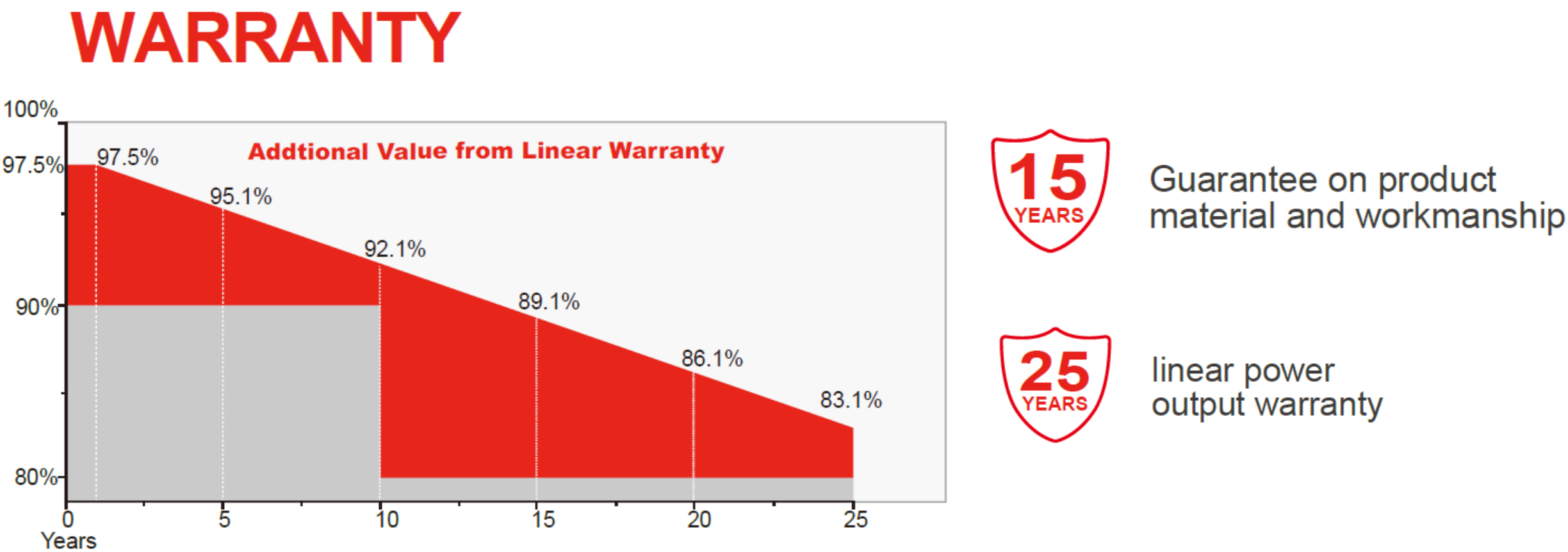
44.1°C

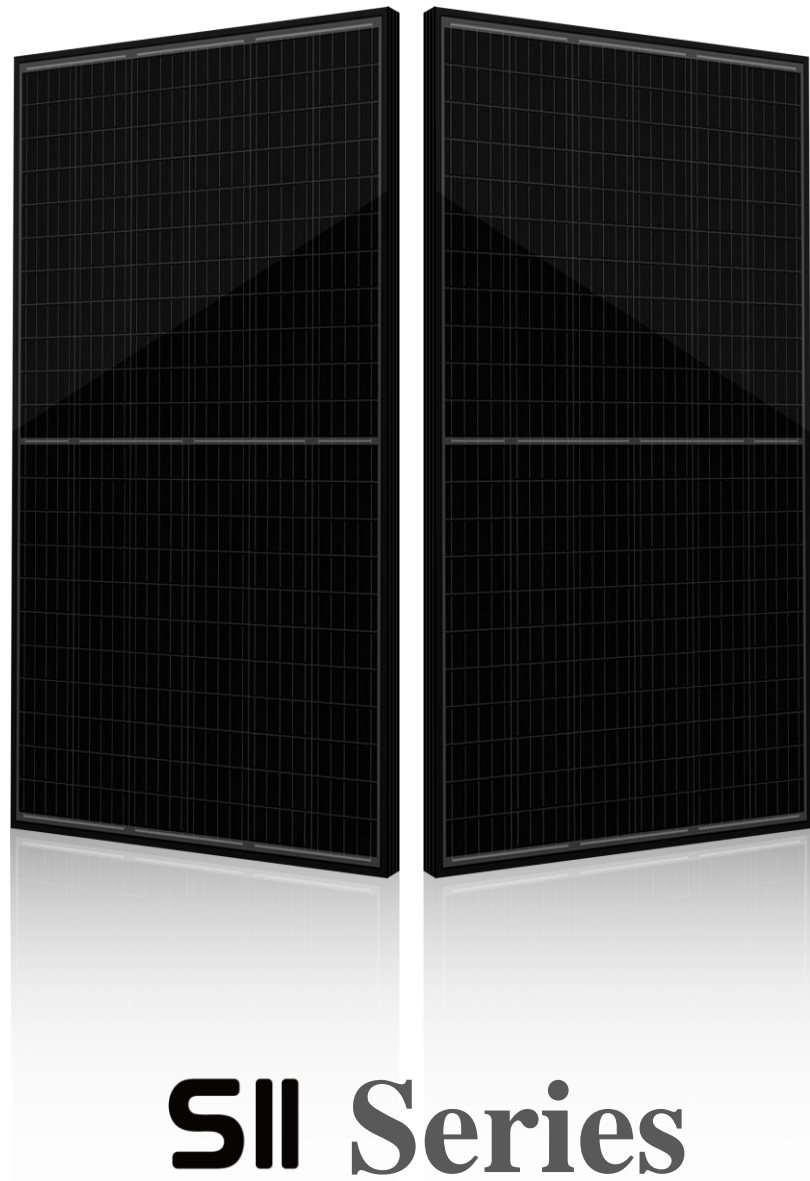
34.53%



Temperature Characteristics

Pmax Temperature Coefficient	-0.36 %/°C
Voc Temperature Coefficient	-0.28 %/°C
Isc Temperature Coefficient	+0.05 %/°C
Operating Temperature	-40~+85 °C
Nominal Operating Cell Temperature (NOCT)	45±2 °C





SII Series

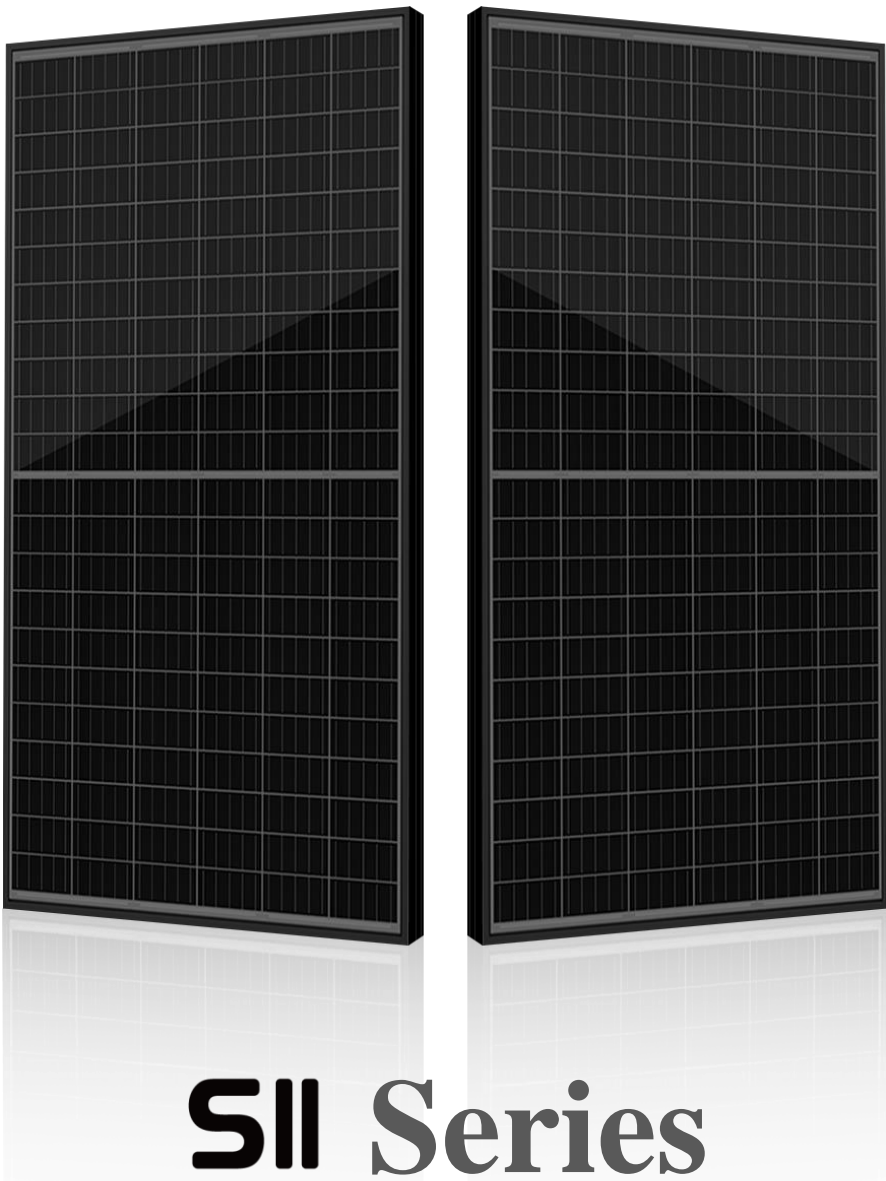
320-330W

18.90%-19.49%

External Dimensions	1690 x 1002 x 35 mm
Weight	19.0kg
Solar Cells	PERC Mono(120pcs)

Different Module Dimension for Various Roof Layout

Limited Space with high Power Demanding on System



SII Series

350-365W

18.86%-19.67%

External Dimensions	1852 x 1002 x 35 mm
Weight	20.0kg
Solar Cells	PERC Mono(132pcs)

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