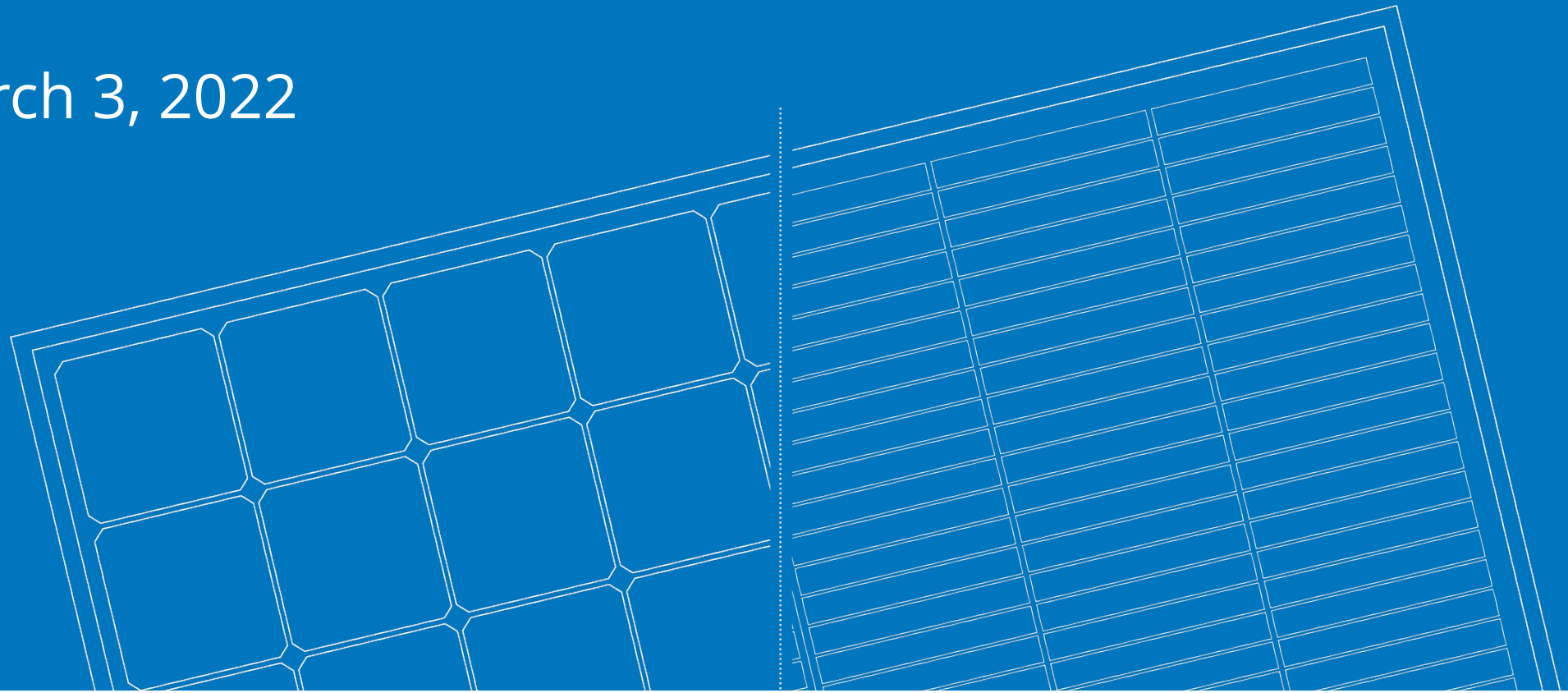
ACHIEVING A 40-YEAR MODULE WARRANTY THROUGH DATA SCIENCE AND ENGINEERING

March 3, 2022



SUNPOWER | FROM MAXEON SOLAR TECHNOLOGIES

AGENDA

- Introduction to the SunPower Maxeon IBC 40-Year Warranty
  - Chris O'Brien, Maxeon Solar Technologies
- Engineering out failure modes in SunPower Maxeon IBC panels
  - Darren Hoffman, Maxeon Solar Technologies
  -
- Preliminary research on system level degradation rates
  - Gareth Walker, Omnidian

Chris O'Brien
Vice President, APAC

MAXEON SOLAR TECHNOLOGIES

SUNPOWER | FROM MAXEON SOLAR TECHNOLOGIES

MAXEON AT A GLANCE

maxeon	
NASDAQ SYMBOL	**MAXN**
HEADQUARTERS	**Singapore**
SALES TERRITORY	**100+ Global Markets** + Exclusive DG[1] Panel Supply Agreement to SunPower
SALES MARKETS & CHANNELS	Residential | Commercial | Power Plant
CUSTOMER-FACING BRAND	**SunPower Brand** outside of the U.S.
INSTALLER NETWORK	**~1,200 Partners**
2020 VOLUME	**2,145 MW**
CUSTOMER BASE	**367,000+**
IP ACCESS	**1,000+ Patents**
MANUFACTURING CAPACITY	**Malaysia, Philippines, Mexico, France, China** IBC[2]: 1 GW | P-Series: 1.8 GW (planned) | 5 GW through JV[3]

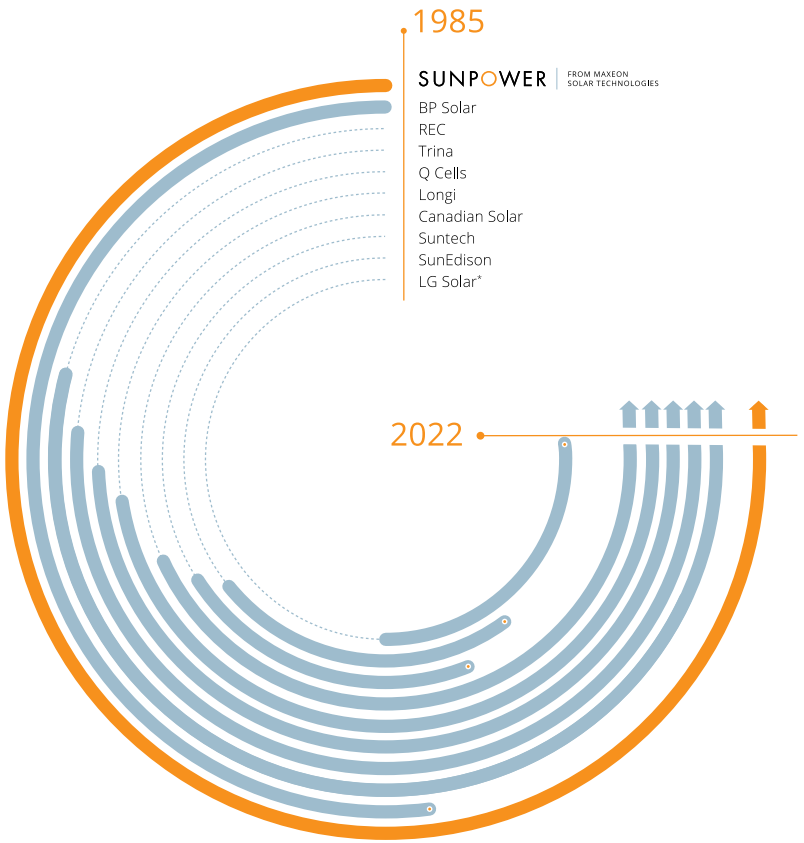
Residential Solar

Commercial Solar

Solar Power Plants

[1] DG: Distributed Generation.
[2] IBC: Interdigitated Back Contact ("IBC") technology.
[3] JV: Huansheng Photovoltaic (Jiangsu) Co., Ltd. (HSPV).

STRONG PARTNERS, SAFE INVESTMENT



SunPower Corporation created:

- A solar technology pioneer
- Strong global channels and brand reputation
- Industry-leading innovative products & quality

maxeon

- Capital to accelerate **product platforms with compelling roadmap**
- Strong access to low-cost Asia-based solar supply chain
- Exclusive distributed generation panel supply agreement to SPWR
- Retains strong global channels and SunPower brand outside of the US

TotalEnergies SE ("TOTAL")

- $141 billion in sales (2020)[1]
- 100 GW commitment to renewables by 2030
- Significant customer of Maxeon's panel technology –
- ~700 MW across 35+ projects

~24.9% current ownership[4]

Tianjin Zhonghuan Semiconductor Co. ("TZS")

- $2.9 billion in revenue (2020)[2]
- Global wafer supplier – 40 GW
- Innovation leader – largest wafers (G12)
- $331.7 million investment, > $1 billion implied MAXN valuation in 2020

~24.4% current ownership[3,4]

* LG launched their first solar panel in mass production in 2010
** Suntech declared bankruptcy in 2013 and was acquired by Shunfeng International Clean Energy Limited I n2014

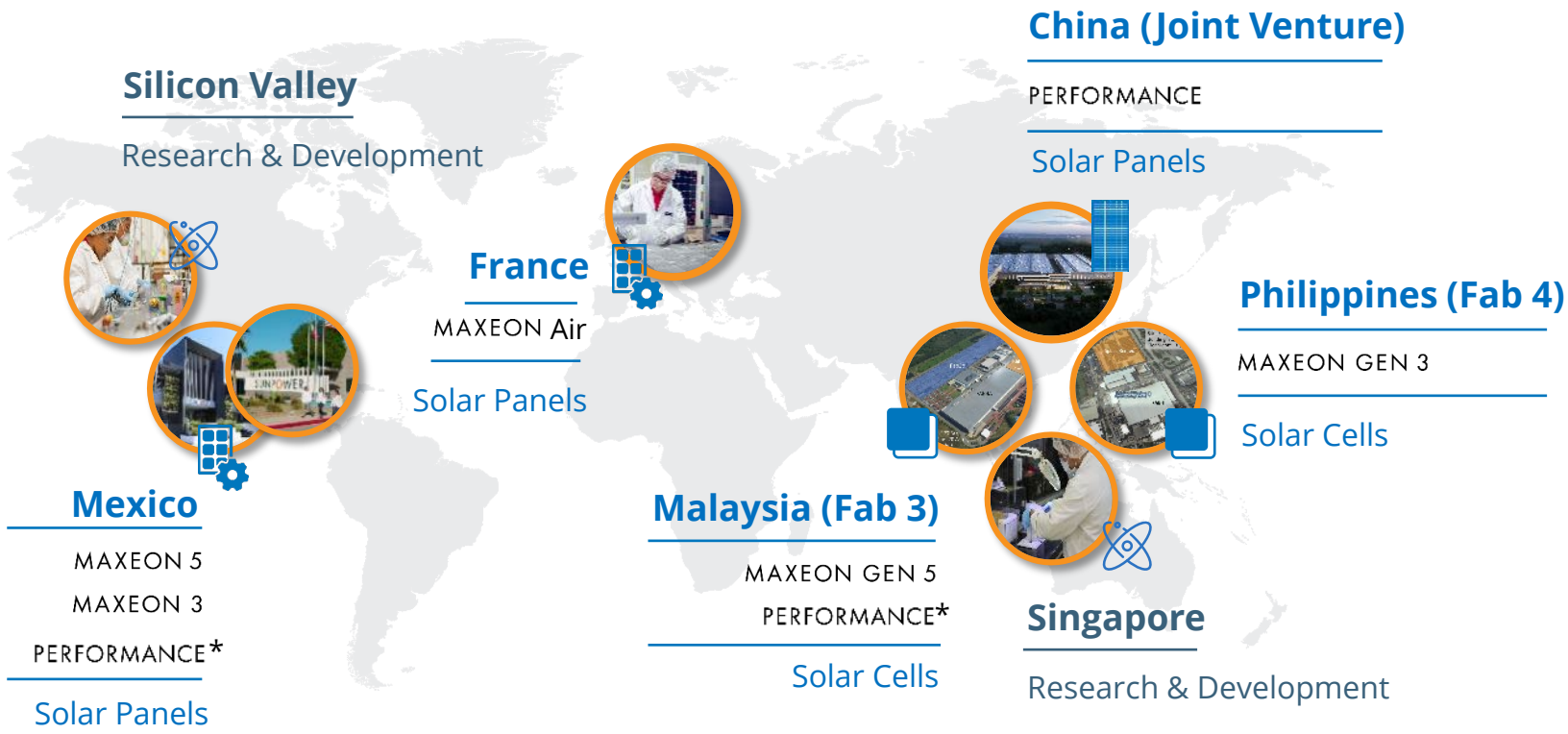
[1] TOTAL SE full-year 2020 consolidated accounts.
[2] 2020 annual report; based on 2020 revenue of RMB19,057MM and RMB/USD exchange rate of 6.5286 as of 12/31/2020.
[3] TZS invested concurrently with the public offering via a PIPE (Private Investment in Public Equity) in April 2021.
[4] Ownership percentage as of May 31st, 2021.

A LEADER IN GLOBAL SOLAR INNOVATION

We design and build industry-leading[1] **SunPower solar cells and panels.**

Global Development & Manufacturing Locations

Maxeon Solar Technologies, Ltd.



*Planned. Read more: https://mediaroom.maxeon.com/2021-04-06-Maxeon-Solar-Technologies-Announces-Initiative-to-Expand-Engagement-in-U-S-Solar-Power-Market

SUNPOWER | MAXEON

Fundamentally different, and better

#1 Solar Panel Efficiency[1]
in the market, fitting more energy in less space

#1 Lowest Degradation Rate
in the solar industry[2]

Leading Durability[2]
through a 40-year warranty, top module reliability performer[3]

SUNPOWER | PERFORMANCE

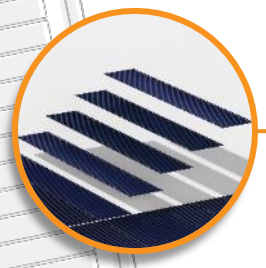
Making the conventional, exceptional

Higher Efficiency at a Value Price
Patented technology, G12 wafers, China JV

Enhanced Energy Yield
Less soiling/shading loss (row spacing), bifacial, greater power density

Reliability Advantages in Harsh Environments
Comprehensive warranty, top module reliability performer[4]

Ultra-pure silicon on a patented copper foundation



Patented unique mono PERC shingled cell panel design

1. Based on search of datasheet values from websites of top 20 manufacturers per IHS, as of January 2019 2. As of 2018, Jordan, et al, "Robust PV Degradation Methodology Application" PVSC 2018 and "Compendium of Photovoltaic Degradation Rates" PiP 2016 3. SunPower panels identified as Top Performer in the PVEL PV Module Reliability Scorecard: https://modulescorecard.pvel.com/.

SUNPOWER | MAXEON

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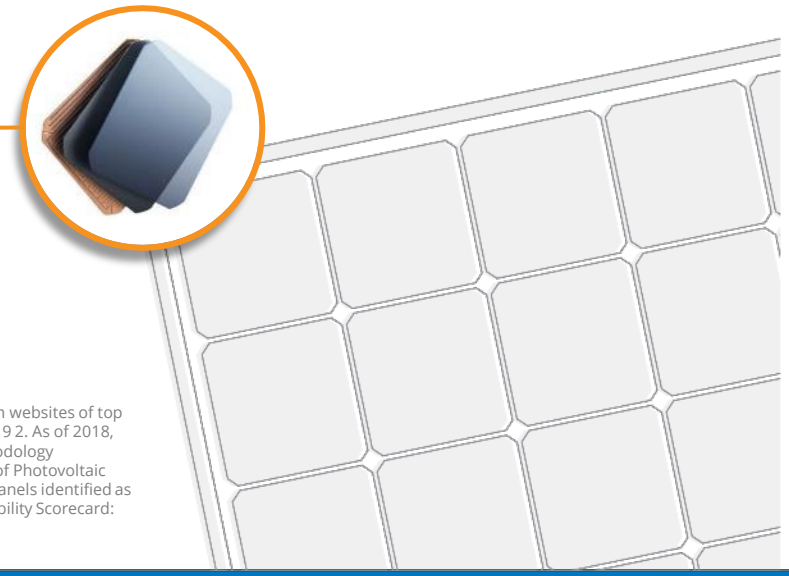


1. Based on search of datasheet values from websites of top 20 manufacturers per IHS, as of January 2019 2. As of 2018, Jordan, et al, "Robust PV Degradation Methodology Application" PVSC 2018 and "Compendium of Photovoltaic Degradation Rates" PiP 2016 3. SunPower panels identified as Top Performer in the PVEL PV Module Reliability Scorecard: https://modulescorecard.pvel.com/.

SUNPOWER 40 YEAR WARRANTY
Power | Product | Service

And now with the industry's first comprehensive 40-year product and performance warranty

More Lifetime Energy

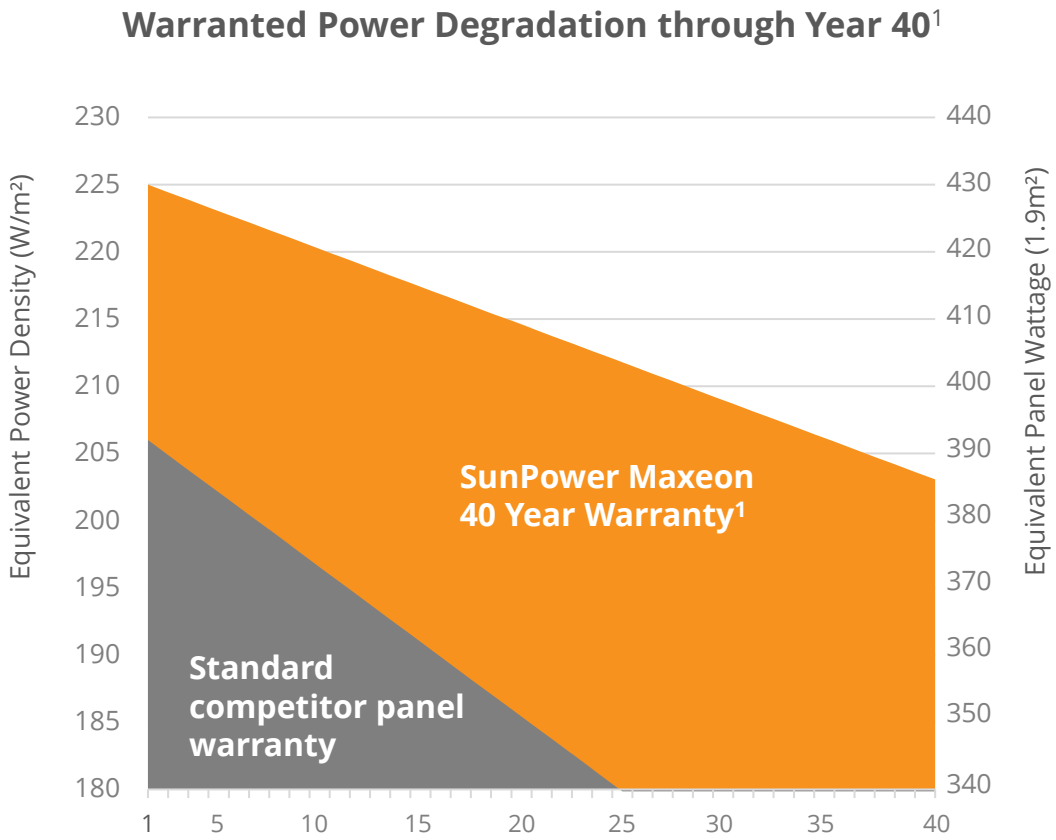
- High-quality materials including high grade n-type silicon cells and dual-layer anti-reflective glass
- Leading conversion efficiency allows panel to run cooler and convert more heat into electricity
- Enhanced performance in high temperatures and low-light conditions

Uncompromising Reliability

- Engineered to power through all types of weather conditions with crack-resistant cells and reinforced connections
- Electrical architecture that mitigates the impact of shade and prevents hot-spot formation
- Warranty return rate of 0.005% is 100x better than conventional alternatives

WE GUARANTEE YOUR PANELS WILL LAST

SunPower 40 Year Product and Performance Warranty



SUNPOWER 40 YEAR WARRANTY
Power | Product | Service

PROOF OF OUR CONFIDENCE in a SunPower Maxeon panel purchase

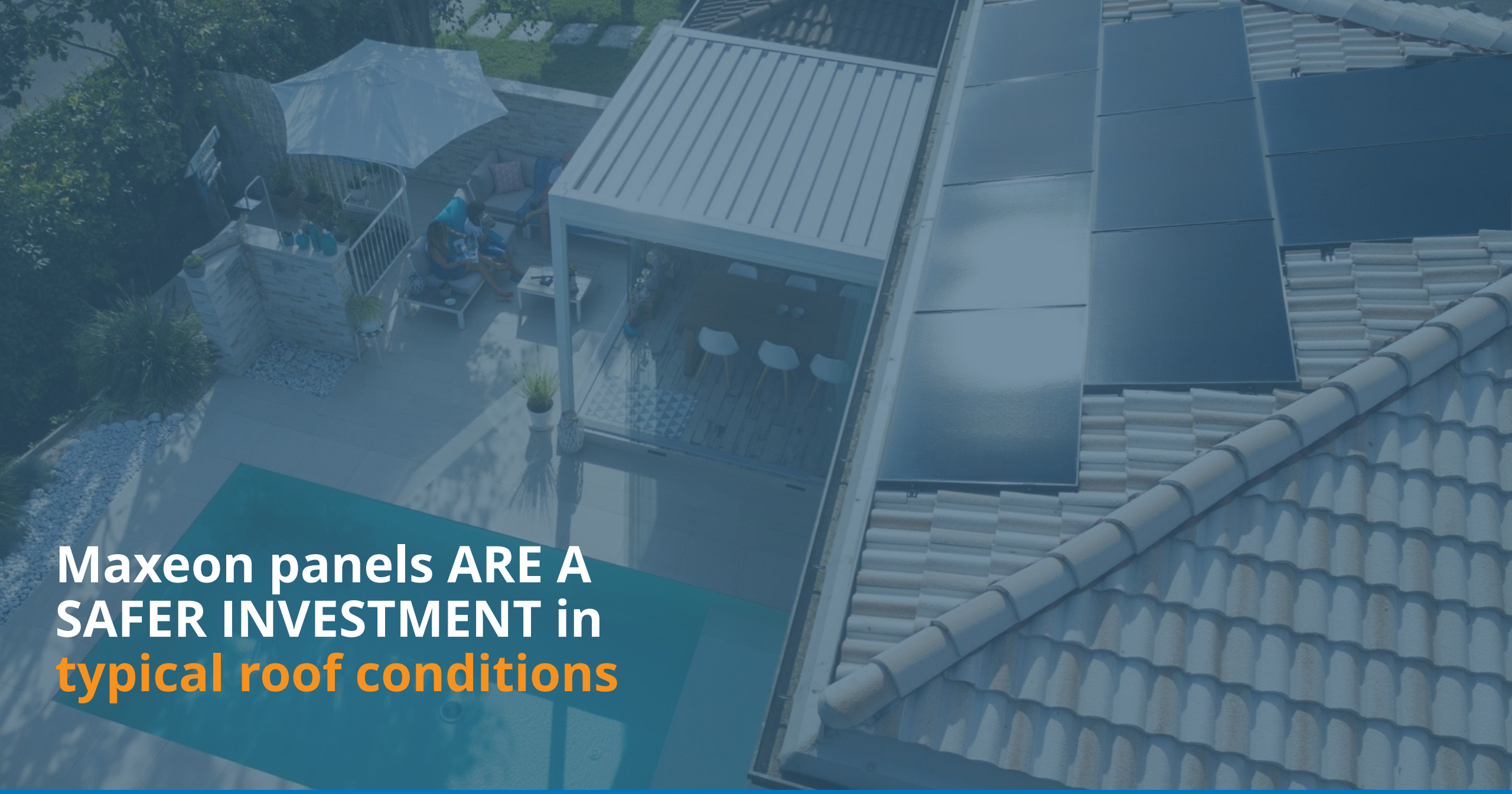
Each SunPower Maxeon panel is manufactured with the absolute confidence to deliver more energy, reliability and savings[2] over time—backed by extensive third-party testing and field data from more than 33 million panels deployed worldwide.

[1]SunPower Maxeon ACM module: Maxeon 5 420W; 22.5 % efficiency (,25% annual degradation rate). Conventional modules Mono PERC 390W, 20.6 % efficiency, (0,54% annual degradation rate) with leading string inverter.
[2]SunPower Maxeon solar panels are backed up by a 40-year warranty. Subject to terms and conditions. Not available in all countries. Jordan, D. et. al. "Robust PV Degradation Methodology and Application." PVSC 2019

Darren Hoffman
Sales & Technical Training Manager, APAC

MAXEON SOLAR TECHNOLOGIES

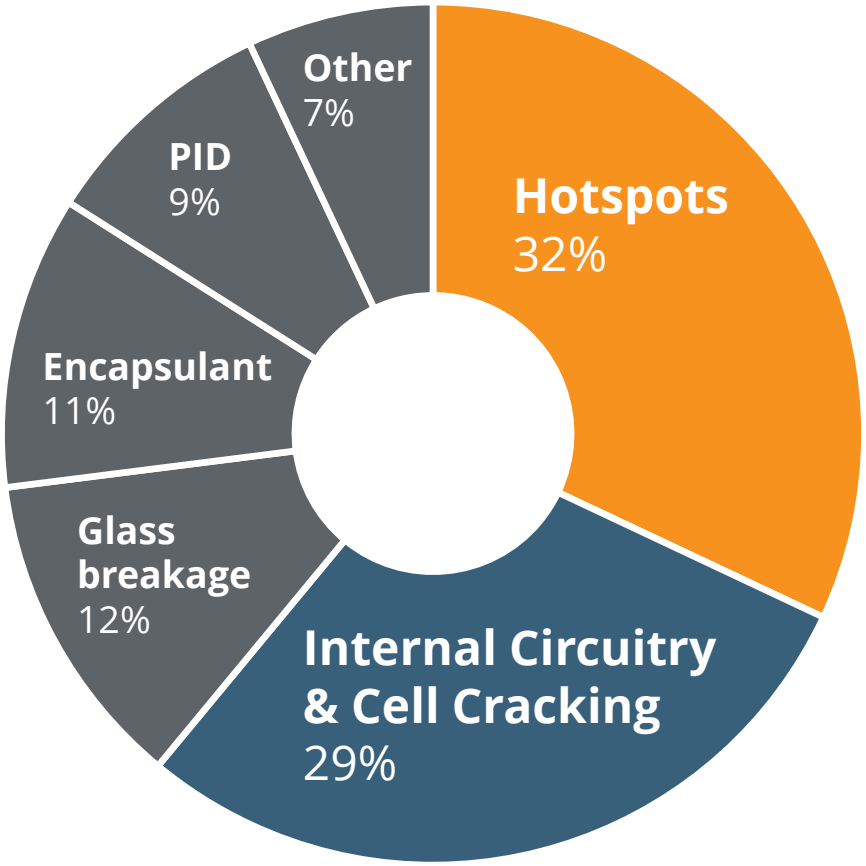
SUNPOWER | FROM MAXEON SOLAR TECHNOLOGIES



Maxeon panels ARE A SAFER INVESTMENT in typical roof conditions

COMMON CAUSES OF SOLAR PANEL FAILURES

Up to 30% of modules have issues within 10 years[1]



Hotspots and internal circuitry problems are the predominant issues affecting solar panel reliability over the last ten years. These issues typically result from shading and cell cracking.

The results can be significant, including energy yield losses, inverter uptime issues, and even outright panel failure.

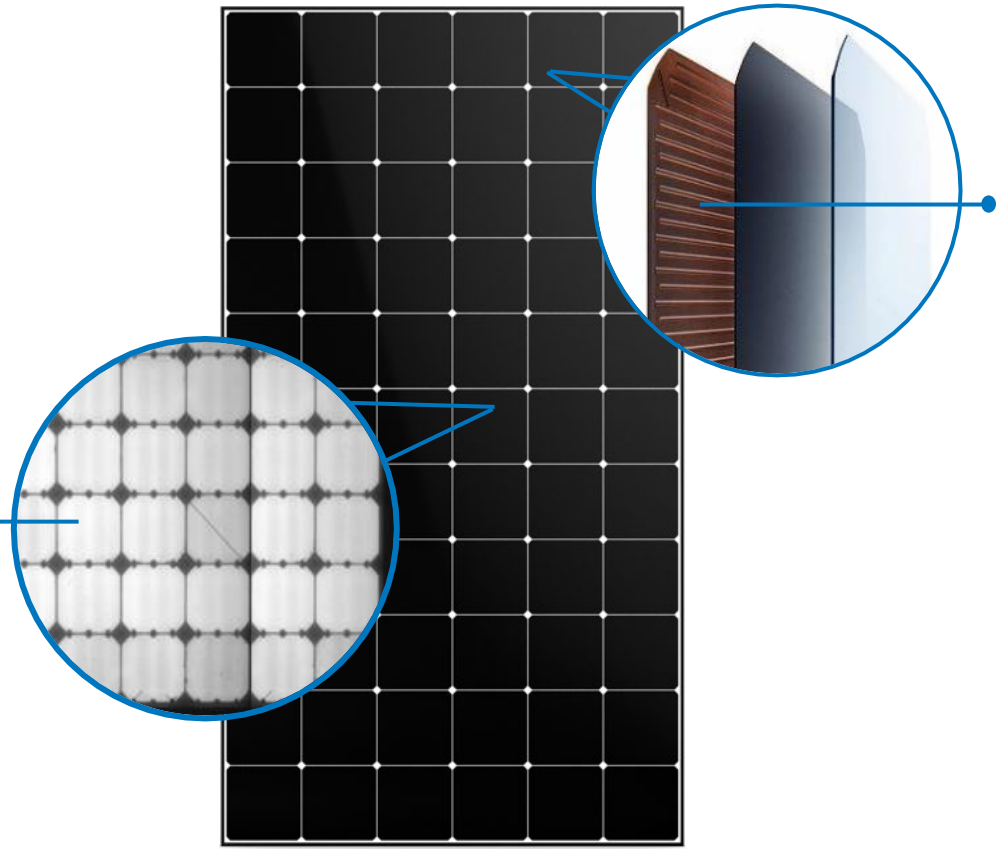
1. DuPont global PV reliability study (2020). Inspection observations based on 3GW in field. DuPont Global-Field-Reliability-Report-2020.pdf
2. Chart source information: Jordan, D. C., Silverman, T. J., Wohlgemuth, J. H., Kurtz, S. R., and VanSant, K. T. (2017) Photovoltaic failure and degradation modes. *Prog. Photovolt: Res. Appl.*, 25: 318–326. doi: 10.1002/pip.2866.

SUPERIOR PERFORMANCE IN ON-ROOF CONDITIONS

Maxeon panels deliver extreme crack resistance

SUPERIOR PERFORMANCE IN ON-ROOF CONDITIONS

Maxeon panels are designed to deliver extreme crack resistance



Protective solid metal foundation

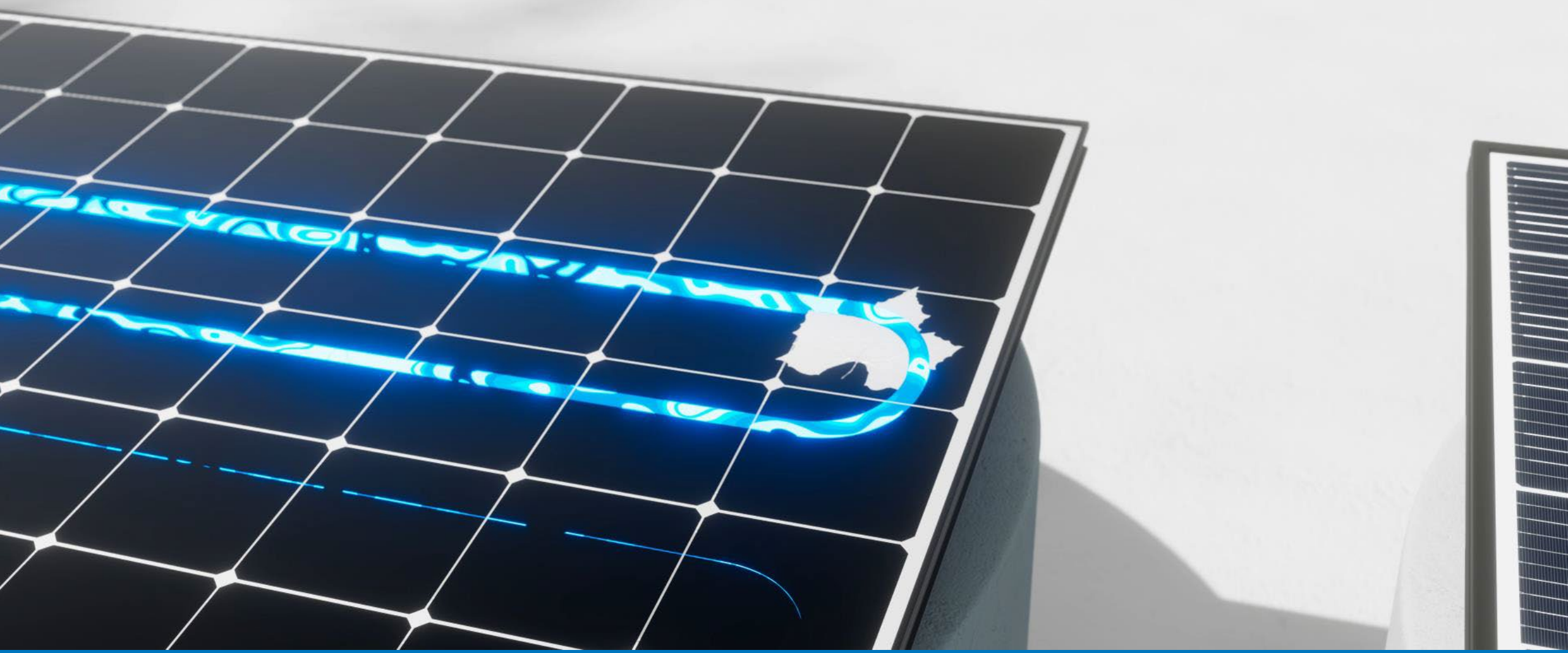
- absorbs temperature swings
- protects from cracking
- creates near-continuous electrical connections

Even with a crack, all parts of the SunPower Maxeon cell are running and crack is contained

Maxeon panels are a 2021 PVEL Top Performer in Mechanical Stress Sequence testing.

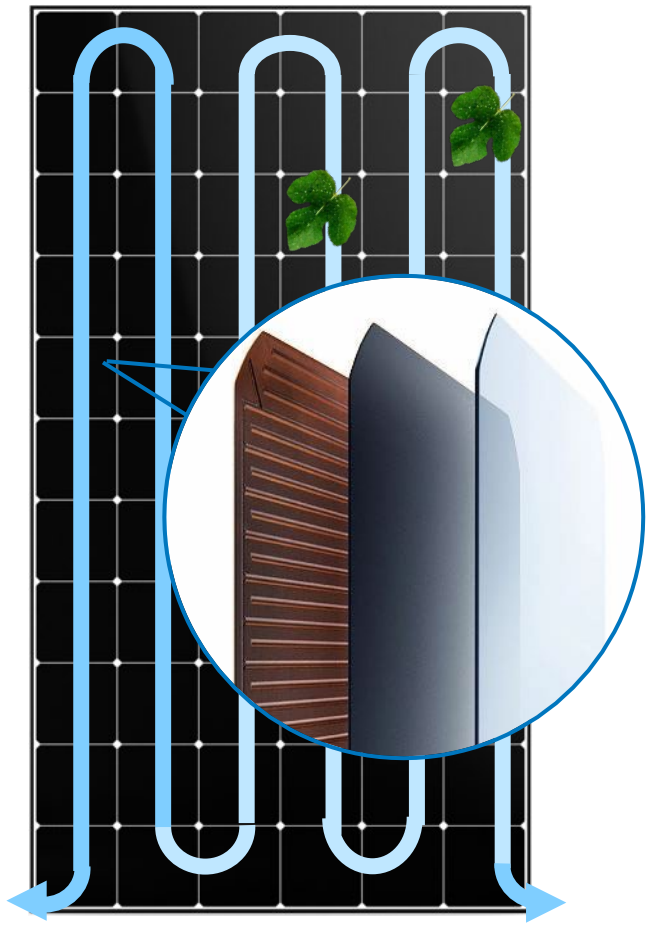
SUPERIOR PERFORMANCE IN ON-ROOF CONDITIONS

Maxeon panels perform more reliably in shade



SUPERIOR PERFORMANCE IN ON-ROOF CONDITIONS

Maxeon panels perform more reliably in shade



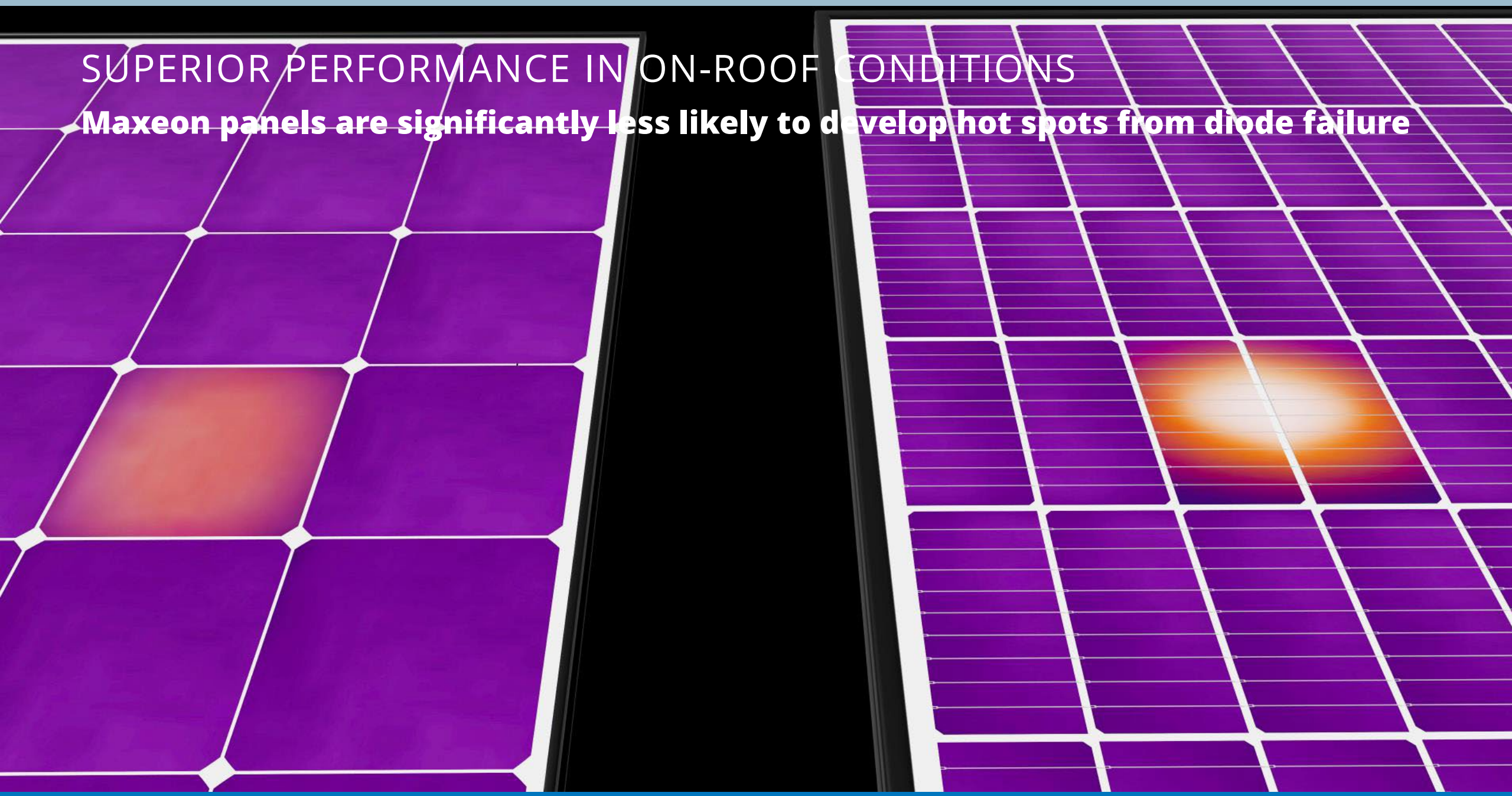
Maxeon cells feature a cell architecture with a lower breakdown voltage to allow large amounts of current to pass uniformly through shaded cells.

As a result, shaded cells don't heat up as much as conventional cells—**the Maxeon cell essentially acts as its own bypass diode to mitigate shade and keep energy flowing.**

		Standard Solar Panels		
	Maxeon	**166mm**	**182mm**	**210mm**
String Current (A)	10.8	10.8	13.0	17.2
Approx Reverse Bias Voltage (V)	3.8	20	20	20
Heat energy to dissipate (W)	41	216	260	344
Heat dissipation pattern	Across cell area	Point hotspot		
Temperature change in shade (°C) versus panel temperature	40	>100		
Temperature change in shade if diode is no longer protecting the panel (°C)	40	>150		

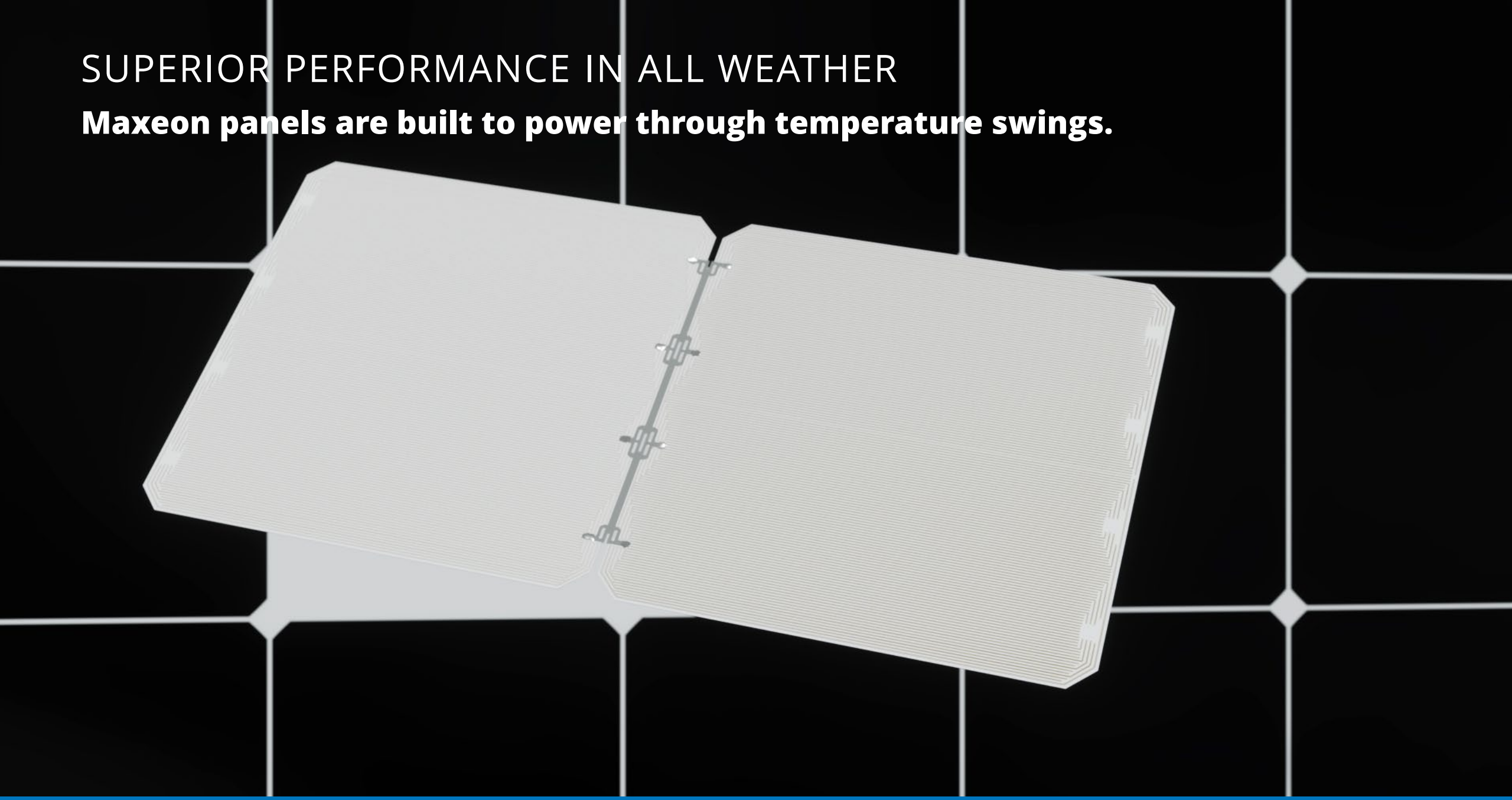
SUPERIOR PERFORMANCE IN ON-ROOF CONDITIONS

Maxeon panels are significantly less likely to develop hot spots from diode failure



SUPERIOR PERFORMANCE IN ALL WEATHER

Maxeon panels are built to power through temperature swings.



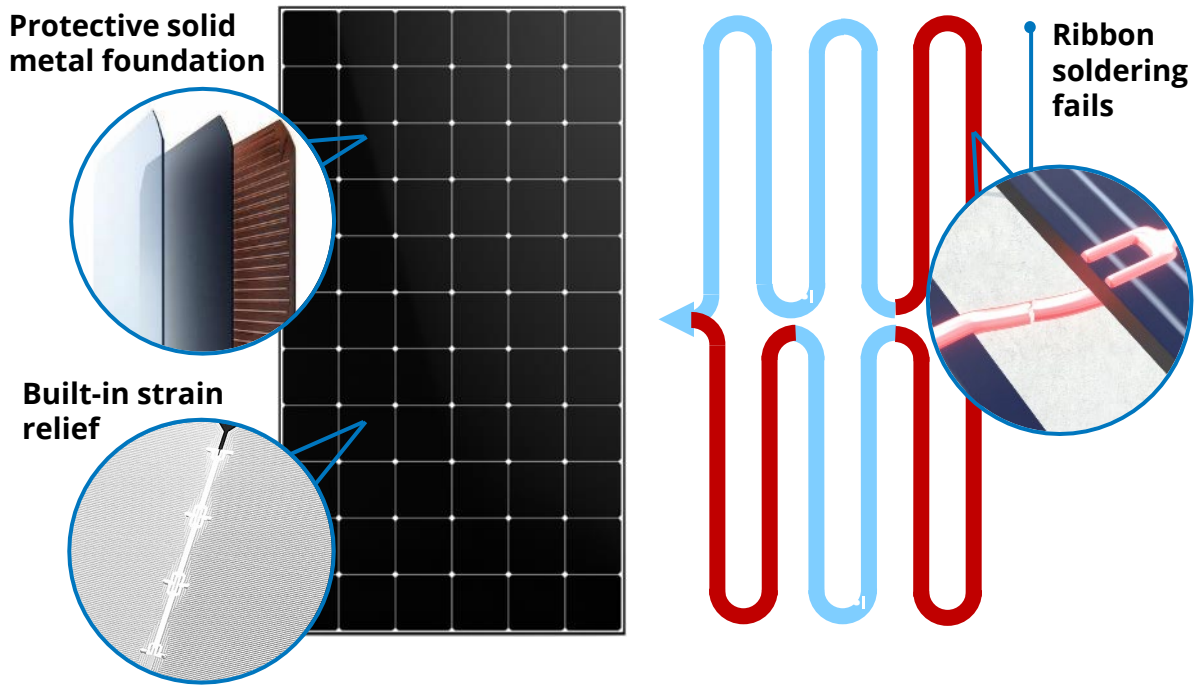
SUPERIOR PERFORMANCE IN ALL CLIMATES

Maxeon panels are built to power through temperature swings.

When module temperatures rise and fall throughout the day to a passing cloud, the circuitry components expand and contract.

Over the time, solder bonds in standard panels fatigue and diminish performance when the sun is at its brightest.[1]

Maxeon panels are a 2021 PVEL Top Performer in rigorous Thermal Cycling testing.

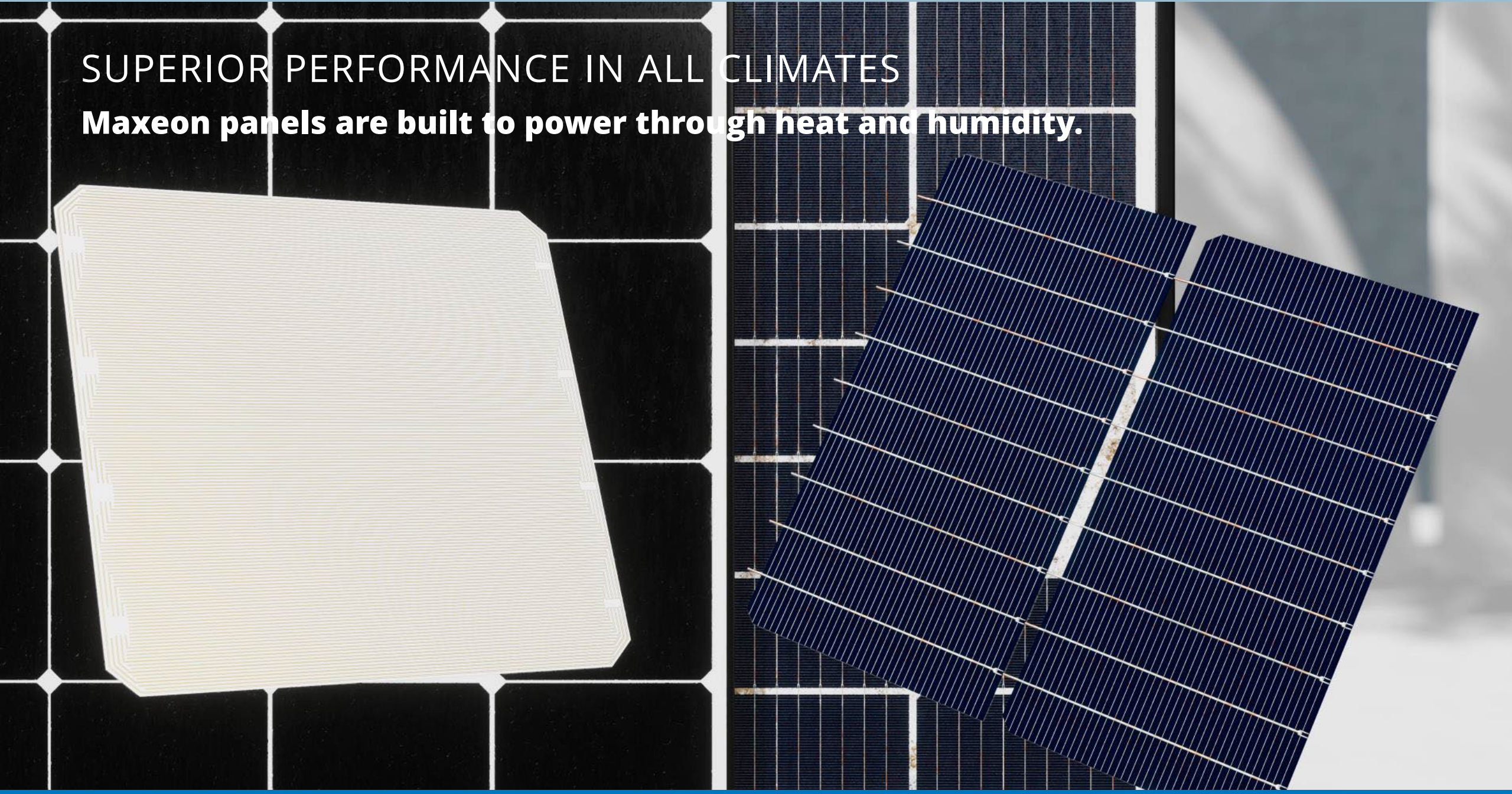


"For all the advantages of multi-busbar (MBB) modules, e.g., reduced power loss from microcracks and higher output power, improper soldering can lead to poor thermal cycling results."[1]

1. PVEL PV Module Reliability Scorecard Report 2021

SUPERIOR PERFORMANCE IN ALL CLIMATES

Maxeon panels are built to power through heat and humidity.



SUPERIOR PERFORMANCE IN ALL CLIMATES

Maxeon panels are built to power through heat and humidity.

In tropical climates, panels are by far the main reason why a PV system will fail.[1]

Risks for panel power loss in hot and humid locations:[2]

- Panel delaminates layers
- Moisture corrodes the silver lines on the front of standard cells
- Materials degrade through EVA browning

PV modules experience periods of high temperature and humidity not only in tropical and subtropical regions but also in moderate climates.

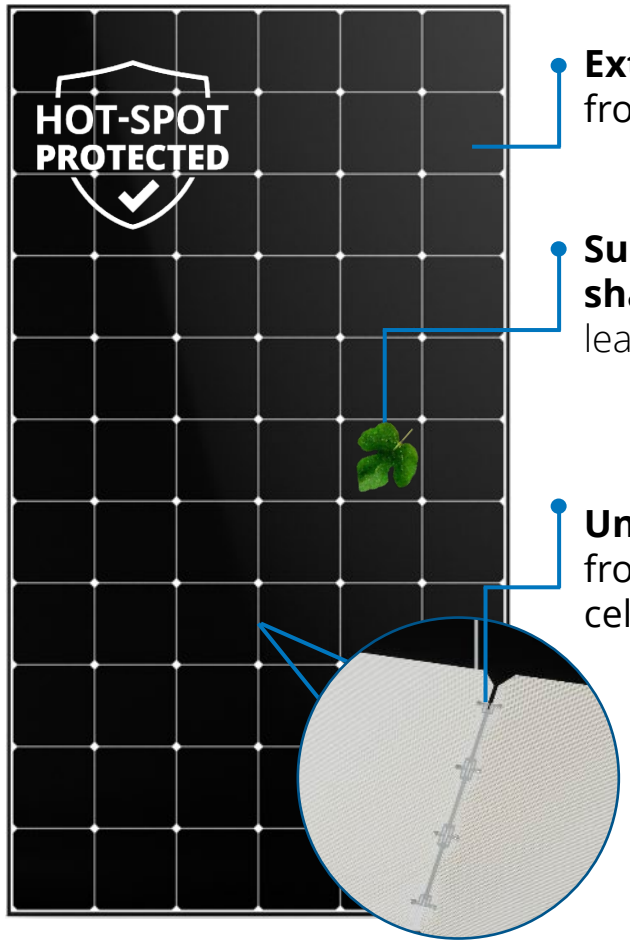
In these conditions, inferior quality components or substandard lamination procedures can lead to degradation or premature failure.

Maxeon panels are a 2021 PVEL Top Performer in Damp Heat and Potential-Induced Degradation (PID) testing.

1. Halwachs et al., Statistical evaluation of PV system performance and failure data among different climate zones, Mar 2019
2. Analysis of long-term performance and reliability of PV modules under tropical climatic conditions in sub-Saharan, Aug. 2020

PERFORMANCE IN ON-ROOF CONDITIONS

Maxeon panels are designed to eliminate how standard panels fail



Extreme crack resistance from solid metal foundation

Superior performance in shade from soiling, falling leaves, obstructions and more

Uninterrupted energy flow from redundant, reinforced cell connections

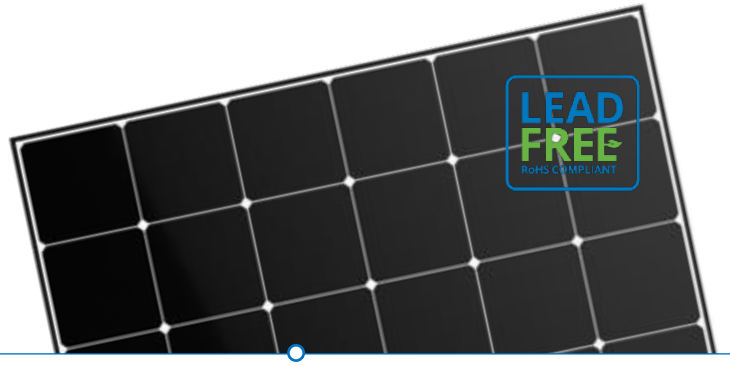
Long-term hot-spot protection from limiting heat build-up in cells and minimizing bypass diode activation

BETTER TOMORROW FOR THE PLANET

SUNPOWER MAXEON PANELS ARE THE MOST SUSTAINABLE PANEL CHOICE IN SOLAR

PANELS AS CLEAN AS THE ENERGY THEY CREATE

How a SunPower Maxeon panel is made



MATERIALS SOURCING

- Public disclosure of all panel materials with **Declare label**
- **Lead-free**[1] and **RoHS and REACH-SVHC compliant**, meeting strict standards set for over 190 harmful chemicals in the EU
- Supplier agreements to reduce the consumption of natural resources use of hazardous substances

PRODUCTION

- **Industry's first and only Zero-Waste-To-Landfill certified**
  - <1% of material from a facility is sent to a landfill and <10% of material is sent to a waste-to-energy facility
- Components produced in **LEED Gold factories ®** in Malaysia, Philippines & Mexico
- **Cradle to Cradle Certified™ Bronze**, demonstrating high standards in material health, water stewardship and social fairness
- **Zero-tolerance policy** for any violations of human and labour rights and compliance with regulations and industry best practices

PRODUCT USE

- Our panels make a significant contribution to **LEED® certification** for commercial buildings[2]
- Our **40-year product warranty** ensures systems will be producing clean energy for decades to come
- Panel efficiency can reduce the volume of materials needed for cables, connectors and balance of system

PRODUCT RE-USE

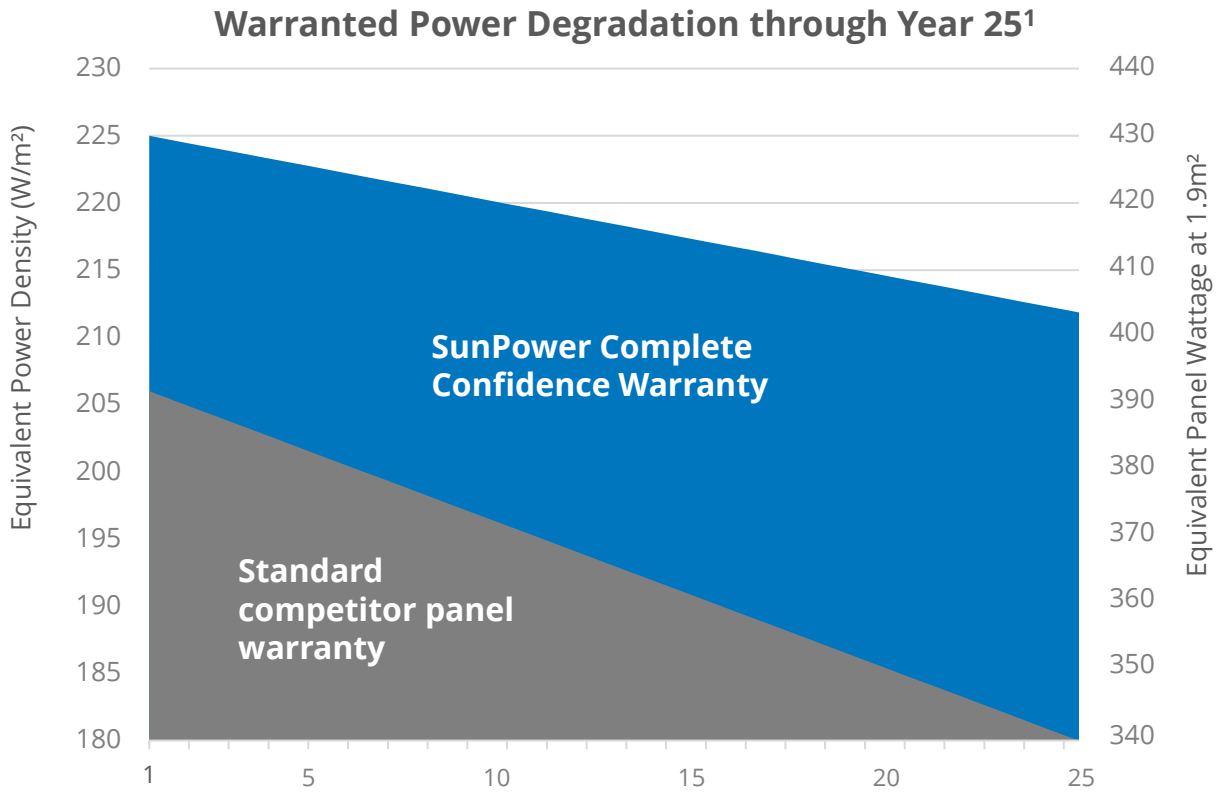
- We support our customers in their recycling efforts by working with local recycling experts in the countries where we operate
- We take a collaborative approach with recyclers, encouraging them to develop innovative ways to process materials for a secondary use

1 RoHS testing standard. 2 SunPower Maxeon DC panels only 2. On a typical project1, a solar system contributes 5 points. Using Cradle to Cradle Certified™ products and reducing construction waste can yield an additional 6 points

maxeon panels create more value for the customer than standard panels

HISTORY OF WARRANTY LEADERSHIP

SunPower Complete Confidence Guarantee



PV Category's Best Combined

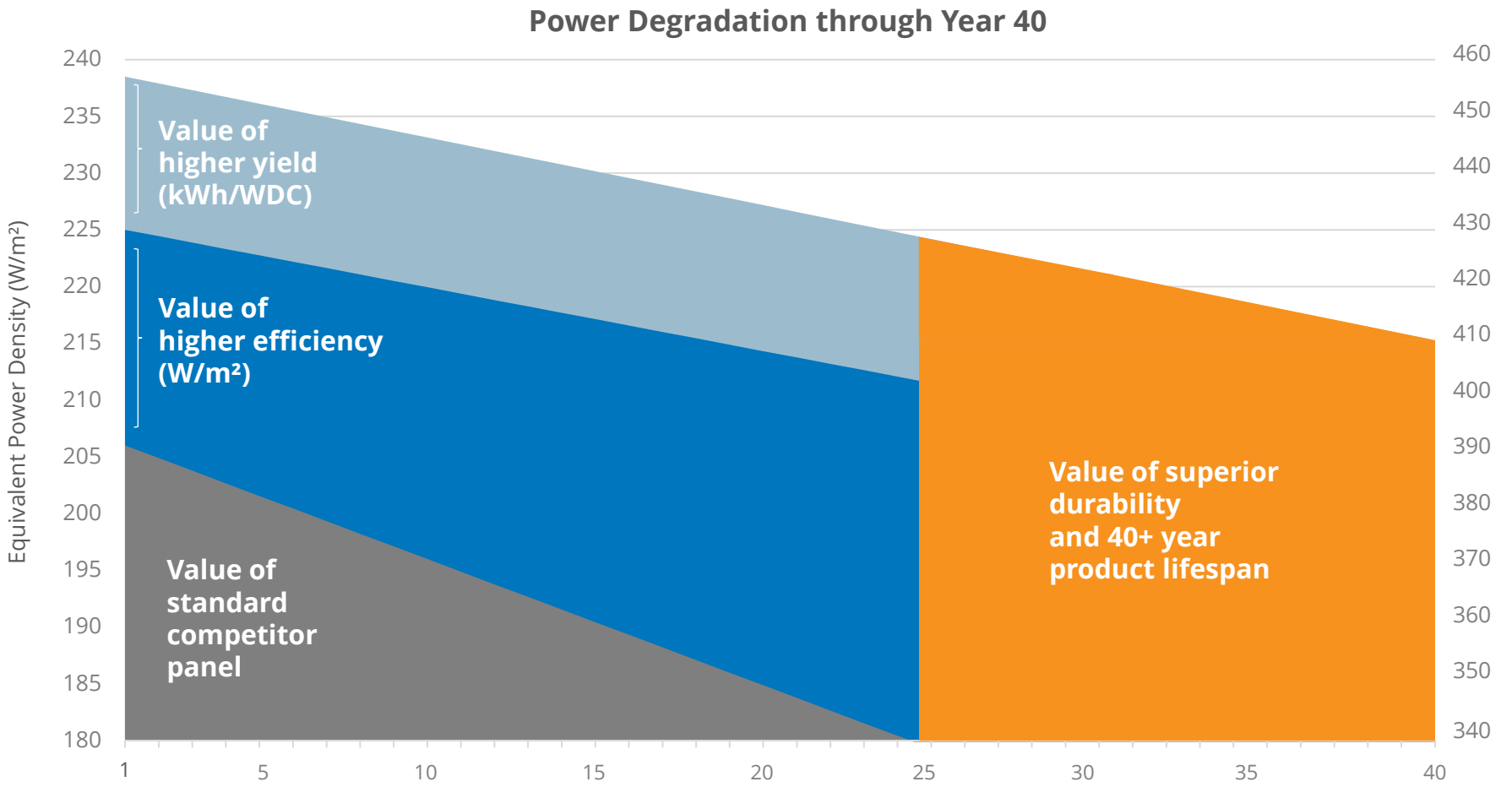
Power, Product and Service Warranty[2]

POWER PRODUCT SERVICE[3]

[1]SunPower Maxeon module: Max5 AC 420W with Enphase IQ7A-72-x-INT; 22.5 % efficiency (.25% annual degradation rate). Conventional modules Mono PERC 390W, 20.6 % efficiency, (0,54% annual degradation rate) with leading string inverter. [2] Based on January 2021 review of warranties on manufacturer websites for top 20 manufacturers per IHS. [3] Service applicable only to PV Module originally installed in Belgium, France, Germany, Italy, The Netherlands, or the United Kingdom. Scope of warranty coverage varies by country. For more information about the warranty terms and conditions available in your country, visit maxeon.com/legal.

MAXEON **40+ YEAR LIFESPAN** ADVANTAGE

Maxeon panels multiply in value over the lifetime of the system



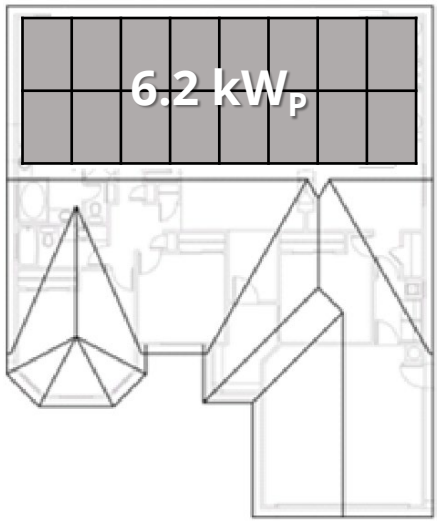
SunPower Maxeon panels are proven, **with an expected useful life of 40+ years and a return rate of less than 0.005%**

[1]SunPower Maxeon module: Maxeon 5 420W; 22.5 % efficiency (.25% annual degradation rate). Conventional modules Mono PERC 390W, 20.6 % efficiency, (0,54% annual degradation rate) with leading string inverter. [2] Source: PVSYST simulations in typical climates; PAN files are third-party verified; compared to leading mono PERC panel

MAXEON **WARRANTED ENERGY** ADVANTAGE

Maxeon panels are warranted to create 85% more energy than guaranteed by a standard panel on a standard rooftop

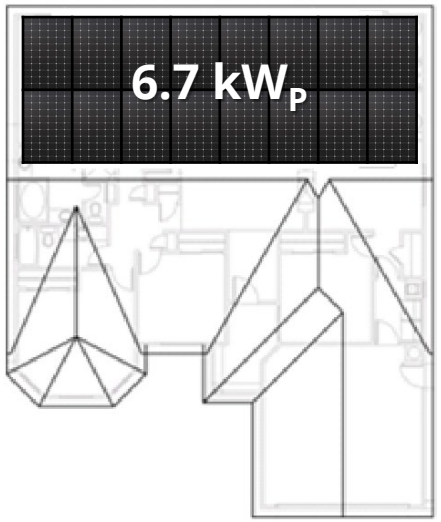
Conventional Solar + String Inverter



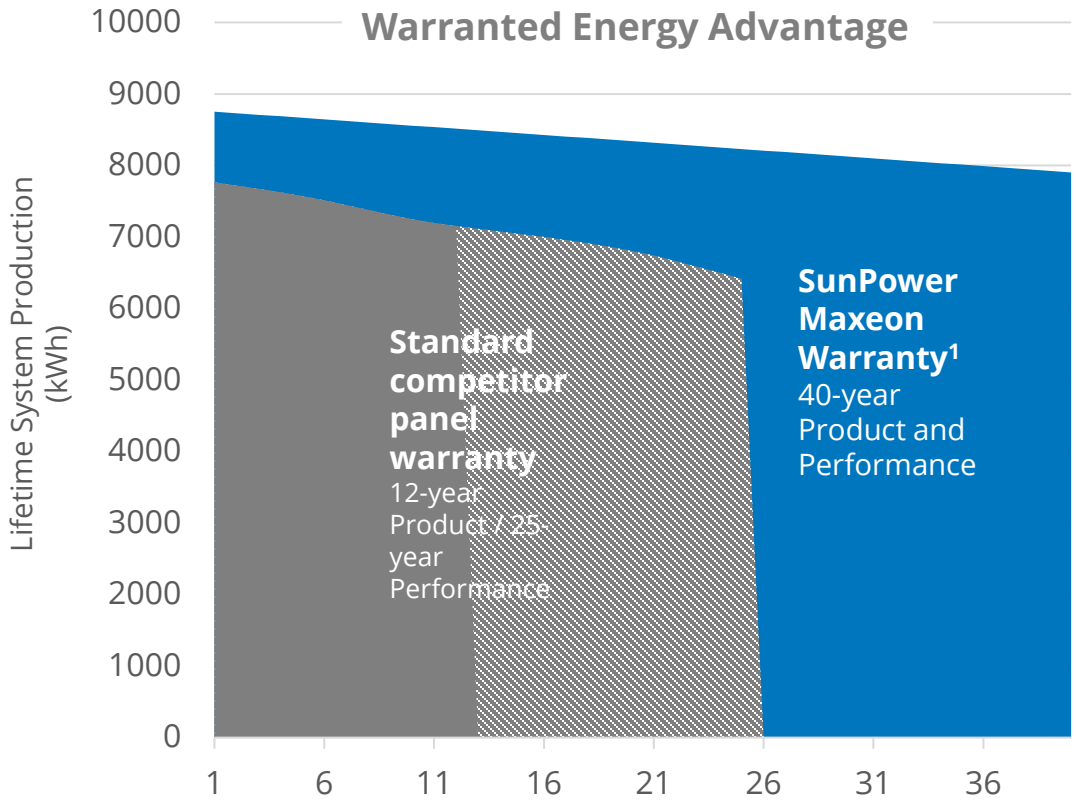
206 W/m²

vs.

Maxeon System



225 W/m²



1Source: PVsyst simulation. Assumptions: Residential roof with 1300 GHI at 20 deg tilt with portrait installation. SunPower Maxeon 5 420W. Conventional modules Mono PERC 390W (0,54% annual degradation rate) + leading string inverters and DC optimisers (1 string). No power degradation affected to String inverter over 25-years period. Non shaded scenario. Non shaded scenario

Preliminary research on system level degradation rates

www.omnidian.com

PRESENTED BY

Gareth Walker
Head of Data Science

OMNIDIAN®

OUR MISSION

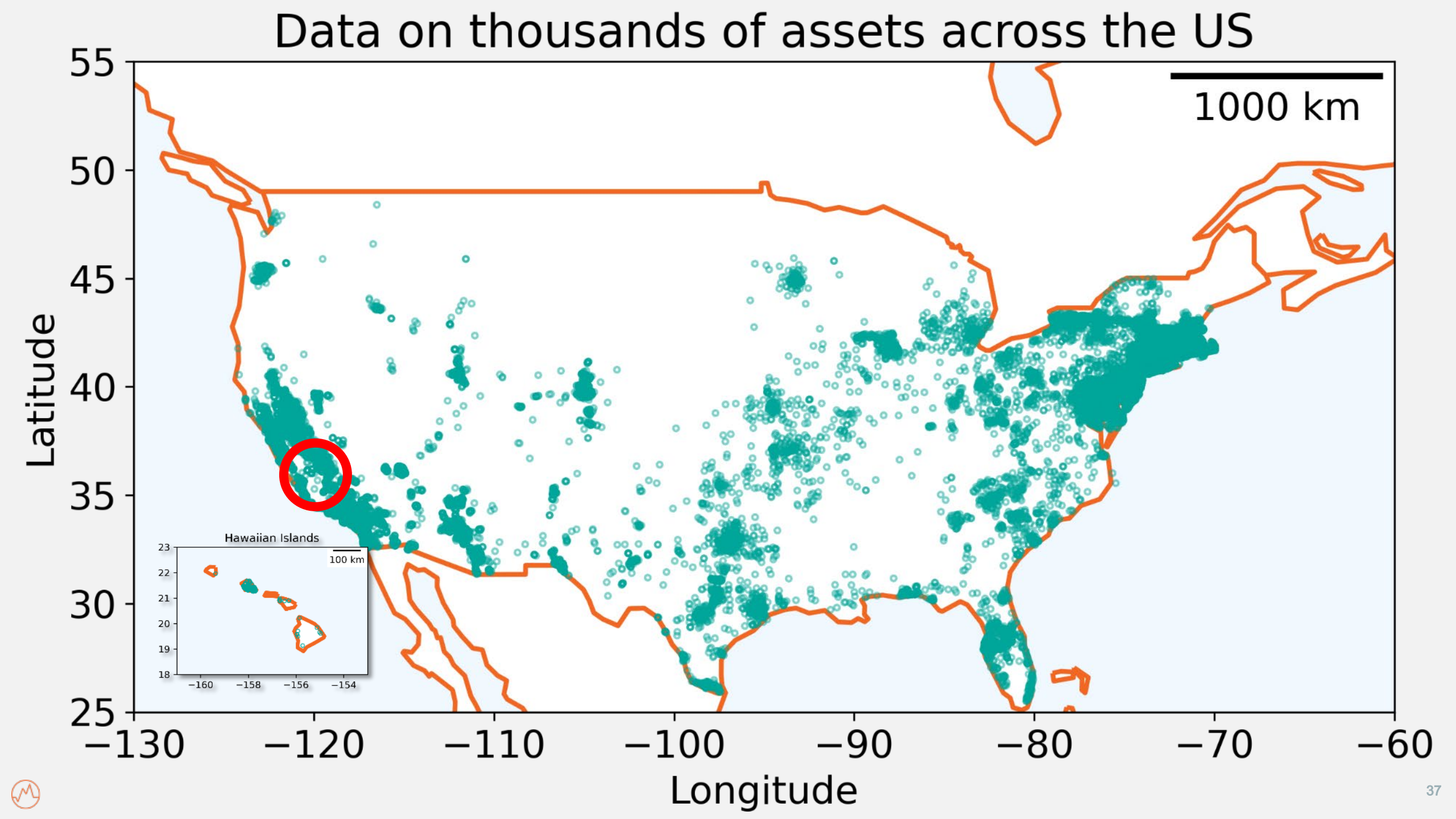
Protect and accelerate investments in clean energy with one industry-leading service: Performance Assurance

OMNIDIAN®

RESPONSIBLE FOR

200,000 SOLAR HOMES

10% OF U.S. INSTALLED BASE


Data on thousands of assets across the US
1000 km
Latitude
Longitude
55
50
45
40
35
30
25
−130
−120
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Hawaiian Islands
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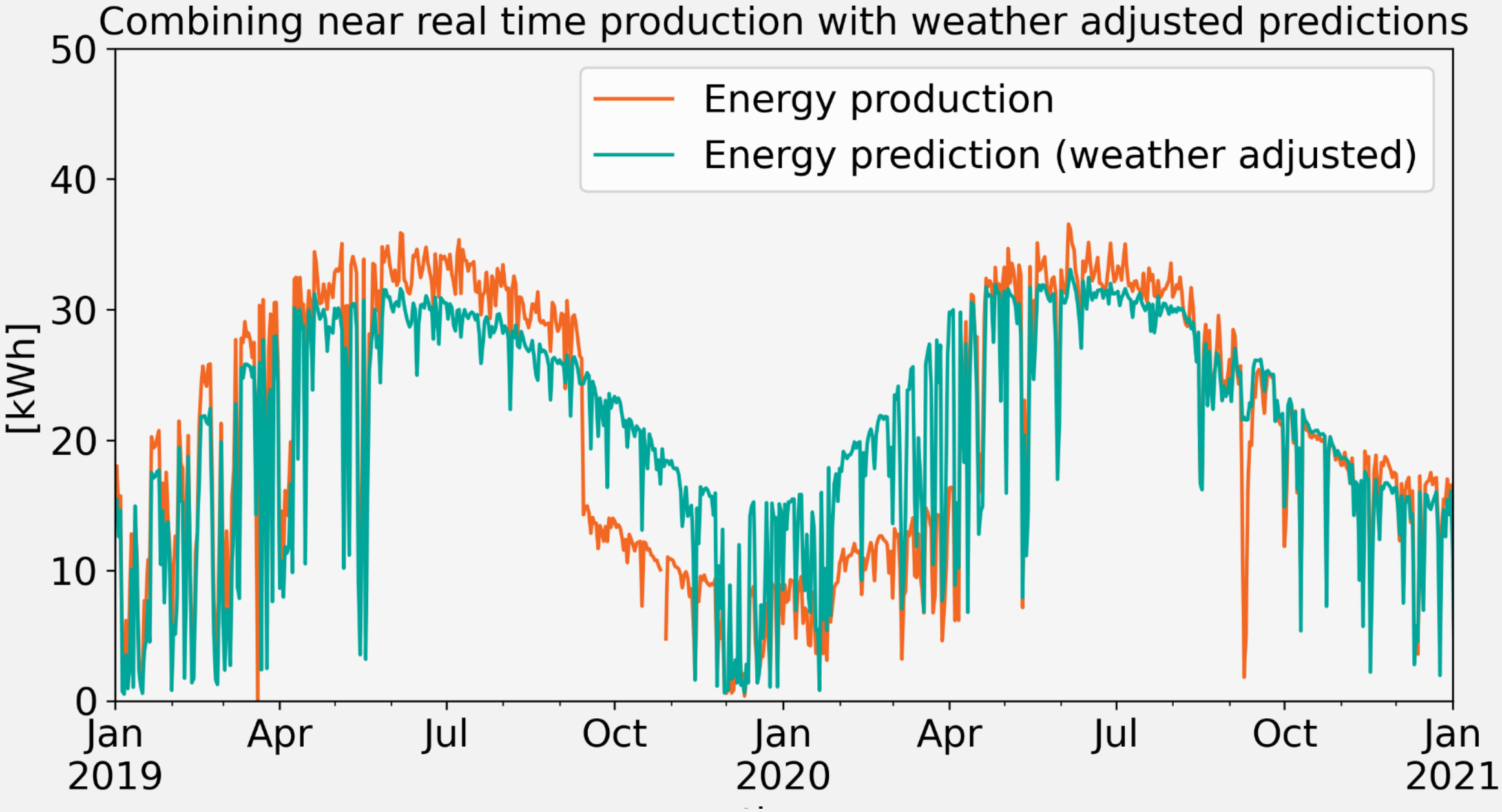
Combining near real time production with weather adjusted predictions
Energy production
Energy prediction (weather adjusted)
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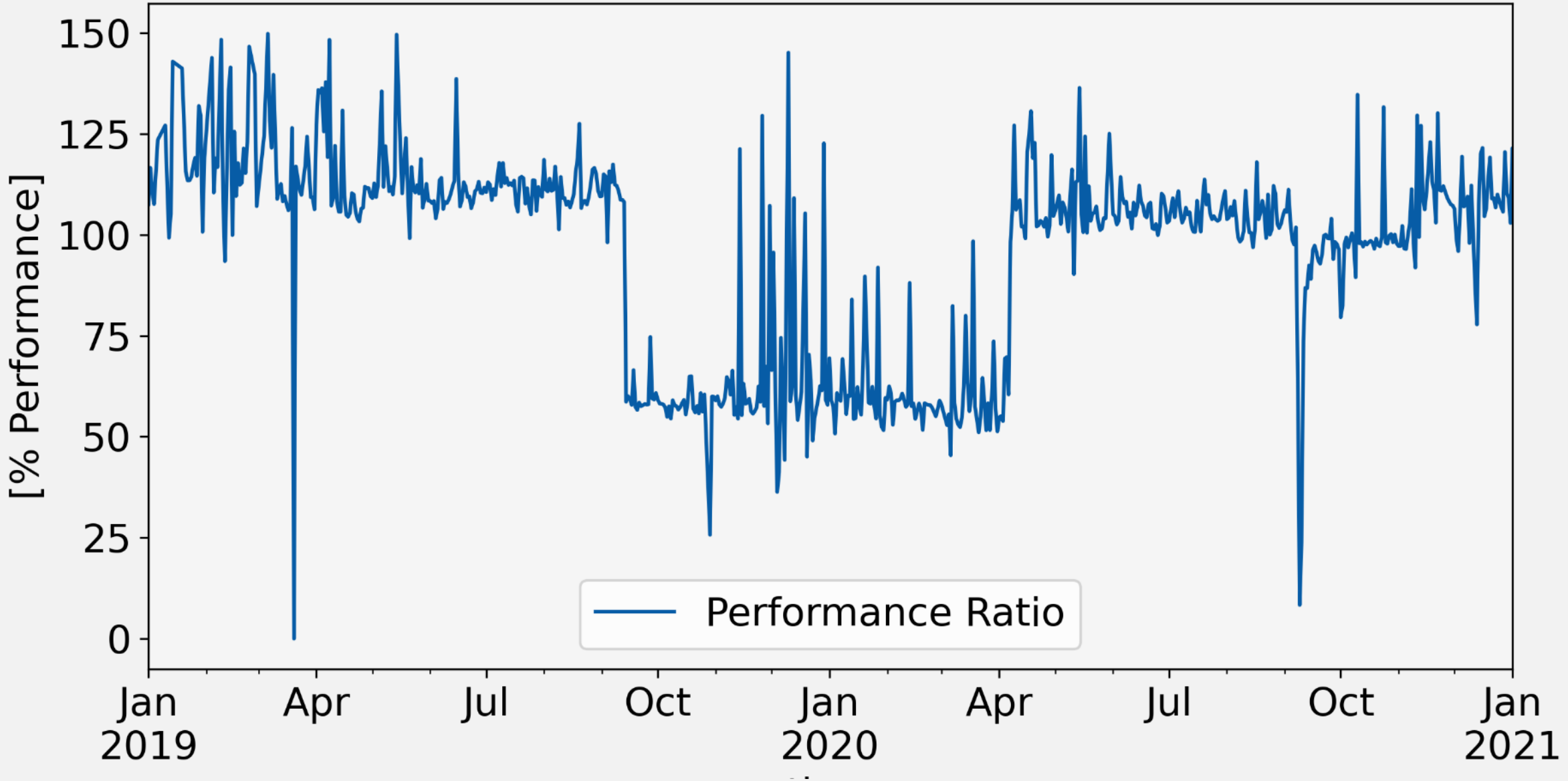
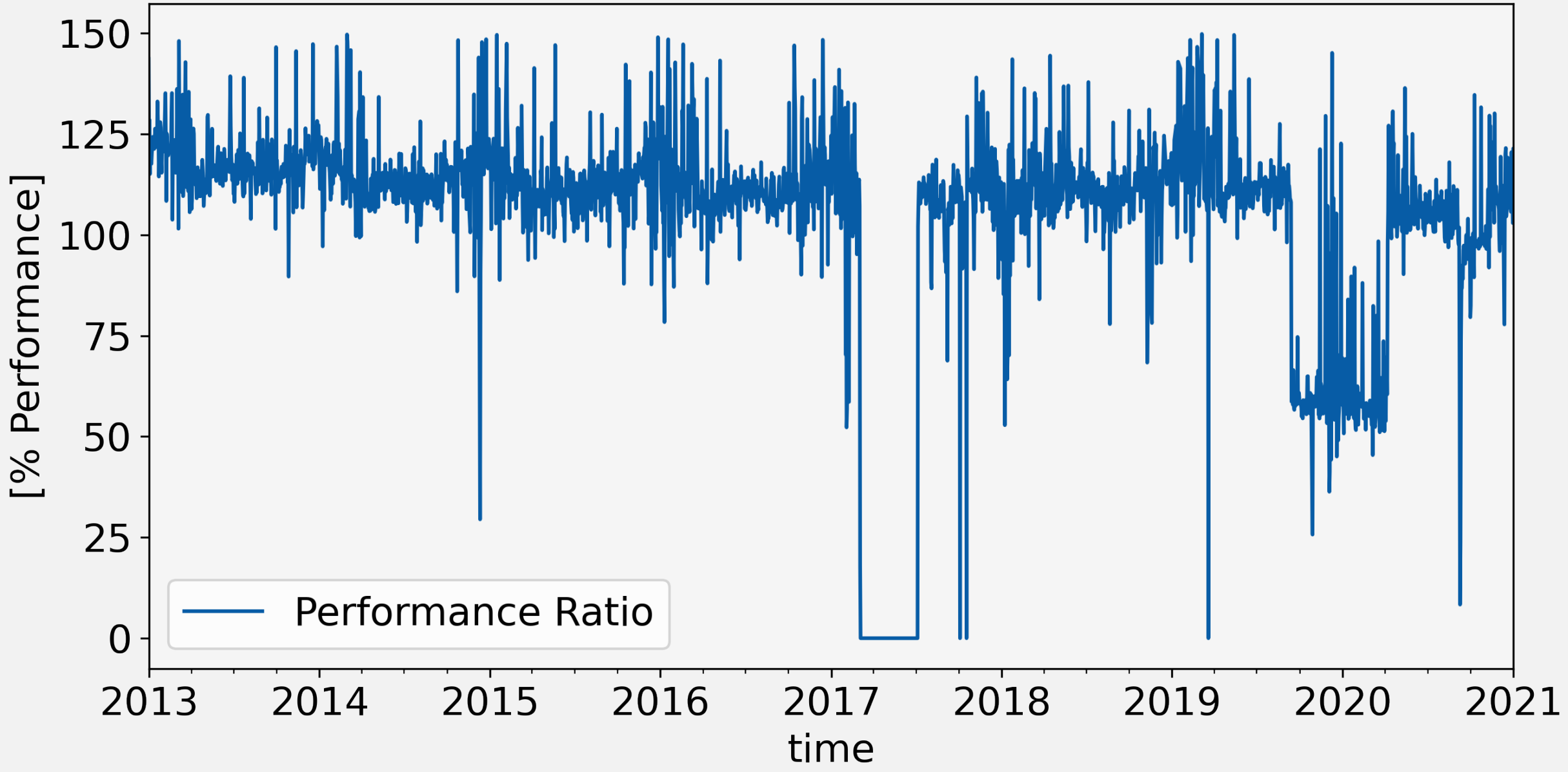
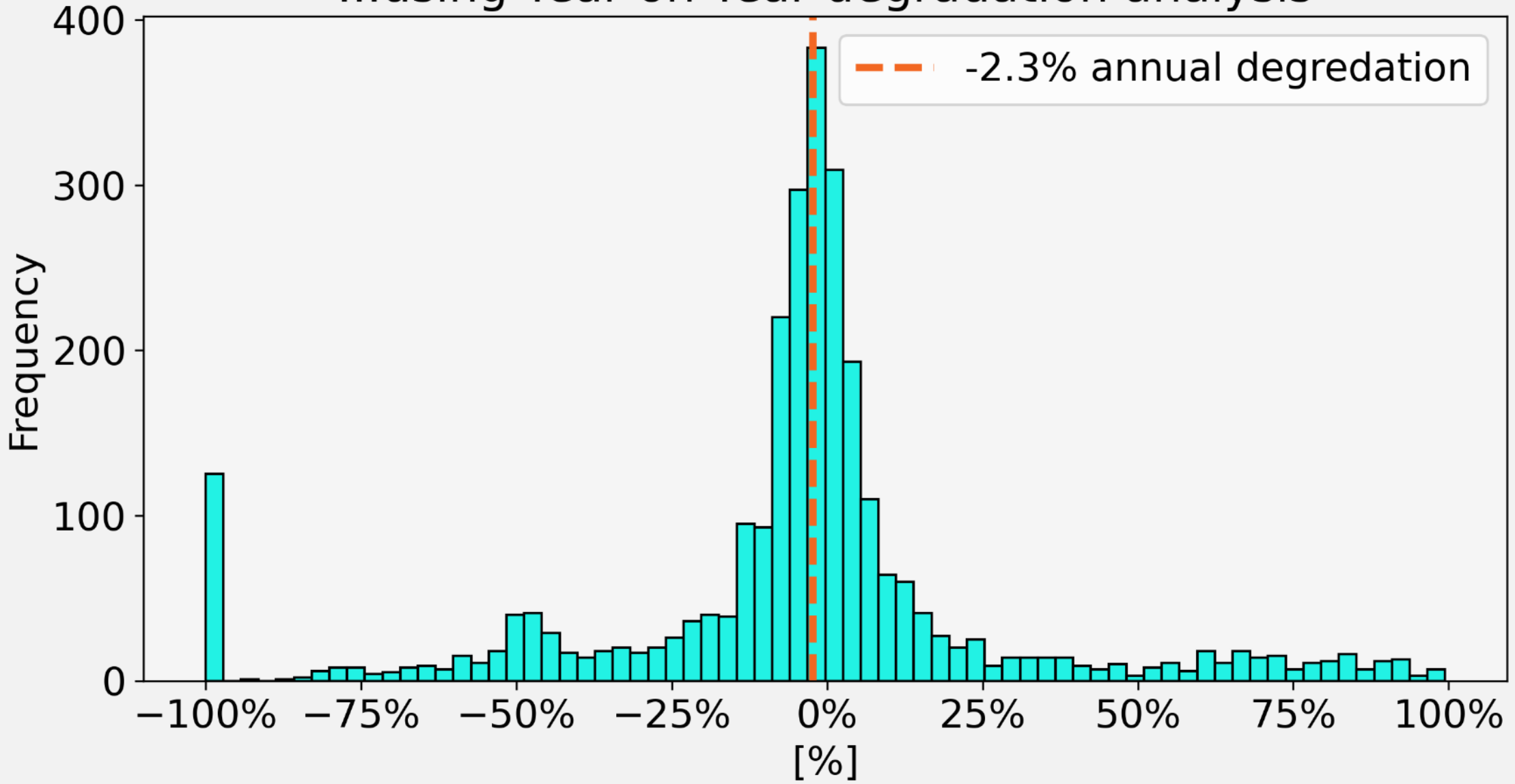
..allows us to detect and diagnose changes in asset conditions



We also can analyse long term **system** performance trends



...using Year on Year degradation analysis



D. C. Jordan, C. Deline, S. R. Kurtz, G. M. Kimball and M. Anderson, "Robust PV Degradation Methodology and Application," in *IEEE Journal of Photovoltaics*, vol. 8, no. 2, pp. 525-531, March 2018, doi: 10.1109/JPHOTOV.2017.2779779.

Module Level Degradation	System Level Degradation
Hot spots	Module degradation **AND:**
Internal circuitry & cracked cells	DC miss-match
Module light induced degradation	Inverter performance
Glass breakage	Wiring, breakers, fuses
Encapsulant	Year on year soil build up
PID	Shade growth
LID	

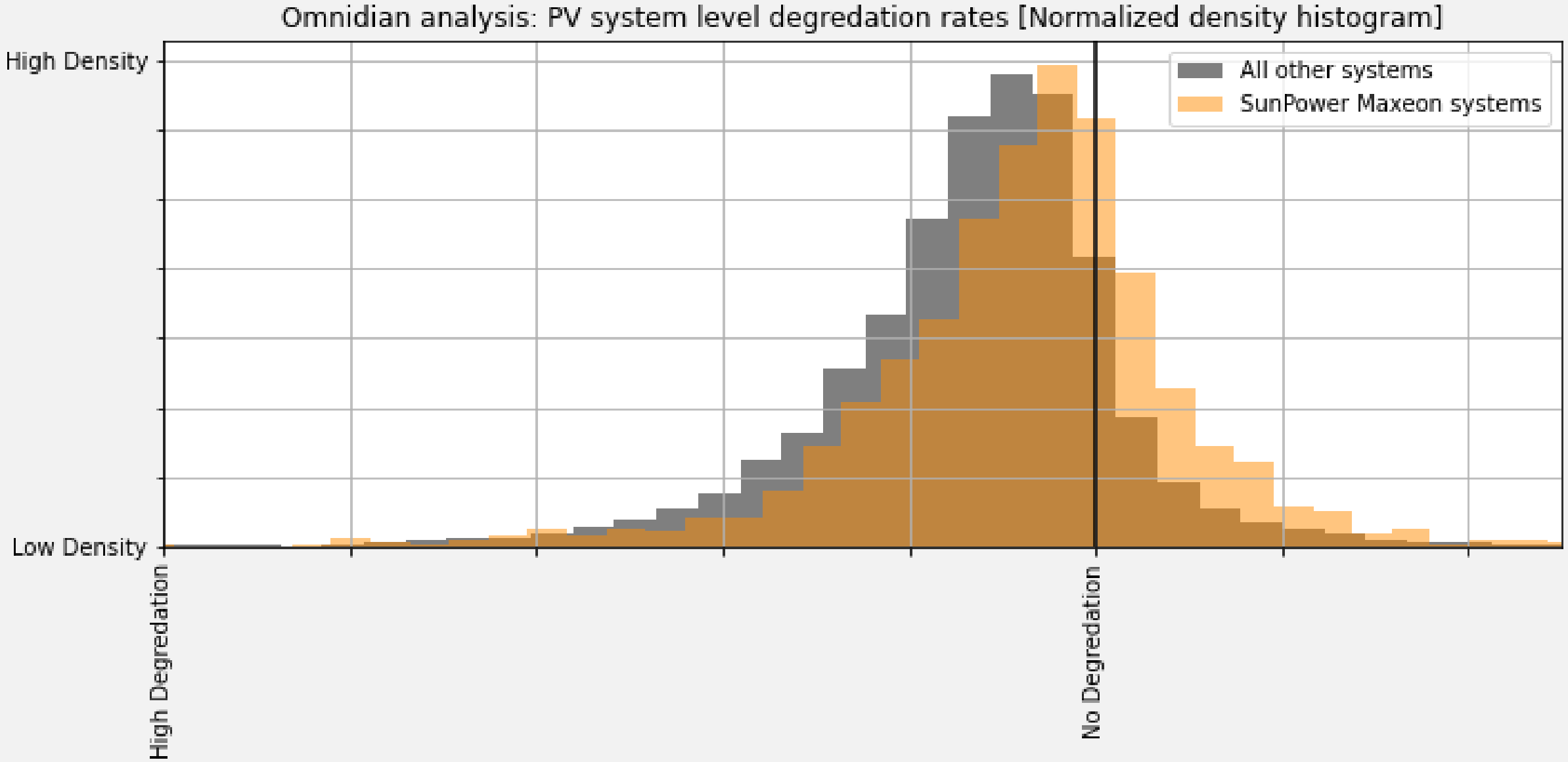
Measuring SunPower Maxeon IBC System Degradation

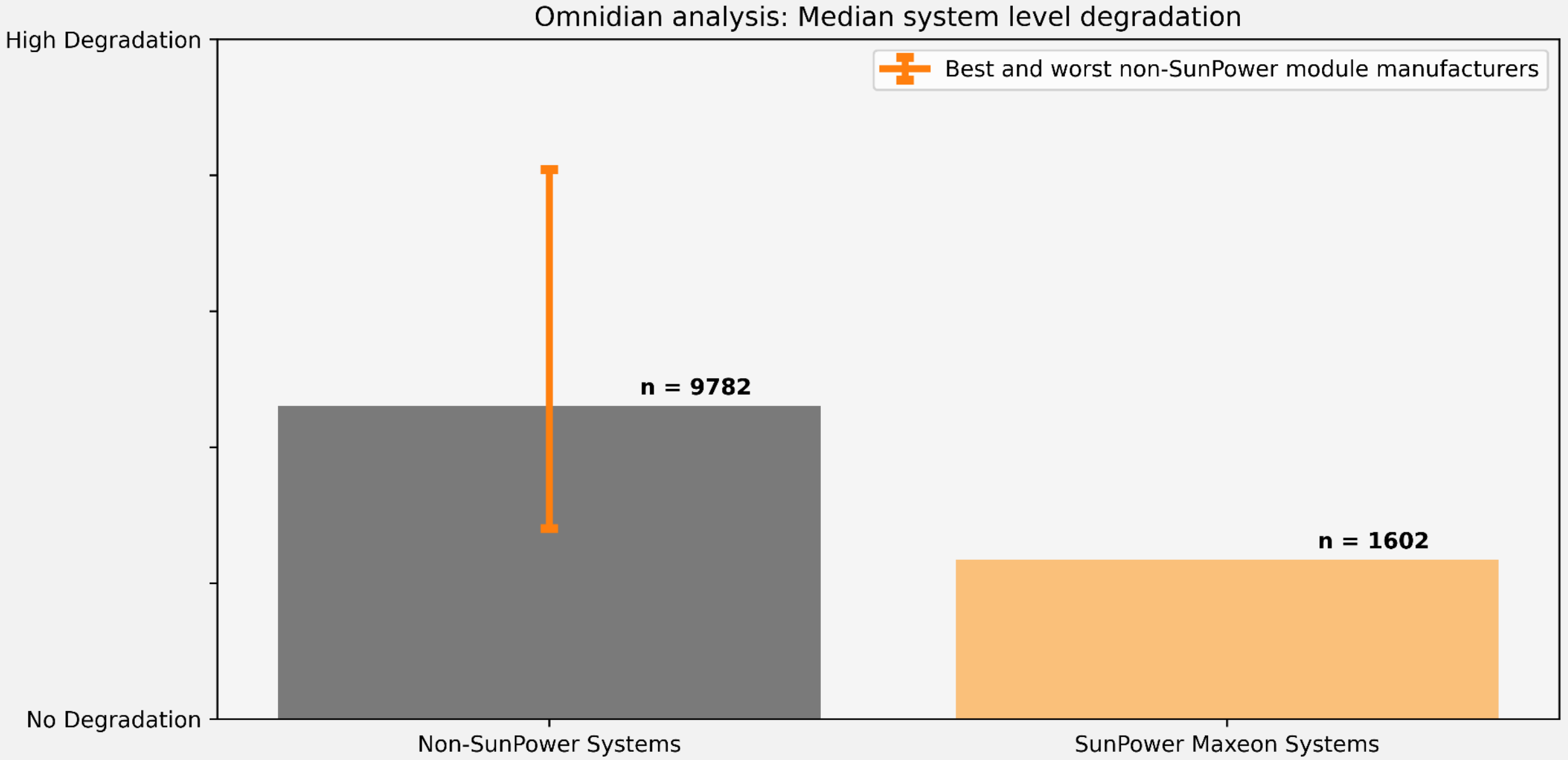
Sampling criteria:

- **Location**: Good distribution across geographies in U.S.
- **Asset age**: Minimum of 5 years(median 9, max 11)
- **Data cleaning:** removal of hardware failures using Omnidian performance analysis.

Split into two populations:

- Assets with only SunPower Modules n = 1602
- Assets without any SunPower Modules : n = 9782


Omnidian analysis: PV system level degredation rates [Normalized density histogram]
High Density
Low Density
All other systems
SunPower Maxeon systems
High Degredation
No Degredation


Omnidian analysis: Median system level degradation
High Degradation
No Degradation
Best and worst non-SunPower module manufacturers
n = 9782
n = 1602
Non-SunPower Systems
SunPower Maxeon Systems

Omnidian Impact

We can offer improved Annual Energy Guarantee: We are confident in offering a more competitive degradation rate in our energy guarantees for Maxeon assets.

And we are including that guarantee in our Performance Assurance product, offered with US commercial and Industrial Maxeon systems.

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