
SUNPOWER®
PERFORMANCE

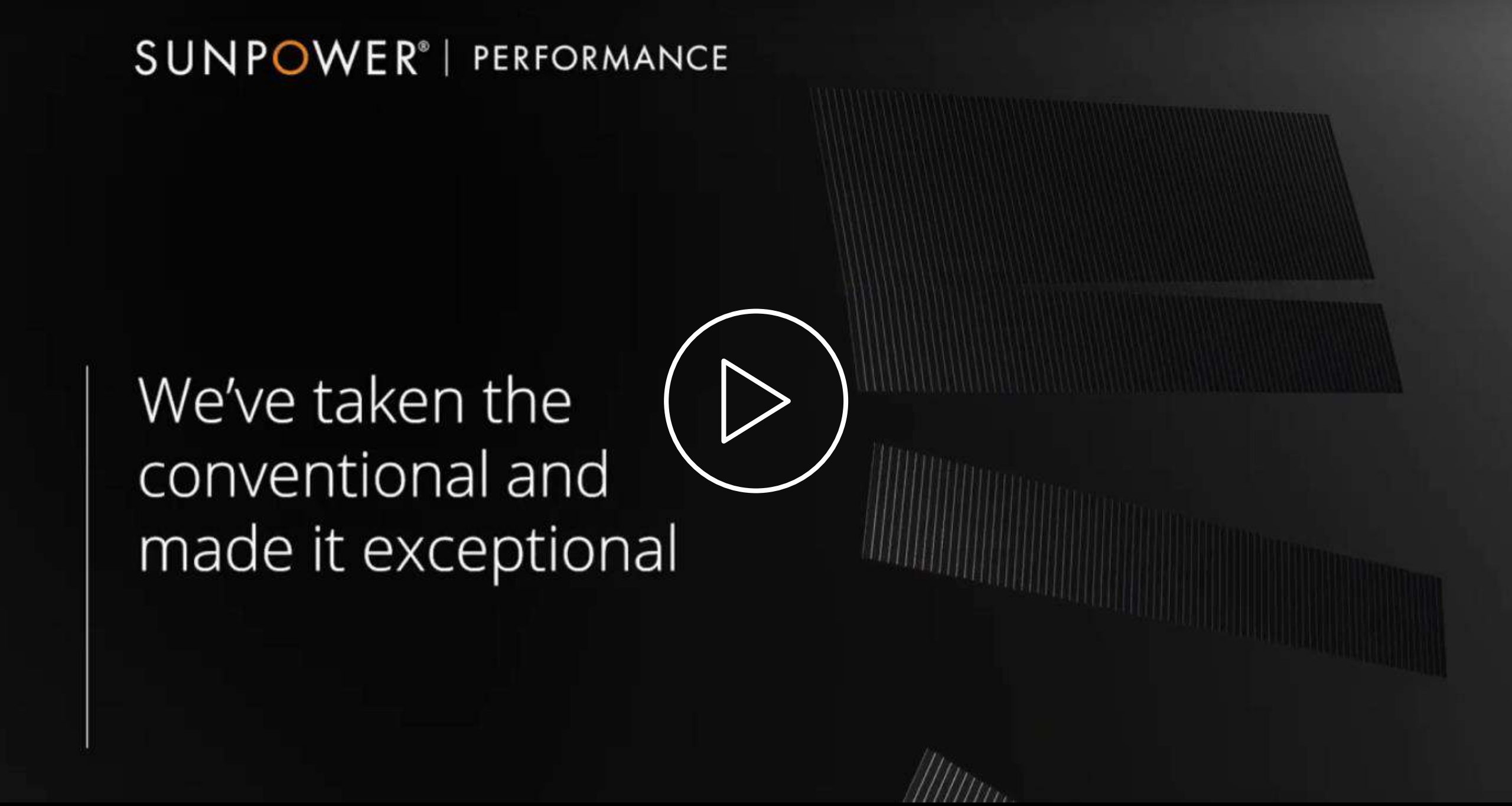
Making the conventional, exceptional.

SUNPOWER®

PERFORMANCE

SUNPOWER®

SUNPOWER® | PERFORMANCE



We've taken the conventional and made it exceptional

Uncompromised Quality, Exceptional Value

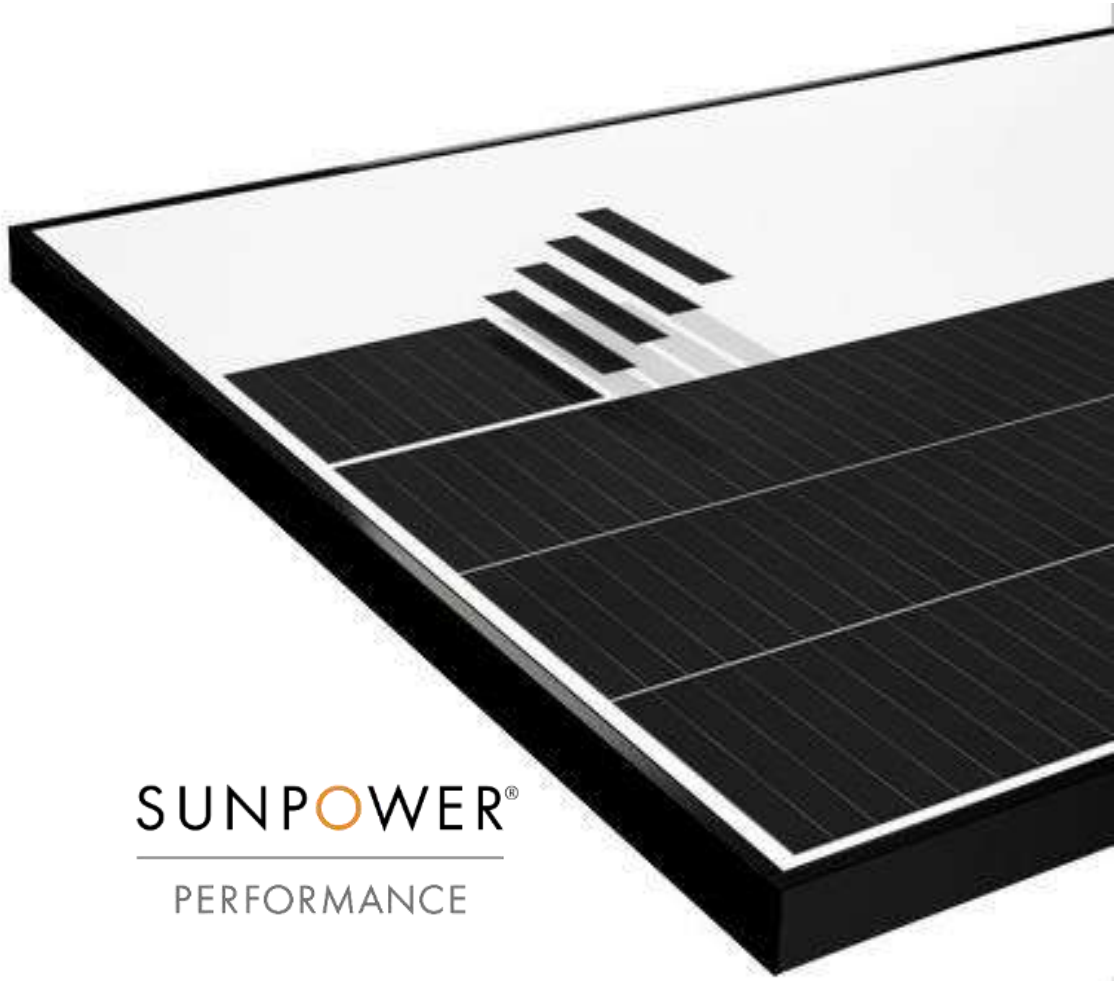
Performance panels provide the confidence to take greater control of your energy future

TRUSTED DURABILITY — Supported by 35 years of SunPower materials, engineering and manufacturing expertise

PROVEN RELIABILITY — Proven results in real-world conditions, backed by a comprehensive 25-year warranty

MORE LIFETIME ENERGY — Greater energy production over a system's lifetime

INNOVATIVE LEADERSHIP — Peace of mind from demonstrated market leadership and technology innovation



An Innovative Panel Design

Performance panels are expertly engineered for strength and durability

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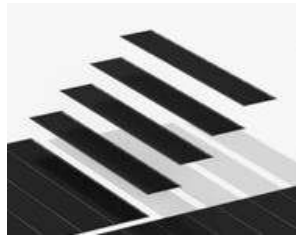
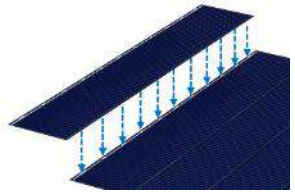


Shingled cell technology

vs.

Conventional Solar Panels

Soldered ribbons connecting cells



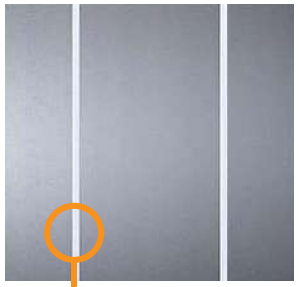
Redundant, solder-free connections

vs.

Thin, screen-printed metal lines

Aerospace-grade conductive adhesive

vs.



Metal paste on back of cell

Vulnerable to Breakage & Corrosion

Making the conventional, exceptional

An innovative shingled cell design delivers more energy, and savings, over traditional front contact panels.

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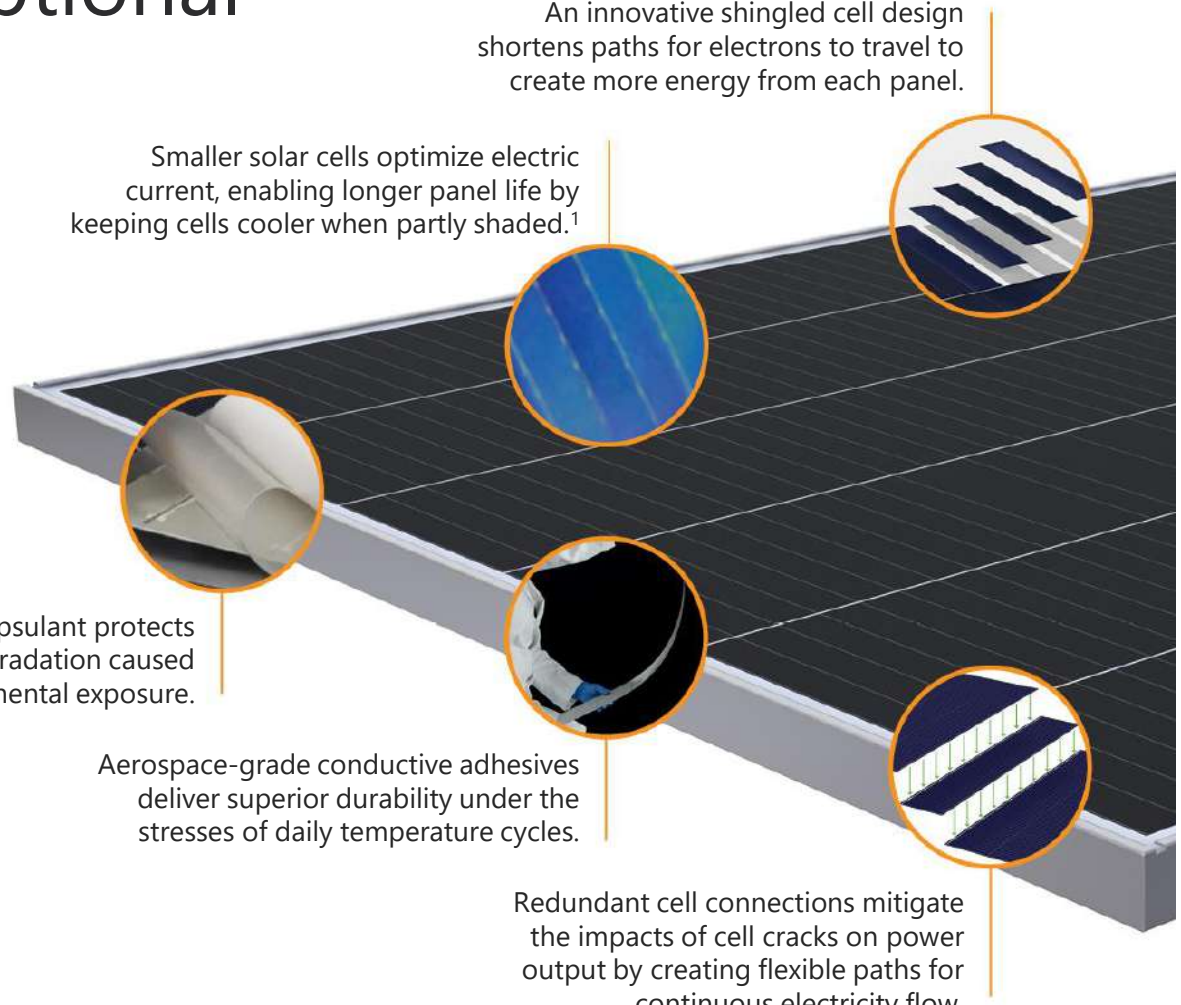
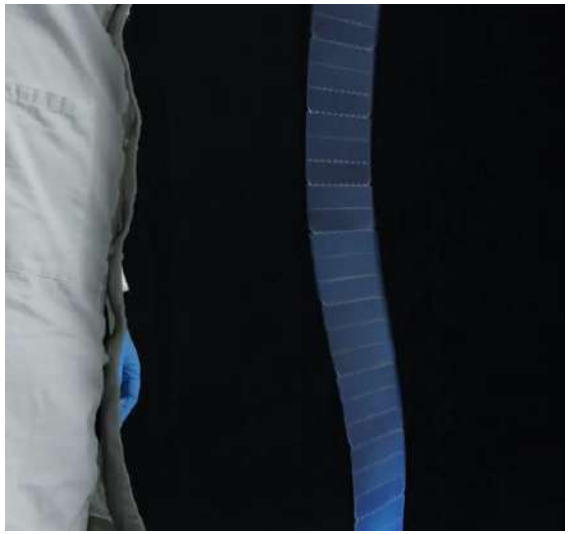
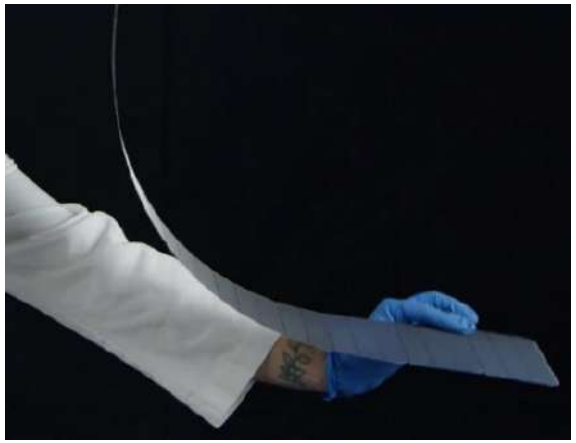


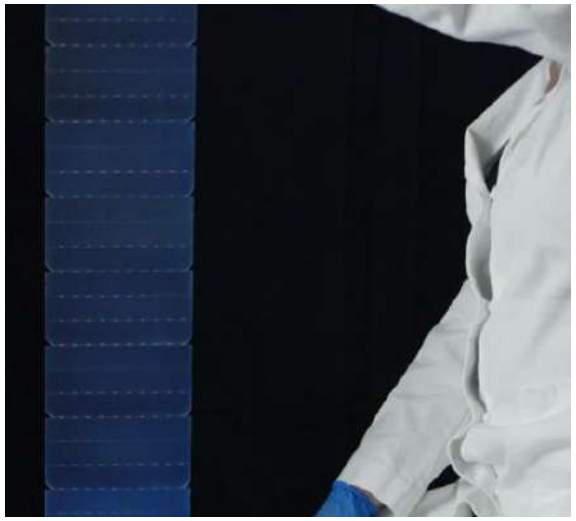
1 SunPower Performance Series – Thermal Performance, Z.Campeau 2016.

Performance Panel Hypercells

The innovative backbone behind Performance panel durability







- Bending, where others break
- Delivering continuous electricity flow
- Enhancing energy output
- Extending panel life

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TRUSTED DURABILITY

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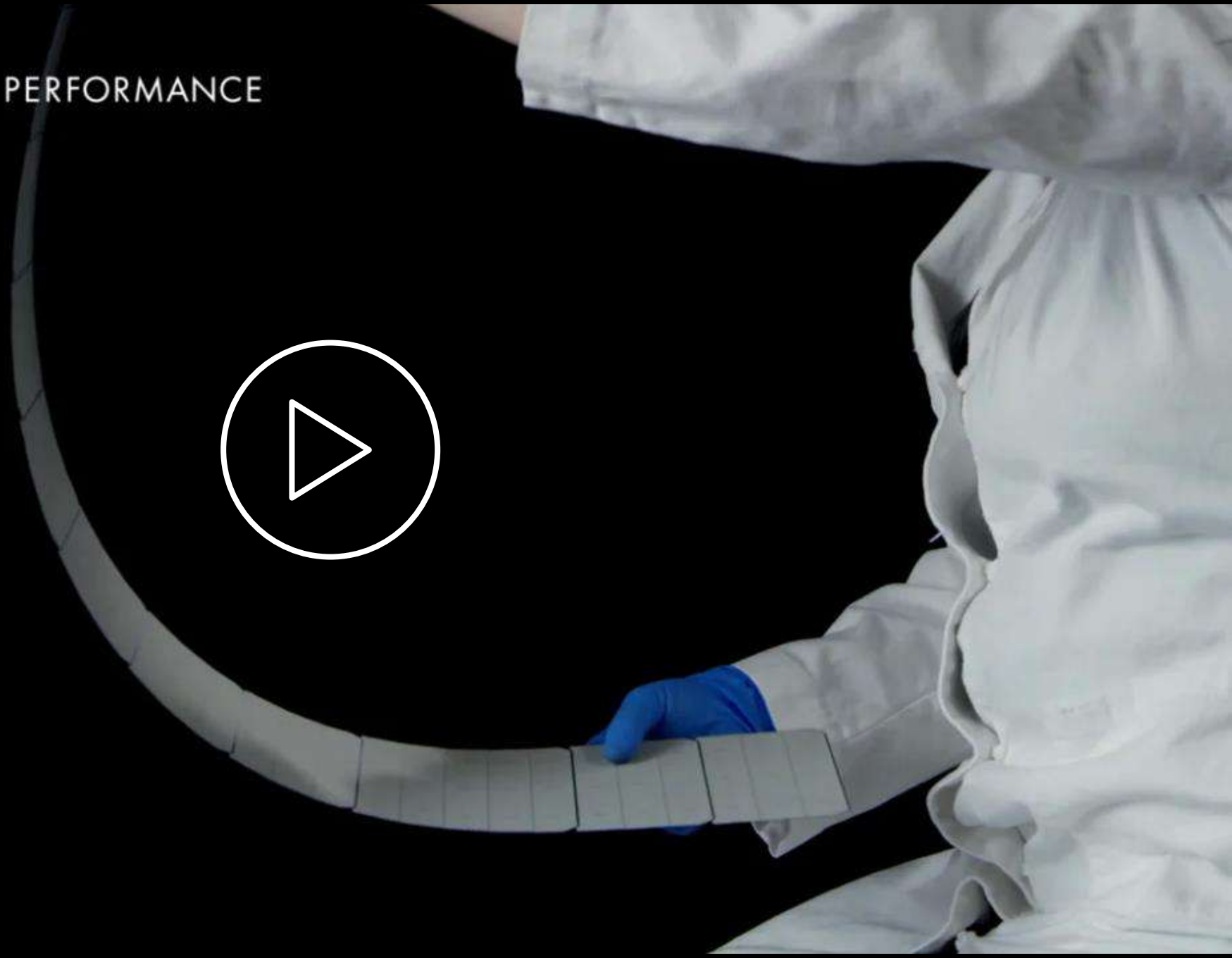

Bending Where Others Break

Conventional front-contact mono PERC

VS.

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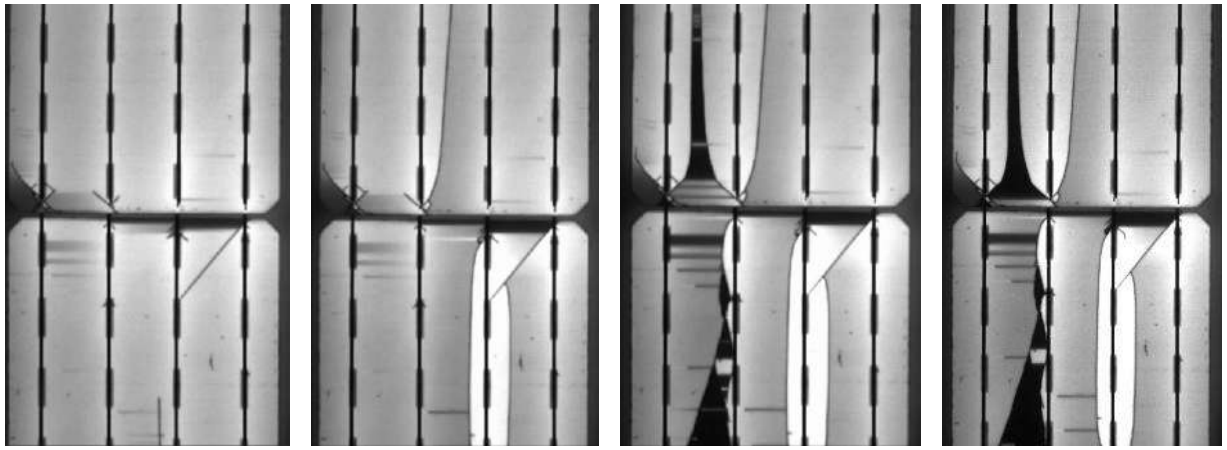
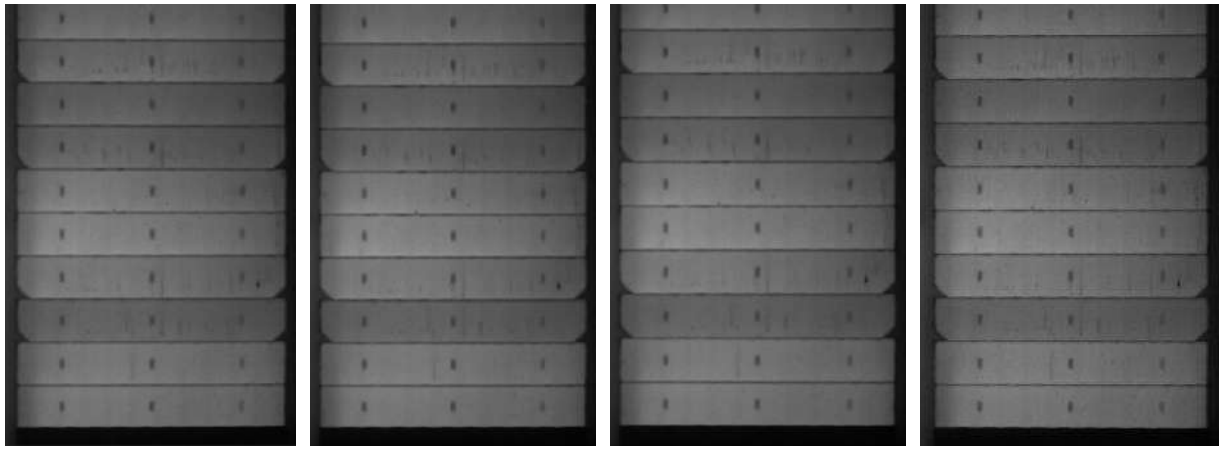


0 N | 150 N | 300 N | 390 N

FORCE APPLIED IN NEWTONS



0 N | 150 N | 300 N | 390 N

FORCE APPLIED IN NEWTONS

Demonstration shows brittleness of typical conventional cells

Smaller cells are less susceptible to breakage

Confines cracks to a smaller portion of the panel

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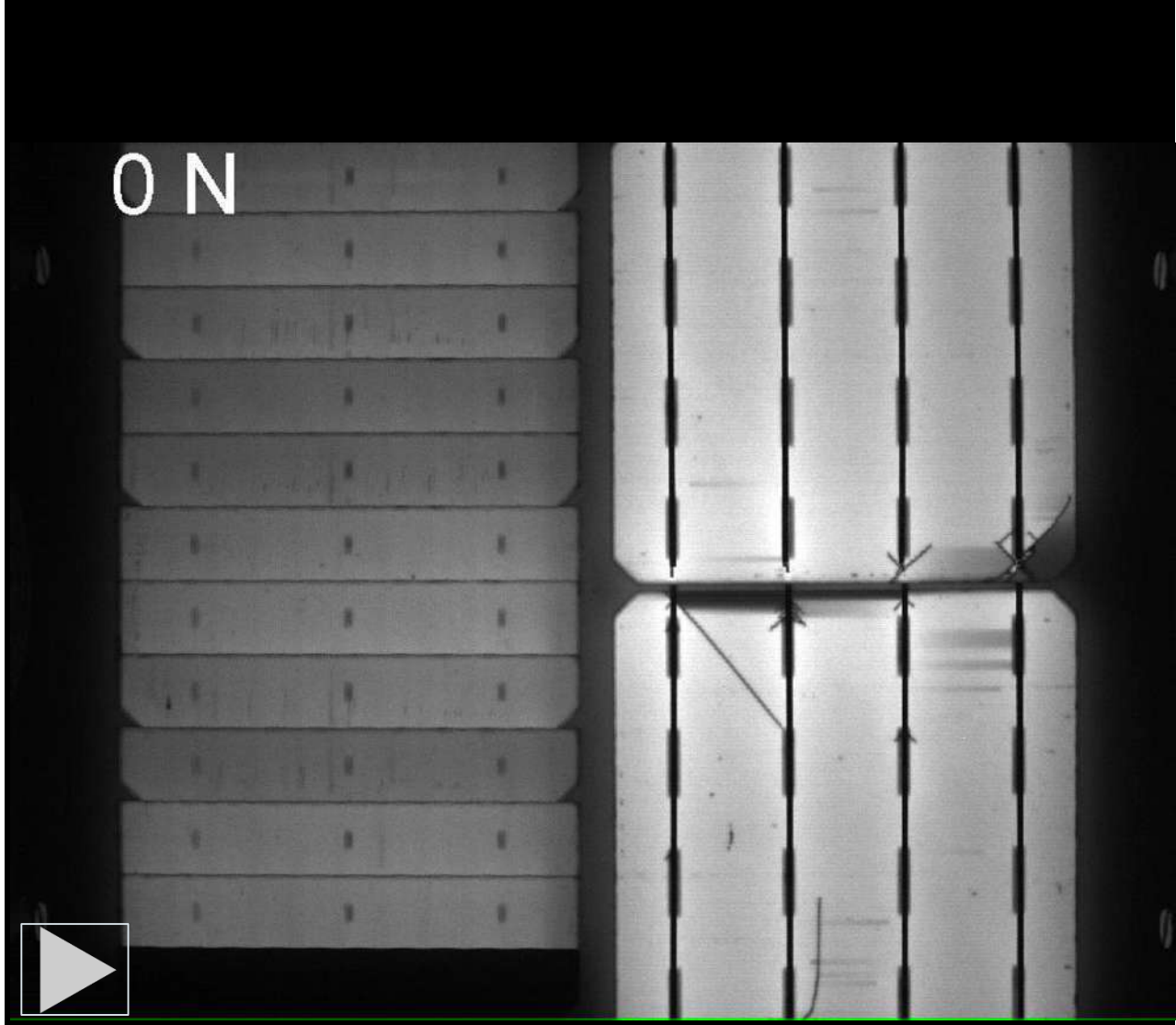
Bending Where Others Break

- Smaller cells are less susceptible to breakage and confine cell cracks to a smaller portion of the panel, maximizing energy generation
- These EL scans from a 4-point bend test at a mechanical load of nearly 400 N show no cracking in the Performance hypercell



EL scans collected from internal SunPower laboratory testing of conventional front contact mono PERC cell stringing vs SunPower Performance panels; September, 2017.

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SUNPOWER® | PERFORMANCE P17

Third-party Reliability Validation

Performance panels were a Top Performer in all categories of the DNV GL Reliability Scorecard[1]

TOP PERFORMER 2017
DNV·GL
PV MODULE RELIABILITY SCORECARD
PERFORMANCE P17

TOP PERFORMER 2018
DNV·GL
PV MODULE RELIABILITY SCORECARD
PERFORMANCE P19

4 of 4
TOP PERFORMER

Thermal Cycling	Damp Heat	Dynamic Mechanical Load	Potential Induced Degradation
✓	✓	✓	✓

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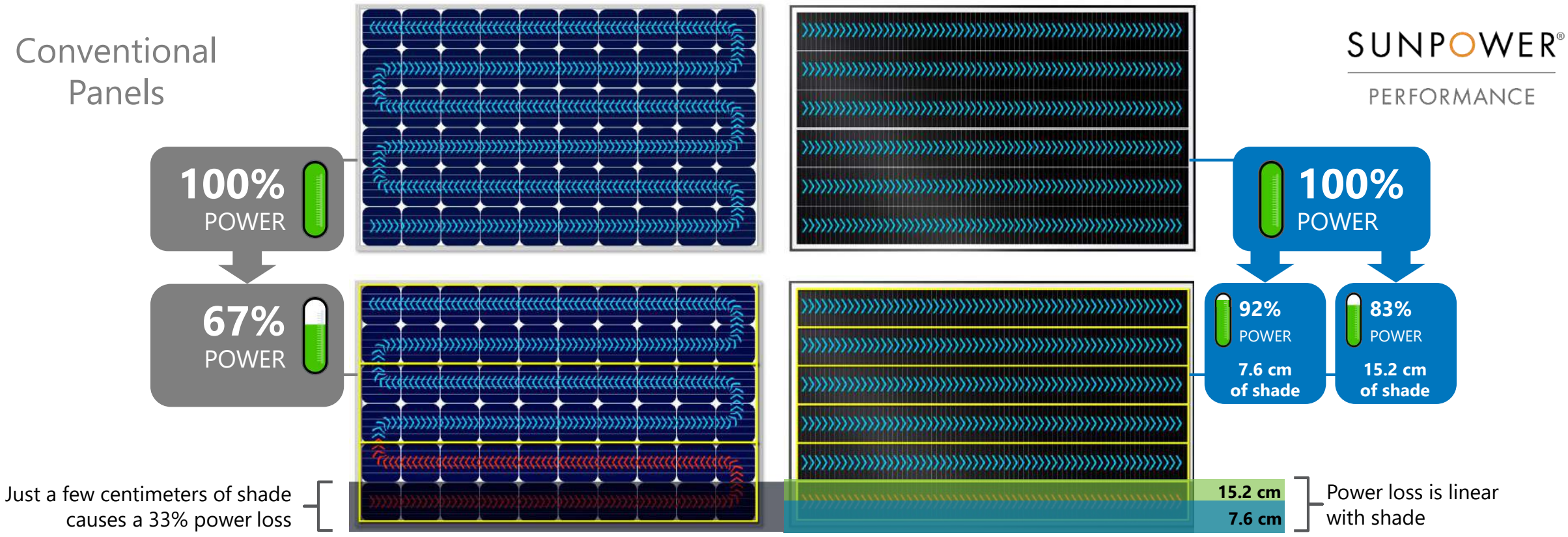
1 SunPower Performance P19 panels identified as top performers in the 2018 DNV GL PV Module Reliability Scorecard: https://www.dnvgl.com/publications/2018-pv-modulereliability-scorecard-117982.

More Reliable Performance in Shade

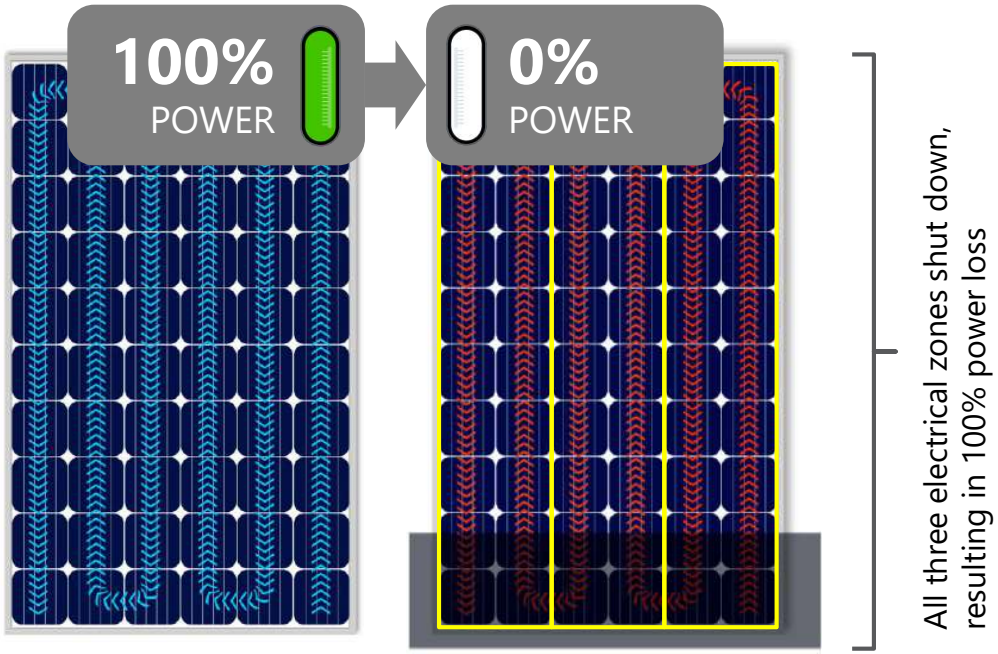
Performance panels are engineered to better withstand the challenges of shading



More Reliable Performance in Shade

Performance panels are engineered to better withstand the challenges of shading

Conventional Panels



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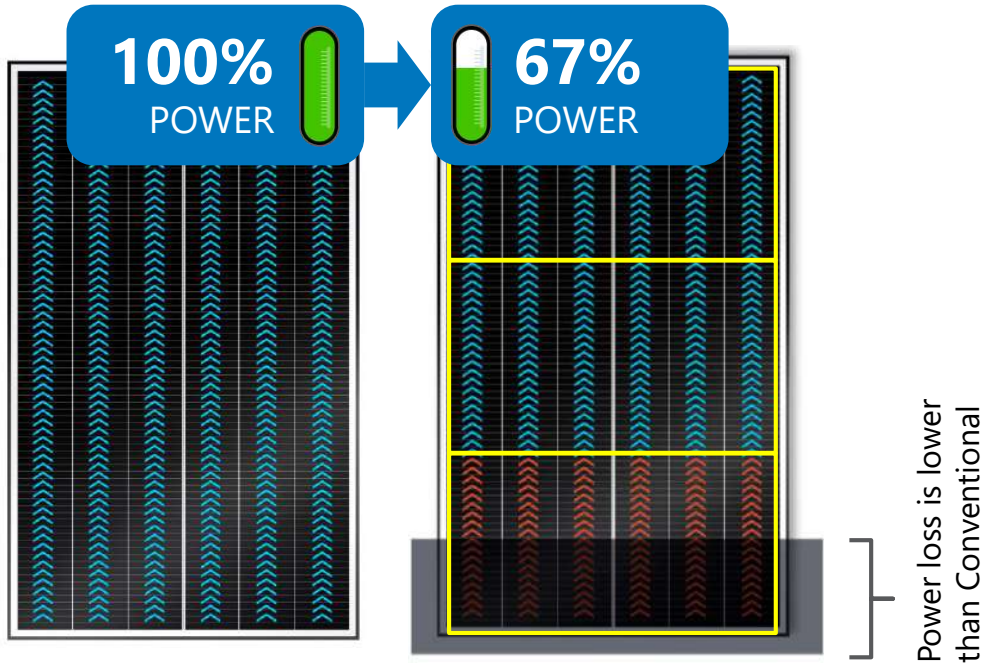
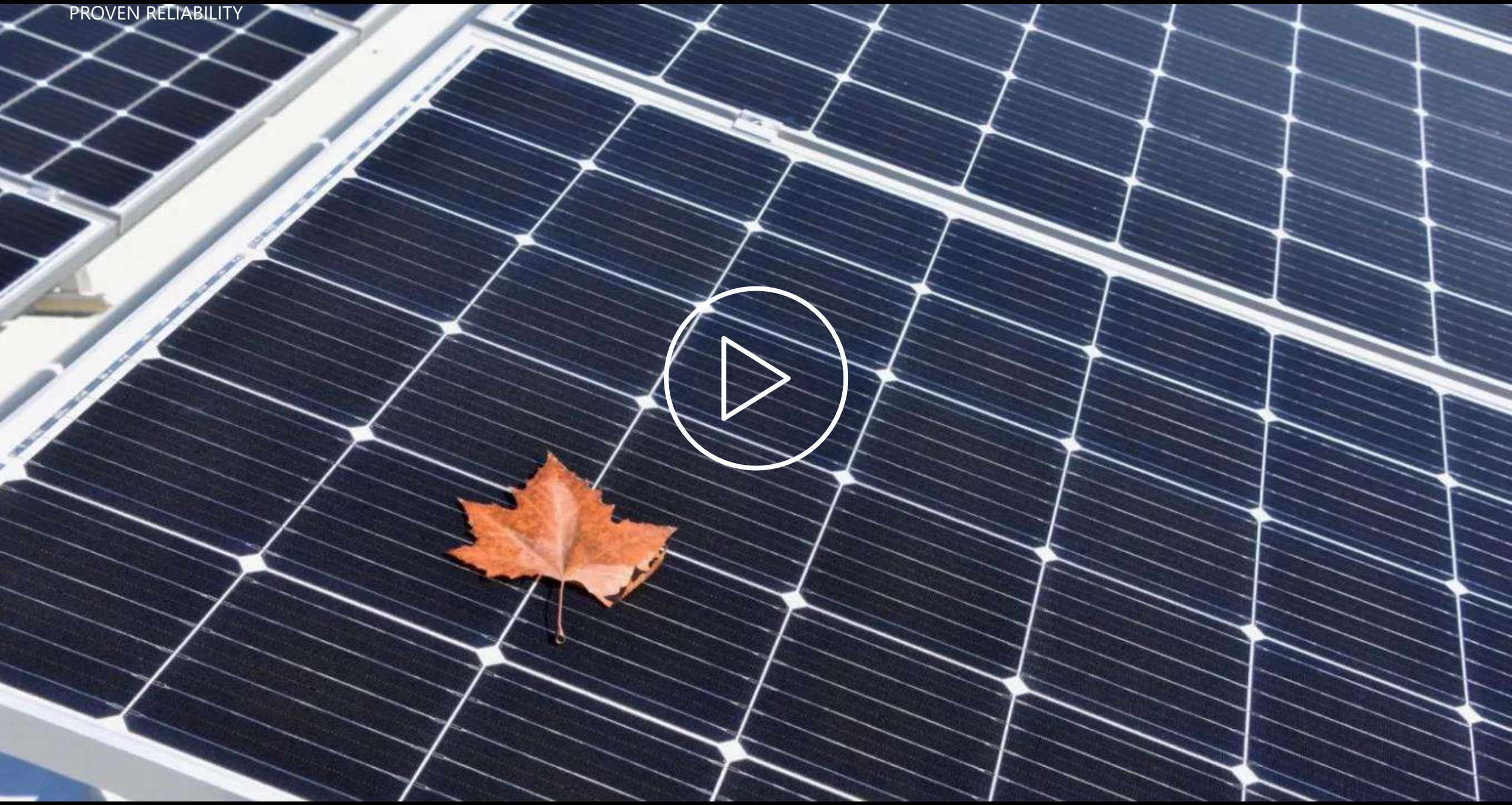




25-year Complete Confidence Panel Warranty

A better warranty starts with a better product

Leading Warranty Coverage[1]

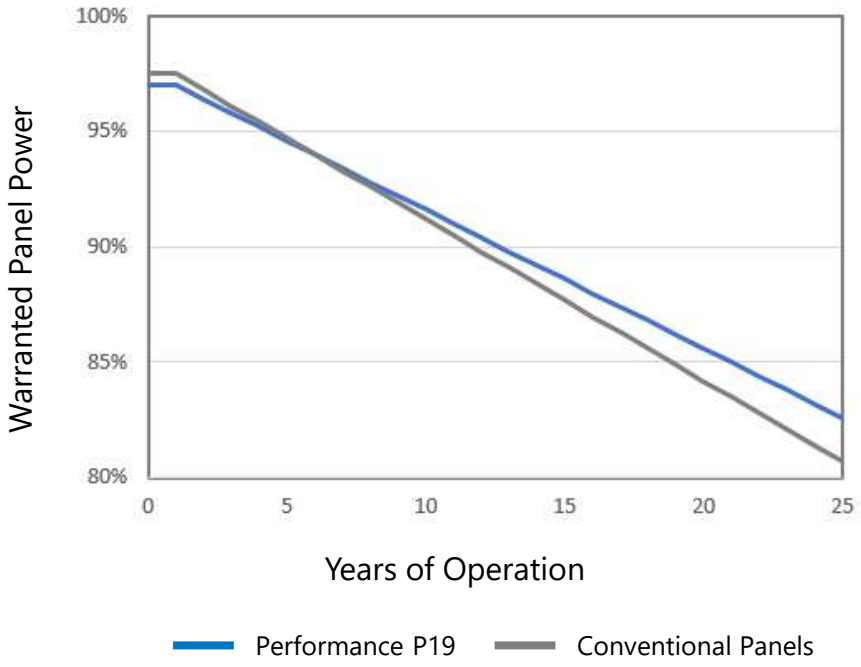
POWER

PRODUCT

SERVICE[2]

SUNPOWER® | PERFORMANCE P19

Higher Power Output than Conventional Power Warranties[1]



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[1] Competitor warranty information provided from latest warranty documentation from various conventional panel manufacturer websites as of October 2019. [2]Repair, replacement or reimbursement will be at SunPower's sole discretion. Warranty service availability may vary from country to country. Ask your installer for full warranty information at the time of purchase or check our website: sunpower.com.

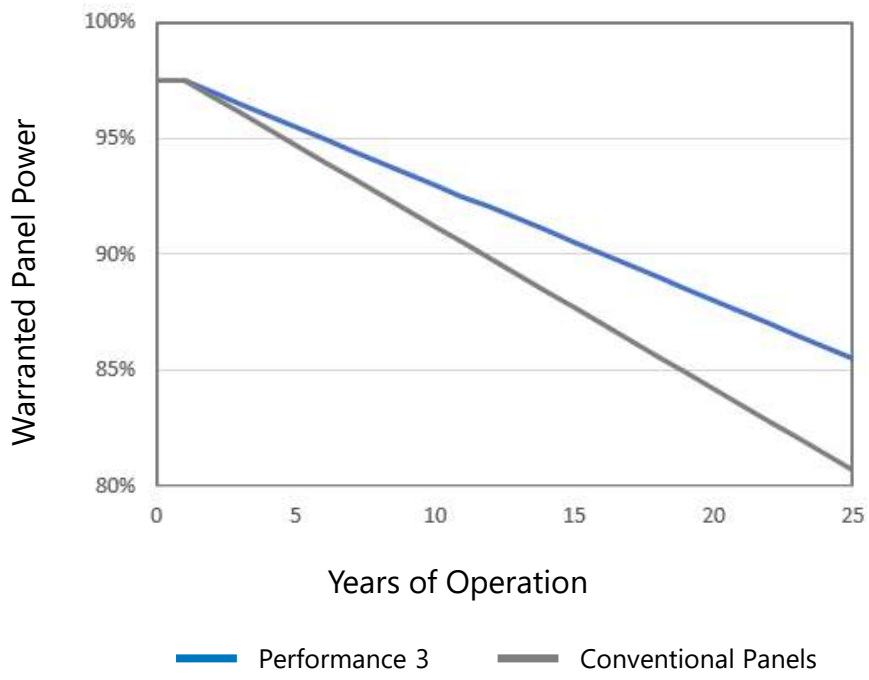
25-year Complete Confidence Panel Warranty

A better warranty starts with a better product

Leading Warranty Coverage[1]

SUNPOWER® | PERFORMANCE 3

Higher Power Output than Conventional Power Warranties[1]



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More Energy Over Conventional Multi-crystalline Panels

Delivering up to 24% more energy, from less space, over 25 years[1]

SUNPOWER® | PERFORMANCE P19

4.2 kW

Conventional Solar

15x 280 W

4.8 kW

Conventional Solar

17 - 18x 280 W

4.8 kW

15x 320 W

1 SunPower 330 W, 19.6% efficient, compared to a Conventional Panel on same-sized arrays (280 W p-multi, 17% efficient, approx. 1.64 m^2), 3% more energy per watt (based on PVSim runs for avg US climate), 0.25%/yr slower degradation rate (Jordan, et. al. Robust PV Degradation Methodology and Application. PVSC 2018; Leidos Engineering. SunPower P-Series Technology Review. 2017).

More Energy Over Conventional Multi-crystalline Panels

Delivering up to 26% more energy, from less space, over 25 years[1]

SUNPOWER® | PERFORMANCE 3

4.2 kW

Conventional Solar

15x 280 W

5.0 kW

Conventional Solar

17 - 18x 280 W

5.0 kW

15x 335 W

SUNPOWER®

1 SunPower 335 W, 19.9% efficient, compared to a Conventional Panel on same-sized arrays (280 W p-multi, 17% efficient, approx. 1.64 m^2), 3% more energy per watt (based on PVSim runs for avg US climate), 0.25%/yr slower degradation rate (Jordan, et. al. Robust PV Degradation Methodology and Application. PVSC 2018).

More Energy Over Conventional Mono-crystalline Panels

- Delivering up to 7% more energy, from less space, over 25 years[1]

SUNPOWER® | PERFORMANCE 3

4.65 kW

Conventional Solar

15x 310 W

5.0 kW

Conventional Solar

16 - 17x 310 W

5.0 kW

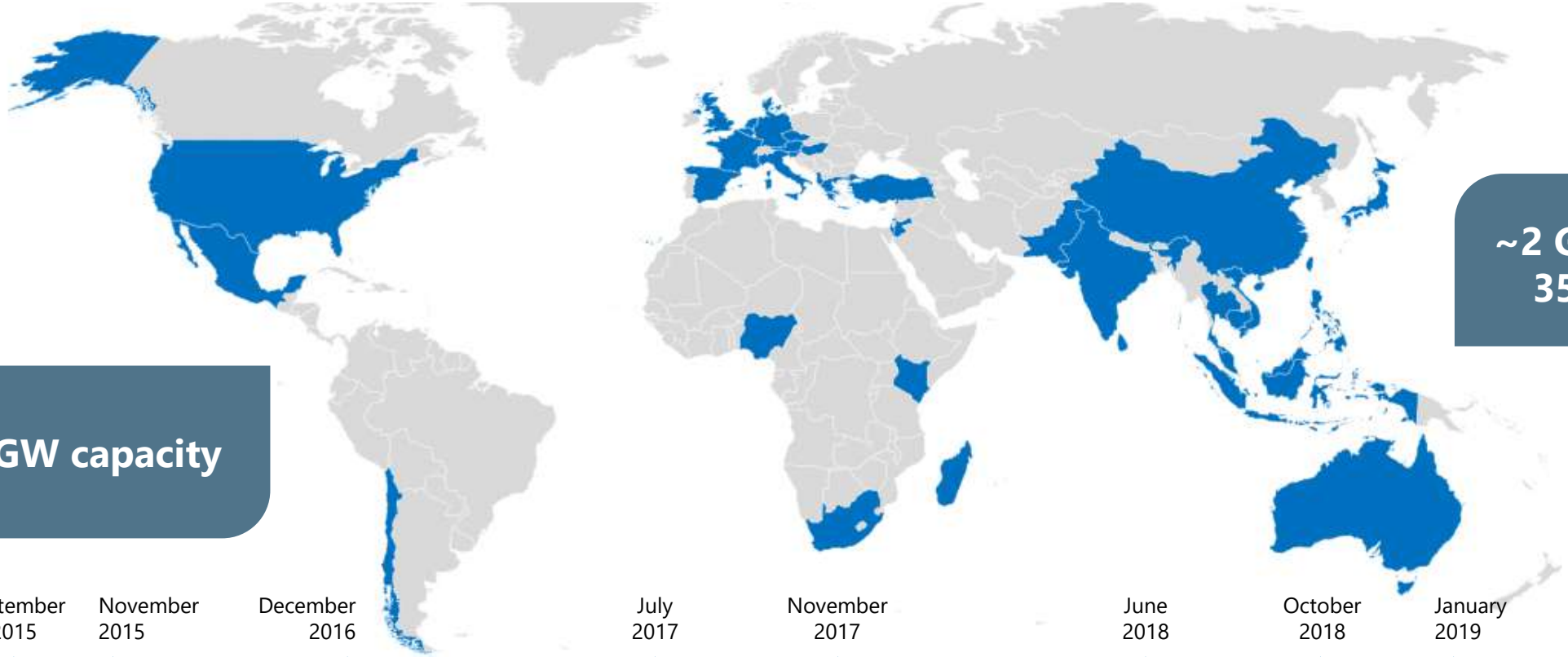
15x 335 W

SUNPOWER®

1 SunPower 335 W, 19.9% efficient, compared to a Conventional Panel on same-sized arrays (310 W mono PERC, 19% efficient, approx. 1.64 m^2), 0.25%/yr slower degradation rate (Jordan, et. al. Robust PV Degradation Methodology and Application. PVSC 2018).

Performance Panel Track Record

SunPower was the first manufacturer to materially commercialize shingle-cell solar panels



2.2 GW capacity

~2 GW shipped to 35+ countries

September 2015	November 2015	December 2016	July 2017	November 2017	June 2018	October 2018	January 2019	January 2020
Cogenra Acquisition	1st P17 panels on 25 MW pilot line in USA	Mexico manufacturing (400MW)	1st P19 panel manufacturing in China (750MW)	World's largest shingled panel project completed (NextEra, 125 MW)	Additional P19 manufacturing in China (1.25 GW)	349 MW supply agreement (Innogy, Belectric, Australia)	Additional P19 manufacturing in USA (220 MW)	Launch of Performance 3 panel

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Protecting Intellectual Property in a Global Supply Chain

- Products (solar panels) routinely leave their country of manufacture to be imported into new markets
- Device and manufacturing patents that have been granted in the country of import afford the patent holder protection of their intellectual property in that market
- By purchasing products from an authorized source, the infringement risk is mitigated for all parties to a transaction

Patents in the country of import mitigate infringement risk for all parties in a licensed transaction.

IMPORTER FINANCIER DISTRIBUTOR INSTALLER

Performance Panel IP Timeline

2014 / 2015
Original patent applications filed

April 2015
8633
ZL 201530098884.4
002684043-0001
002684043-0002
1540698
1540606

March 2016
D750,556
The ornamental design for a solar panel

May 2016
9,356,184
Module comprising cells arranged in a shingled manner to form super cells

July 2016
9,401,451
9,397,252
Enhancements to shingled solar cell module

Sept 2016
D767,484
Enhancements to the ornamental design for a solar panel

Nov 2016
9,484,484
Enhancements to shingled solar cell module

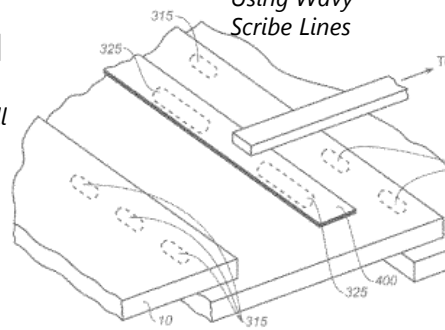
Oct 2017
9,780,253
Enhancements to shingled solar cell module

Nov 2017
004509917
Process To Reduce Shingled PV Strip Overlap Using Wavy Scribe Lines

Jan 2018
9,882,077
9,876,132
Enhancements to shingled solar cell module

April 2018
9,947,820
Shingled solar cell panel employing hidden taps

June 2018
30-960344
Process To Reduce Shingled PV Strip Overlap Using Wavy Scribe Lines



July 2018
2016/08010
Shingled solar cell module

Sept 2018
10,084,104
Enhancements to shingled solar cell module

30-975194
30-975195
30-975196
Process To Reduce Shingled PV Strip Overlap Using Wavy Scribe Lines

Oct 2018
10,090,430
D832,203
System for manufacturing a shingled solar cell module

ZL2017303739912
Solar Hypercell

1616818
1617052
1616879
Solar panel

Nov 2018
1620103
1620104
1620105
1620106
1620287
1620107
Solar panel

Dec 2018
1621479
1621638
Solar panel

30-988246
Process To Reduce Shingled PV Strip Overlap Using Wavy Scribe Lines

May 2019
347994
365318
High efficiency configuration for solar cell string

I660518
Shingled solar cell module

ZL2017303739753
Solar hypercell

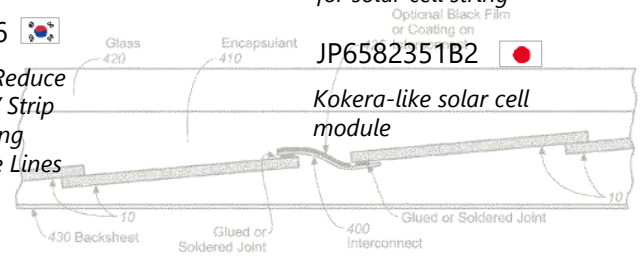
ZL2018300782826
Module Comprised of Interlocking Shingled Wafer Strips

July 2019
ZL 2017105232371
6554703
Shingled solar cell module

Aug 2019
6575671
Shingled solar cell module

Sept 2019
2917940
56.665
High efficiency configuration for solar cell string

JP6582351B2
Kokera-like solar cell module



Oct 2019
ZL 201680000981.7
Configuration for overlapping solar cell module

30-1026971
Process To Reduce Shingled PV Strip Overlap Using Wavy Scribe Lines

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IHS Markit 2019 PV Module Advance Technologies Report

- The 2nd edition of the report covers advanced panel technologies such as half-cell, shingle and bifacial.
- Of note, is the IHS assessment of SunPower® Performance panels amongst other shingled panel offerings.

"In addition to challenges associated with one company (SunPower) owning the patent, the technology barrier to enter shingle module production is the highest among all existing advanced module technologies."[1]


Power & Energy Technology: Solar

Report

PV Module Advance Technologies Report – 2019

8 April 2019

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Jessica Jin, Senior Analyst, +86 21 2422 9043, jessica.jin@ihsmarkit.com

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1 IHS Markit – PV Module Intelligence Service. PV Module Advance Technologies Report –2019.

Performance Line Evolution

Generation 1
2015

PERFORMANCE P17

P17 COM

350W, 345W

Generation 2
2018

PERFORMANCE P19

P19 COM

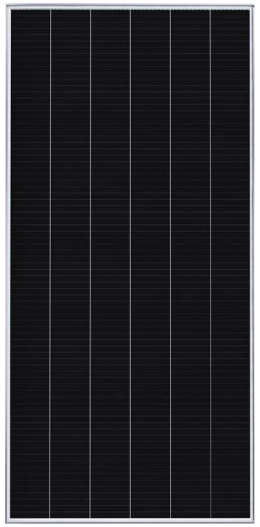
410-400W

P19 BLK

320-315W

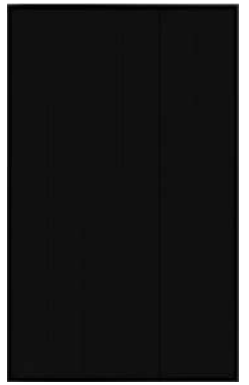
Generation 3
2020

PERFORMANCE 3



P3 COM

425-415W



P3 BLK

335-315W

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SunPower® Performance Panel Line Features

Performance 19 Black (Residential)

40 mm frame

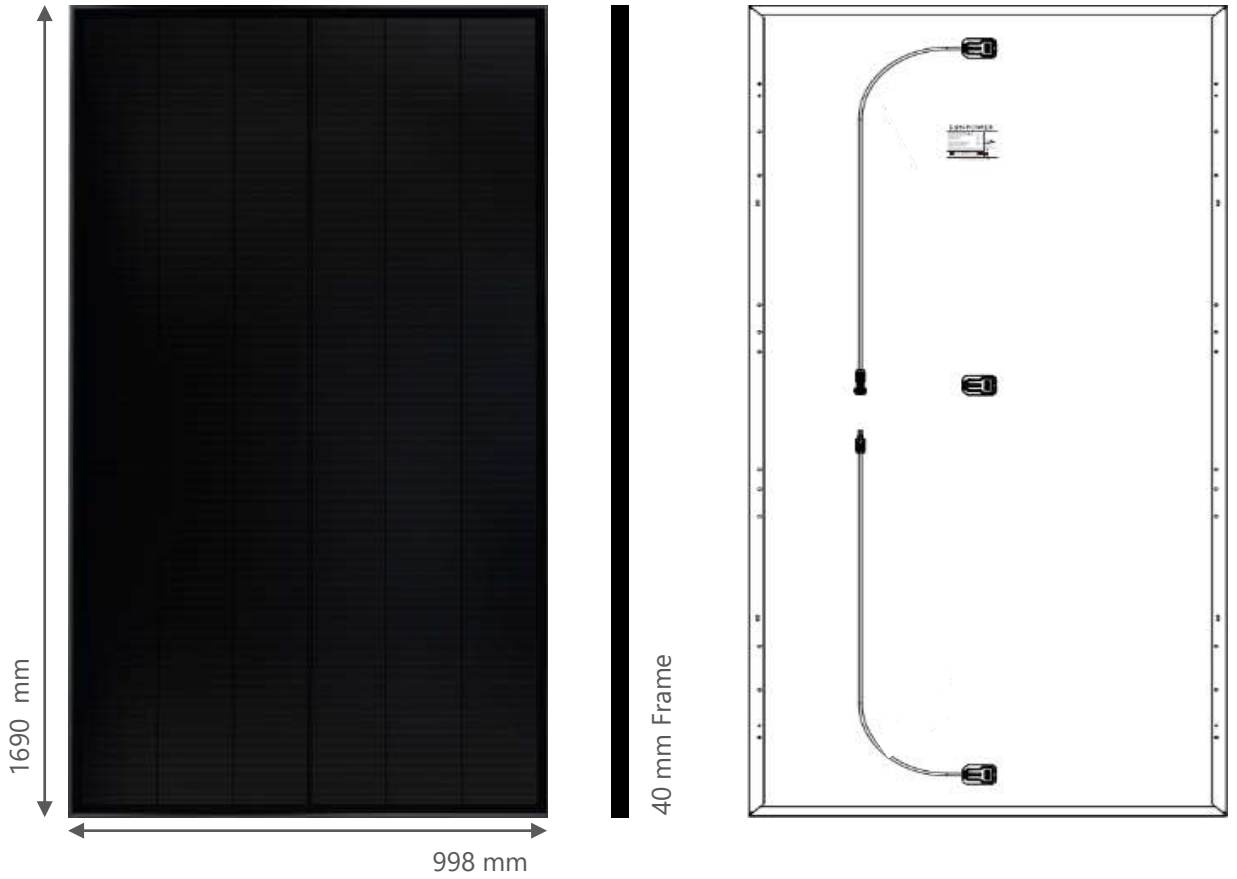
26 modules per pallet

MC4 connectors

3 Junction boxes, 3 Diodes (1 each)

1200 mm cables

Certified to IEC Standard (2016 Ed.)



BETTER PRODUCT · BETTER WARRANTY
25-yr SunPower Complete Confidence

TOP PERFORMER 2018
DNV·GL
PV MODULE RELIABILITY SCORECARD

Power

Up to 325 W

Efficiency

Up to 19.3%

SunPower® Performance Panel Line Features

Performance 3 Black (Residential)

NEW Larger cells

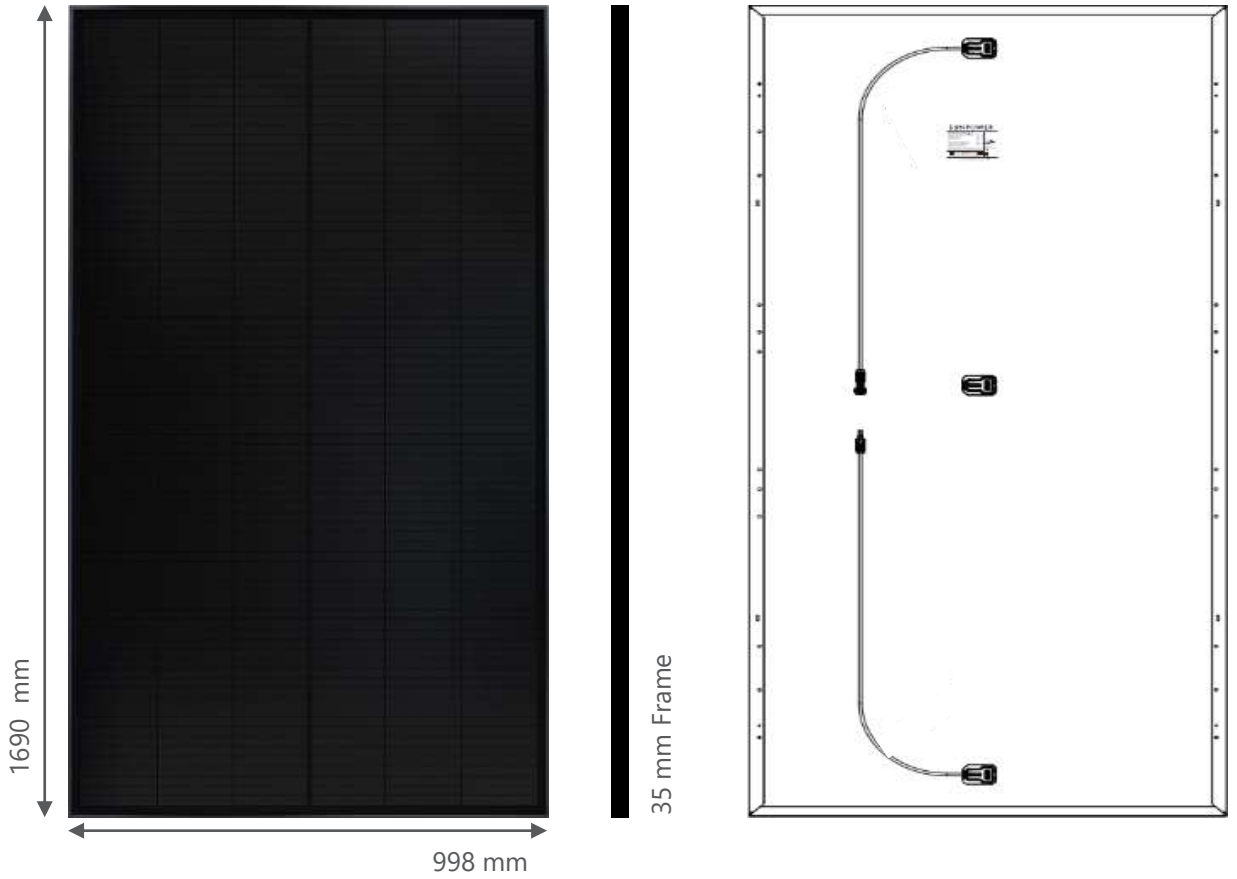
NEW 35 mm frame

NEW 30 modules per pallet

MC4 connectors

3 Junction boxes, 3 Diodes (1 each)

1200 mm cables



Power

Up to **335 W**

Efficiency

Up to **19.9%**

SunPower® Performance Panel Line Features

Performance 3 Thinner 35mm Frame (Residential Only)

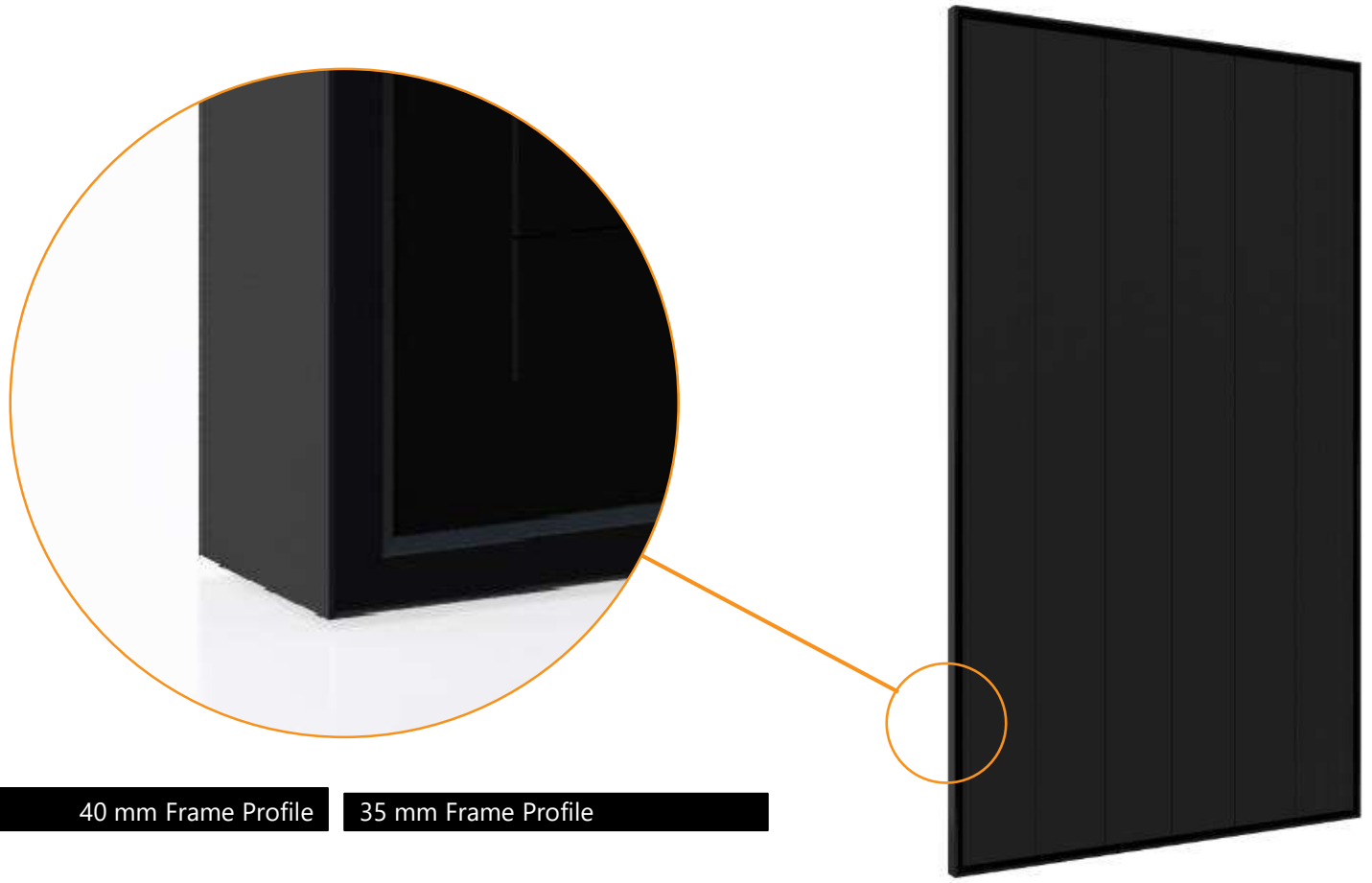
No impact to datasheet load ratings

Minimal impact to end-mount ratings

No change to existing clamping zones

Adds 4 more panels to each pallet

Reduces panel weight for easier install



SunPower® Performance Panel Line Features

Performance 19 COM (Commercial)

MC4 connectors

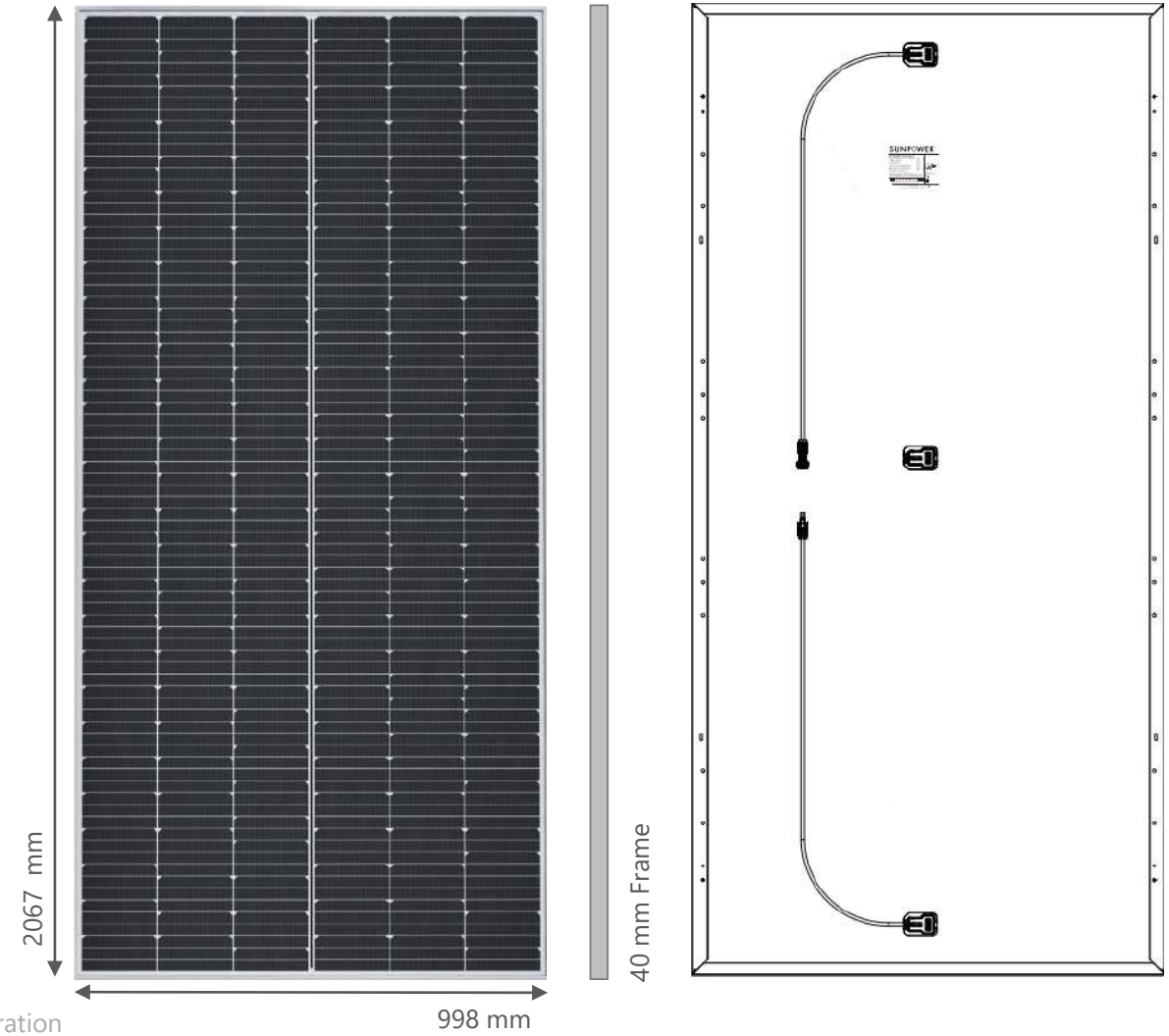
40 mm frame

3 Junction boxes, 3 Diodes (1 each)

1000V Maximum System Voltage

1000 mm cables

Certified to IEC Standard (2016 Ed.)



BETTER PRODUCT · BETTER WARRANTY
25-yr SunPower Complete Confidence

TOP PERFORMER 2018
DNV·GL
PV MODULE RELIABILITY SCORECARD

Power

Up to **410 W**

Efficiency

Up to **19.9%**

SunPower® Performance Panel Line Features

Performance 3 COM (Commercial)

NEW Larger, full square cells

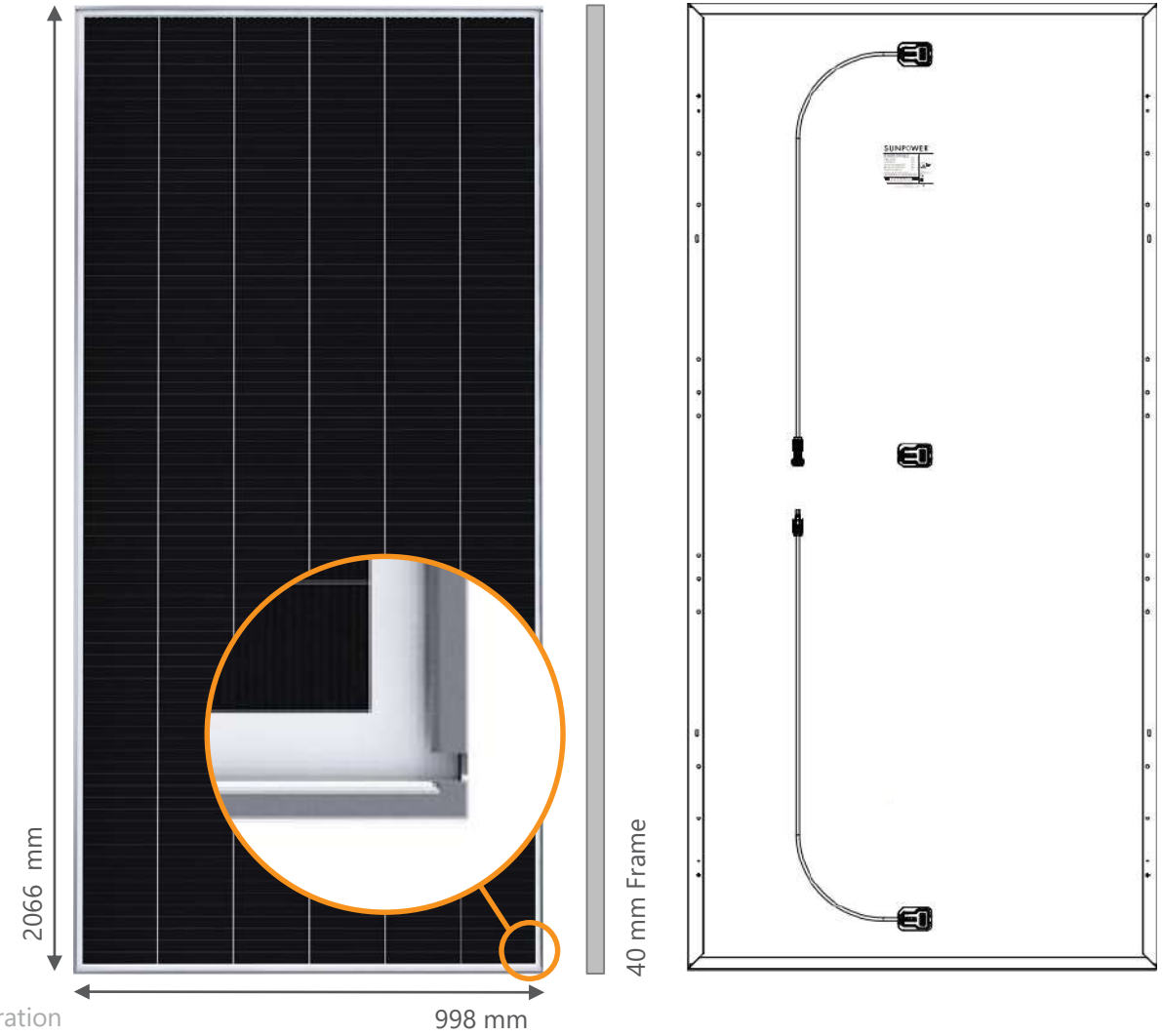
NEW MC4 EVO2 connectors for 1500V

NEW Drainage notch

40 mm frame

3 Junction boxes, 3 Diodes (1 each)

1200 mm cables



BETTER PRODUCT · BETTER WARRANTY
25-yr SunPower Complete Confidence

Power
Up to 425 W

Efficiency
Up to 20.6%

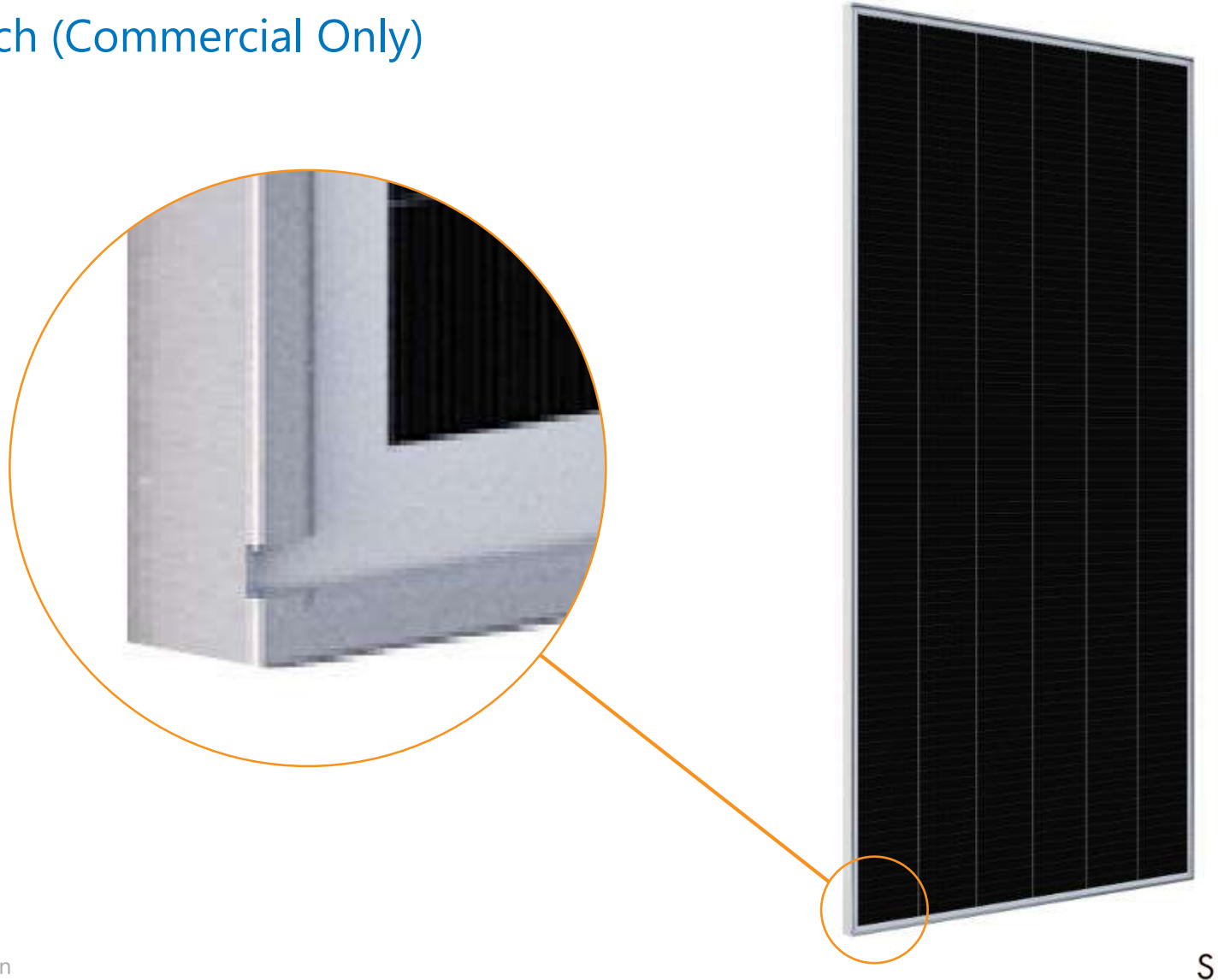
SunPower® Performance Panel Line Features

Performance 3 Drainage Notch (Commercial Only)

Avoids moisture accumulation on frame

Prevents dirt build-up on panel edges

Optimizes surface runoff for higher yield



BACK UP

SUNPOWER® | MAXEON®

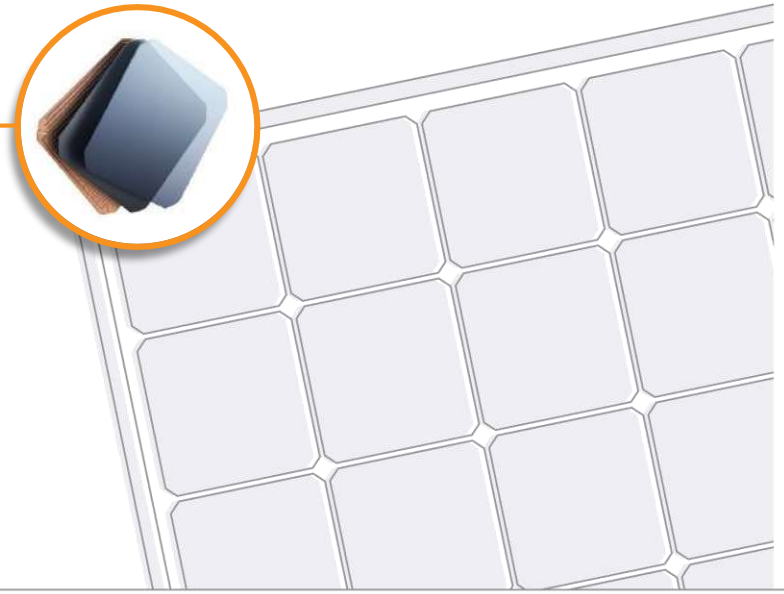
Fundamentally different. And better.

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

#1 Lowest degradation rate
in the solar industry[2]

#1 in Durability[2]
with a 40 year useful life[3]

Ultra-pure silicon on a patented copper foundation



1 Based on search of datasheet values from websites of top 20 manufacturers per IHS, as of January 2019 2 Jordan, et al, "Robust PV Degradation Methodology Application" PVSC 2018 and "Compendium of Photovoltaic Degradation Rates" PiP 2016. 3 Performance panels expected useful life of 35 years. Source: "SunPower P-Series Technology Technical Review," Leidos Independent Engineer Report. 2016. SunPower Maxeon panels expected useful life of 40 years. Source: "SunPower Module 40-Year Useful Life," Useful life is 99 out of 100 panels operating at more than 70% of rated power. 4 SunPower Performance P19 panels identified as top performers in the 2018 DNV GL PV Module Reliability Scorecard: https://www.dnvgl.com/publications/2018-pv-modulereliability-scorecard-117982.

SUNPOWER® | PERFORMANCE

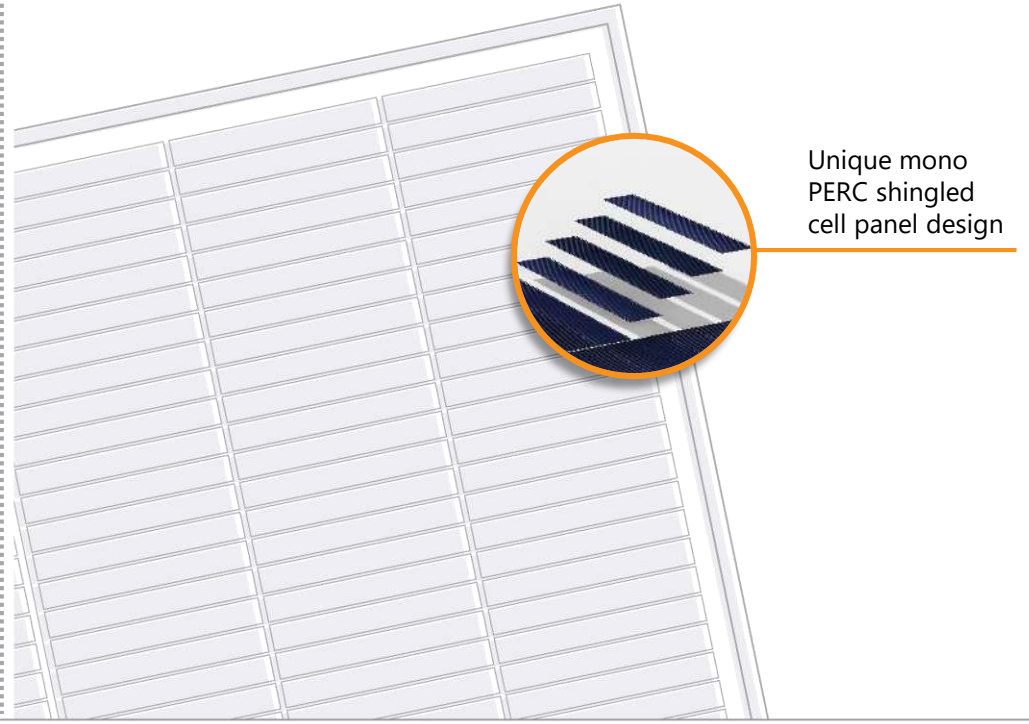
Making the conventional, exceptional.

2.0

2.0 GW Produced
making it the industry's most deployed shingled cell panel

2018 Top Performer[4]
in the DNV GL PV Module Reliability Scorecard

35 years Manufacturing Expertise
for proven reliability while minimising upfront costs



Unique mono PERC shingled cell panel design

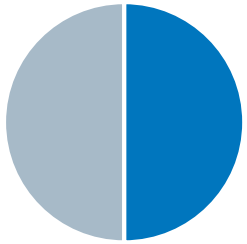
Product Portfolio – Strategic and future proof

Today

Balanced Portfolio Demand

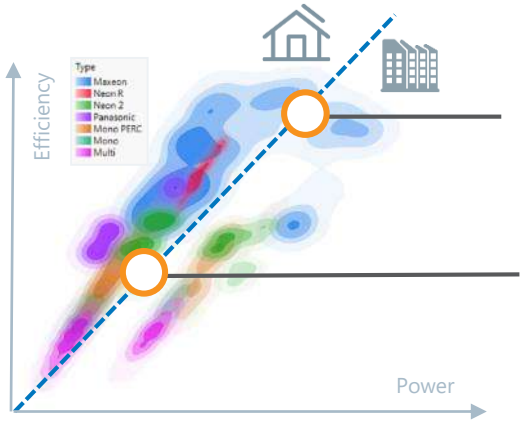
(1H 2019 MW Global Shipments)

SUNPOWER® PERFORMANCE 50%



50% SUNPOWER® MAXEON®

Complimentary Portfolio



Strategic Plan:

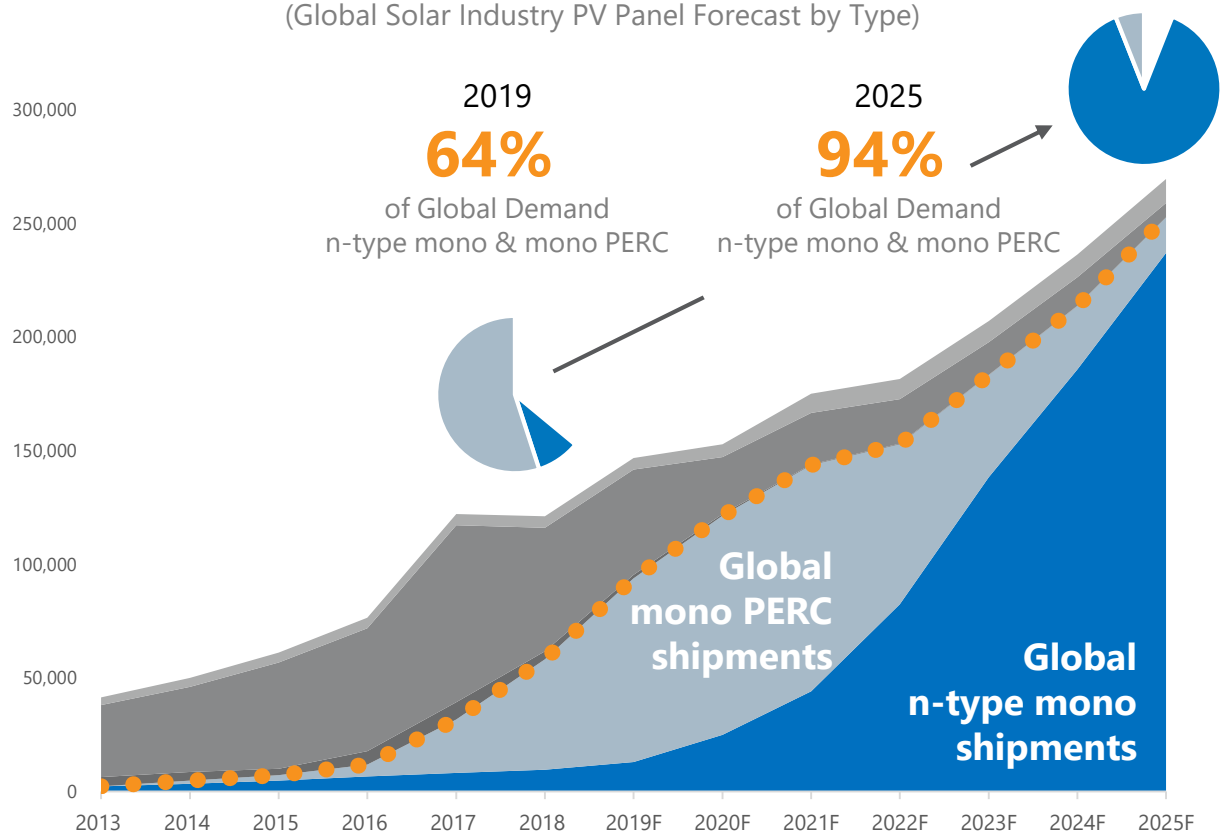
SUNPOWER® | MAXEON®
Own the High Ground

SUNPOWER® | PERFORMANCE
Fighter Brand

Tomorrow

Positioned for the Future

(Global Solar Industry PV Panel Forecast by Type)



SUNPOWER®

Source: PV Insights WW Annual PV Module Shipment Update & Forecast 2019