



PV TECH SHOWDOWN

JinkoSolar | Roberto Murgioni, Technical Service Manager
29.01.2019 London, UK

1. Jinko Introduction & Market Trends
2. Global Solar Market
3. Quality & LCOE
4. Product Portfolio
5. Conclusion

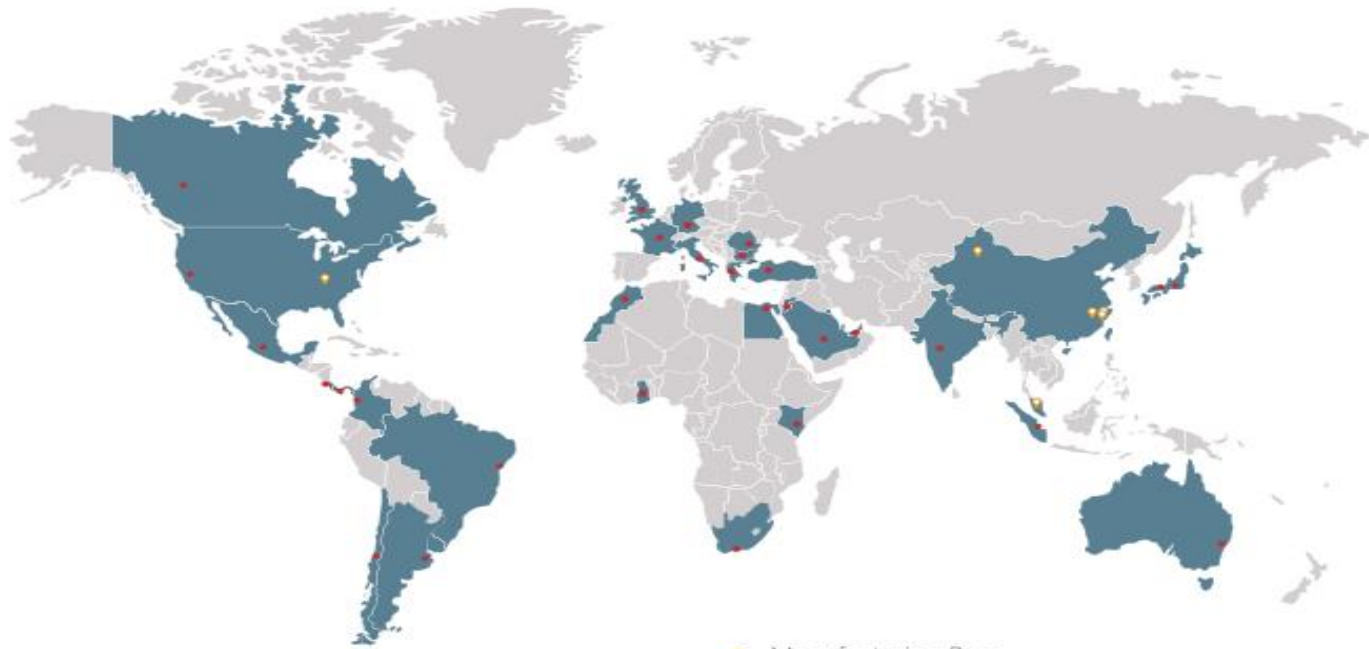
Facts and Figures

6 Global
Factories

30 Sales Offices

80+ Countries where the
modules are delivered

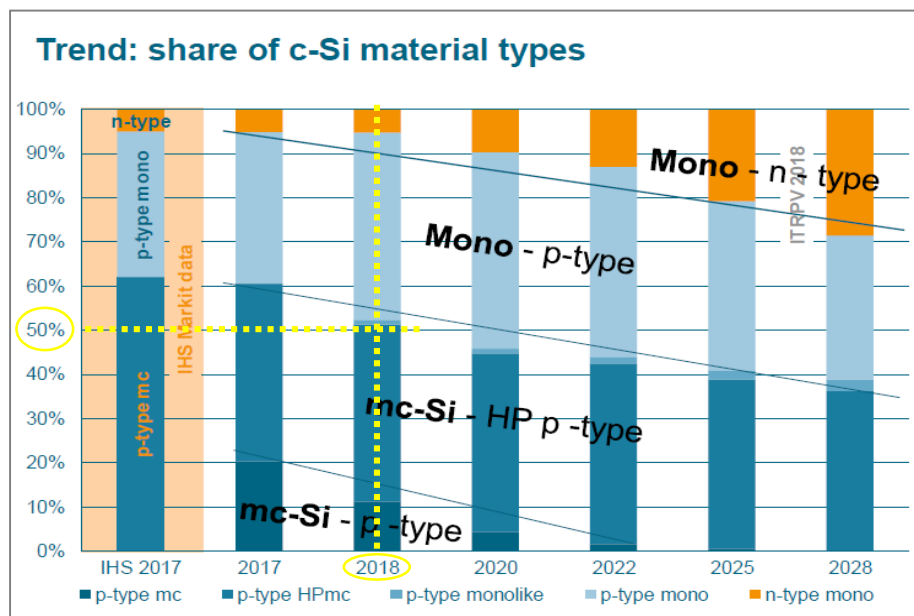
12,000 Employees



📍 Manufacturing Base
📍 Office Locations

10 GW Capacity ('18)	40 GW Delivered (Dec'18)
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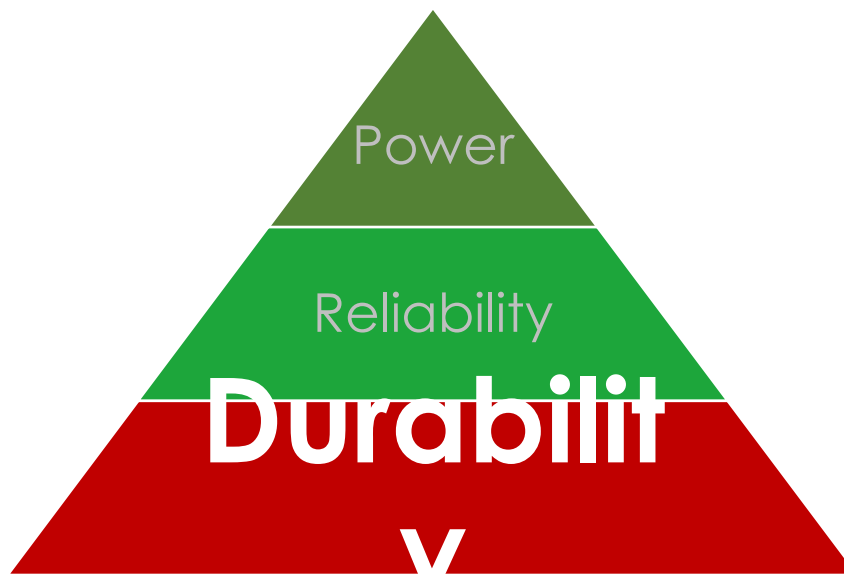
Market Trend: Mono vs. Poly



- Poly still cost-effective, mature option in many regions to sustain market growth
- Wafer cutting technique as key factor in production cost reduction and tech. develop.
- Mono driving capacity expansion, both P/N-type technologies



The Quality Pyramid – Built from Solid Foundation



**Efficiency
&
Real Field Performance**

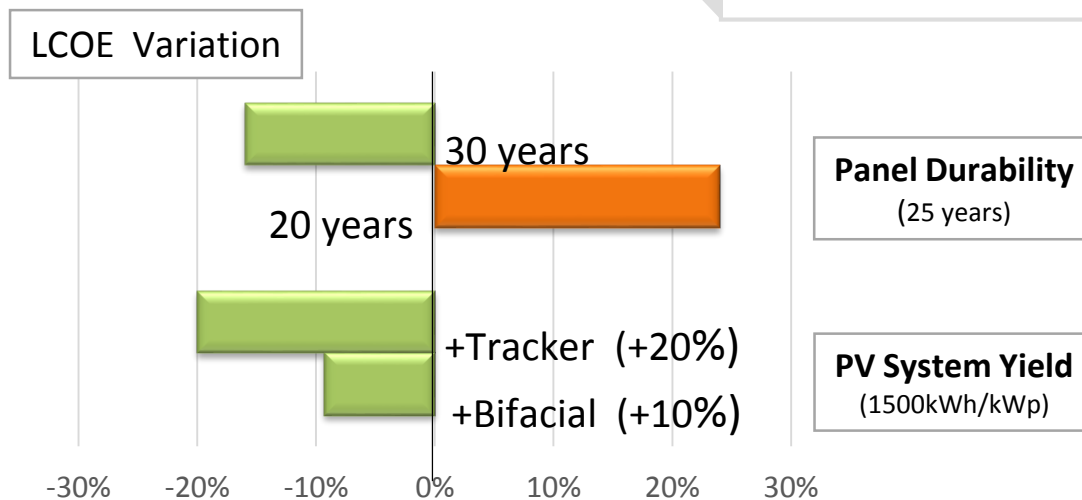
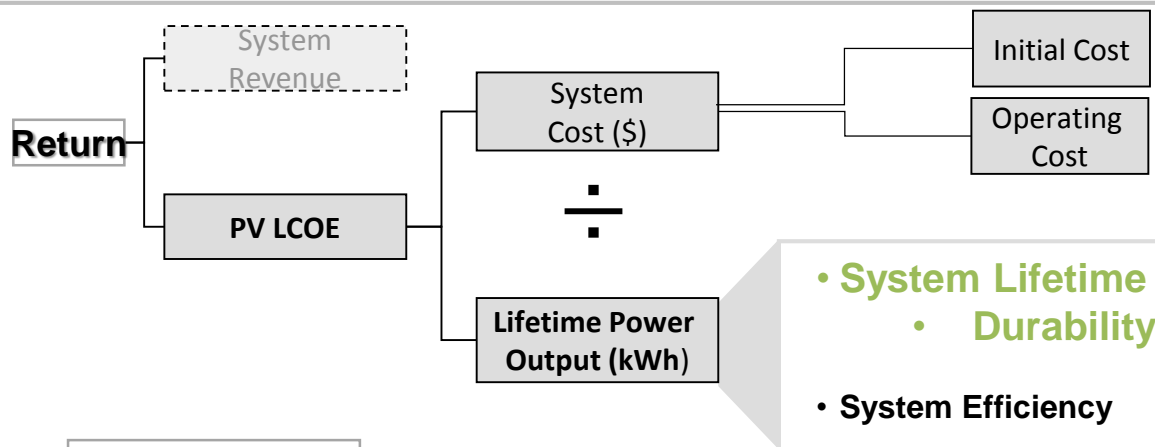
**Low Degradation
&
Stable Performance**

**The core of PV module
quality:
BOM and Prod. Process
make the real difference**

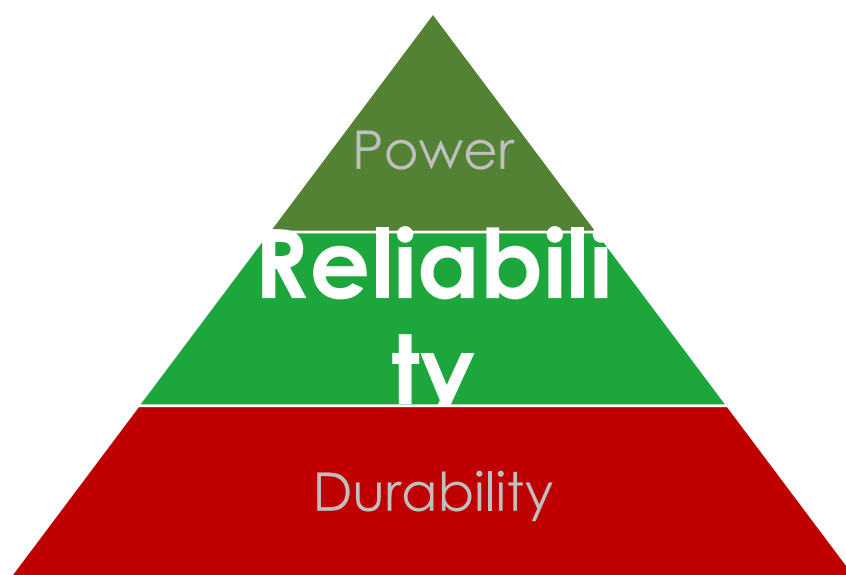
First Class Components



Levelized Cost of Energy (LCOE)



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Third-Party Testing: Accelerated Aging – DNV GL

4 times “DNV-GL Top Performer” in all tests

All Module Series tested:
Eagle Poly, Mono
Standard and PERC

HC and Cheetah Series
TOP PERFORMER

in 2018 Test Protocol

Damp Heat 1000

Thermal Cycling 600

Humidity Freeze 30

UV Light 90

*Dynamic Mechanical
Load 1000*

PID Resistance 192



	2018	2017	2016	2014
Jinko Solar	✓	✓	✓	✓
Trina Solar	✓	✓	✓	✓
Yingli Solar	✓	✓	✓	✓
Astronergy Solar	✓	✓		✓
Hanwha Q CELLS Co., Ltd	✓	✓	✓	
JA Solar Holdings	✓		✓	✓
REC Solar	✓	✓	✓	
BYD Co, Ltd	✓	✓		
Flex Ltd	✓	✓		
GCL System Integration Technology Co., Ltd.	✓	✓		
LONGi Solar Technology Co, Ltd	✓	✓		

Reliability Guarantee: 3rd-Party Test Reports



**PID tests
(85%/85°C)**



**ML tests (3600pa)
And Dynamic
Mechanical Load**



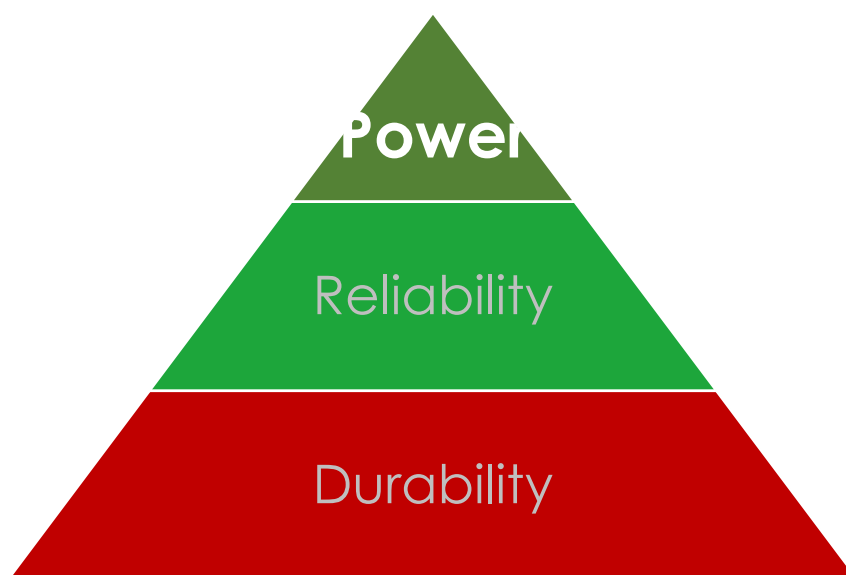
**Pan. File
tests**



**Low irradiance
tests**

Jinko guarantee 25 years performance warranty through 3rd party tests, including extreme reliability tests and high ML tests etc.
Accredited performance tests reports, to make it easier for customers to do project LCOE analysis

The Quality Pyramid – Built from Solid Foundation

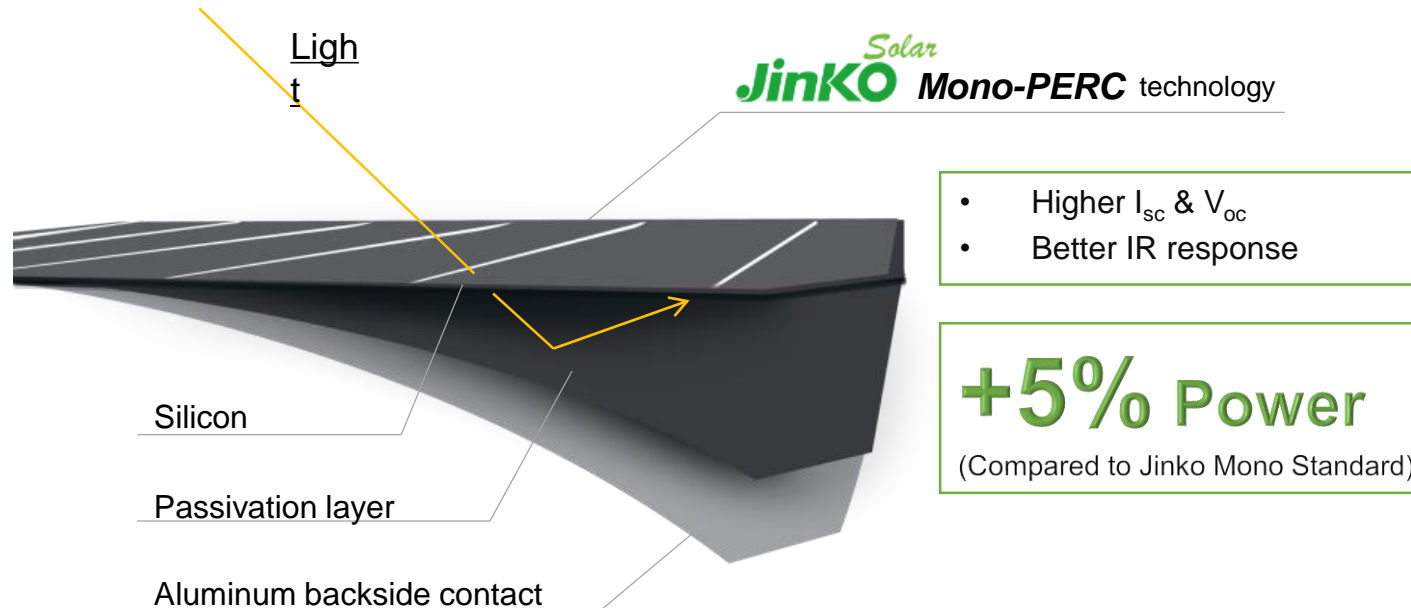


**Efficiency
&
Real Field Performance**

**Low Degradation
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**The core of PV module
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Mono PERC Technology



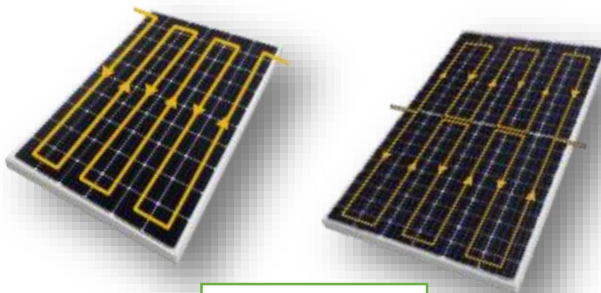
PERC cell Features

- Enhanced internal backside reflectance to **capture more** long-wavelength **light** (IR)
- **Decreased** rear **current** carrier **losses** by reducing the rear-side recombination
- Higher Quantum Efficiency than conventional cells (i.e. **Better Use of Light**)

HC Technology

Full-cell

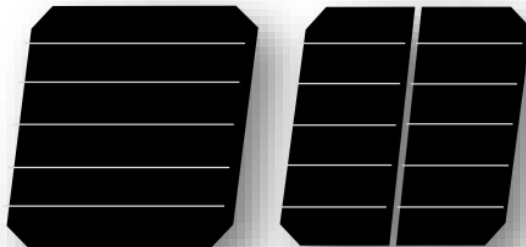
Half-cell



$$P_{\text{loss}} = I^2 * R_s$$

Full Size

Half-cut Size



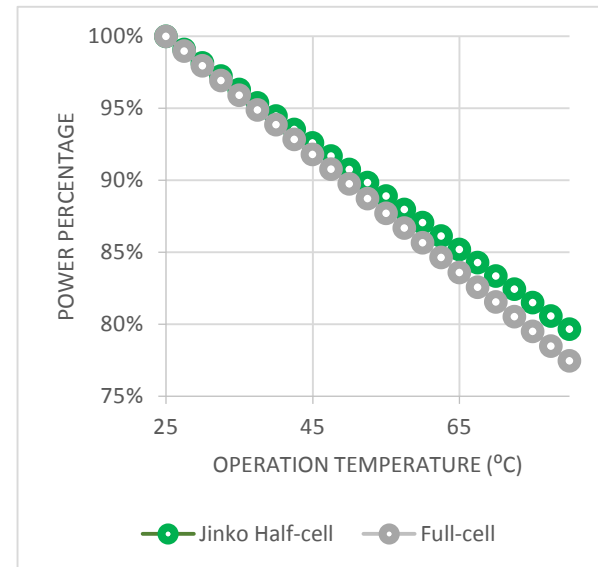
(Amount of electrical current)



280 Wp Mono-Si Module

Op. Temp.: 65 °C

Conventional	→ -0.40%	→ 235Wp
Half-cell	→ -0.37%	→ 240Wp



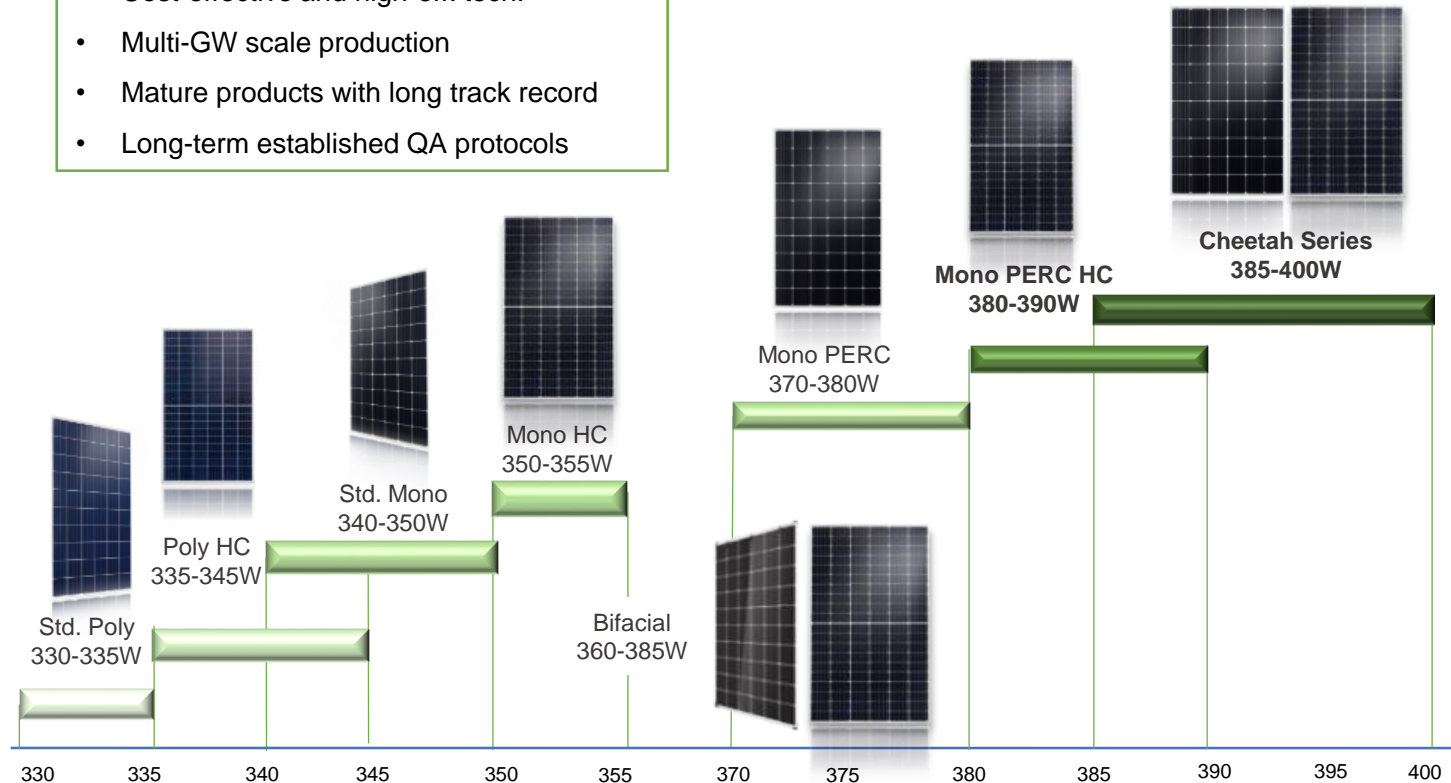
Difference > 2% rel.



Product Portfolio

Broad Portfolio & Wp Range, 72-Cell Series

- Cost-effective and high-eff. tech.
- Multi-GW scale production
- Mature products with long track record
- Long-term established QA protocols



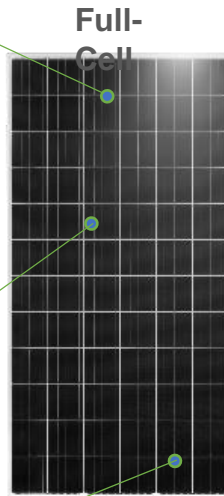
Cheetah Module : Upgraded Design

Cheetah

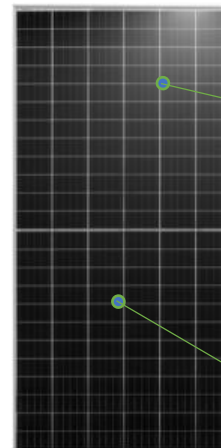
Industry leading
Large Cell technology
(158.75mmx158.75mm)

Avg. 8Wp power up
compared to
156.75mm Mono PERC

Lower BOS costs



Half-Cell



Avg. 7Wp power up
compared to
Cheetah full-cell

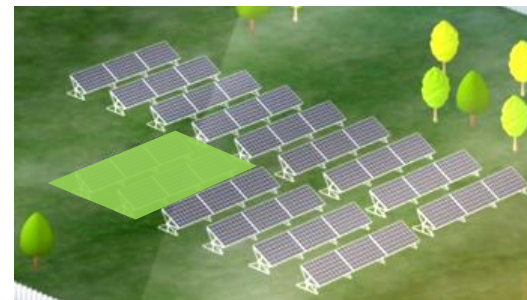
Lower thermal
losses

Lower BOS, Lower LCOE and Higher IRR

Lower BOS, Lower LCOE and Higher IRR



With Eagle Mono PERC 72p



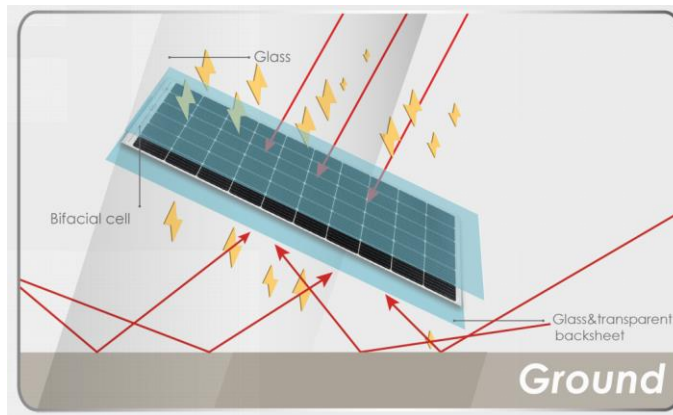
With Cheetah HC 72p
Module Numbers Saving **6.2%**
Less Mounting & Labor

**Example* : 100MW Project

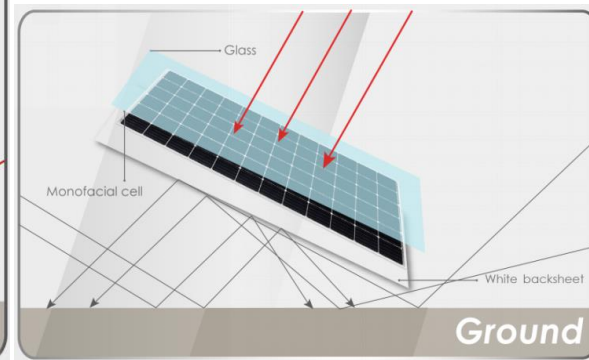
	Normal 375Wp	Cheetah 390Wp	Cheetah HC 400Wp
No. of Module	266,682	256,412	250,016 -16.666
Plant Area	1,861,185 m ²	1,828,804 m ²	1,809,316 m ²
Area Increment	0	-1.74%	-2.79%
Length of Steel Structure	529.1 km	513.9 km	501.0 km -28 km
Steel Structure Increment	0	-2.88%	-5.31%

Bifacial Modules vs Standard Modules

■ Bifacial module: double-sided generation



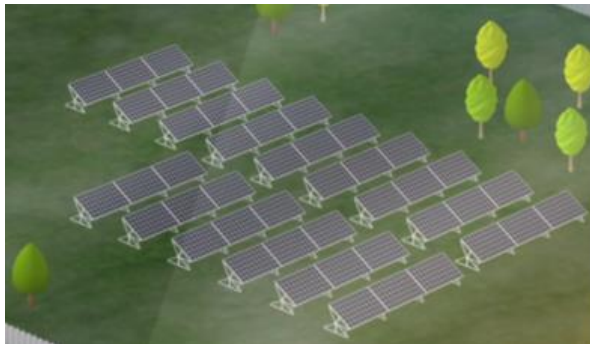
■ Standard module: front-sided generation



Bifacial energy generation → up to **20%** more energy !

BOS Cost Saving

Assuming that two solar farms generate same amount of electricity(1,414 MWh per year), Jinko solar Bifacial farm can save BOS,including spaces, compared with monofacial P type modules farm.



260W P type monofacial module
2,743ea

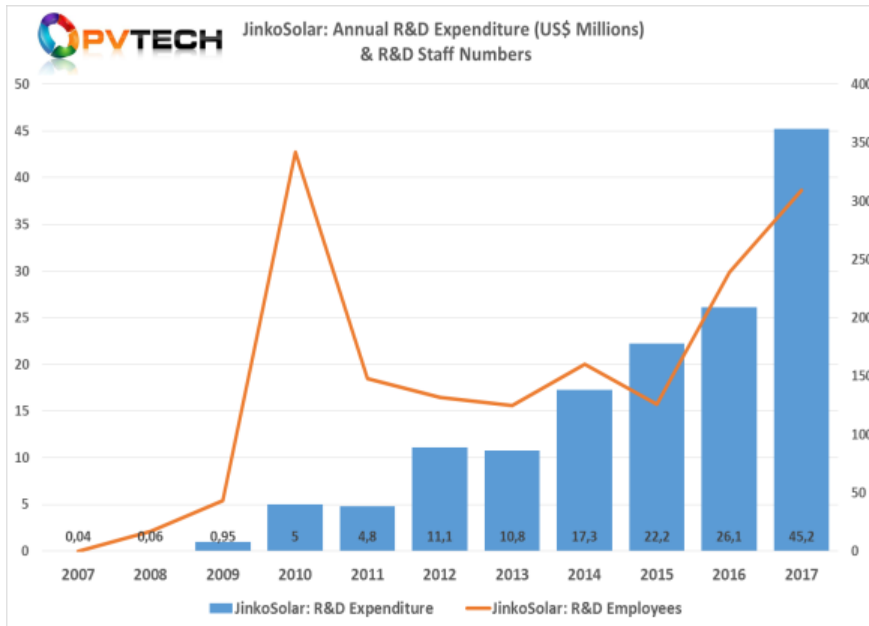


300W **Jinko**^{Solar} Bifacial
2,407ea



Conclusion

R&D Leadership



State Key Laboratory

- **>45 \$M** in 2017 R&D expenditures
- **>300** full-time technical staff
- Dedicated **wafer, cell and module** R&D facilities
- Cooperation with global Research Institutes
- Filed **464** patents

Jinko the largest module maker of 2018

Top 10 Solar Module Suppliers of 2018



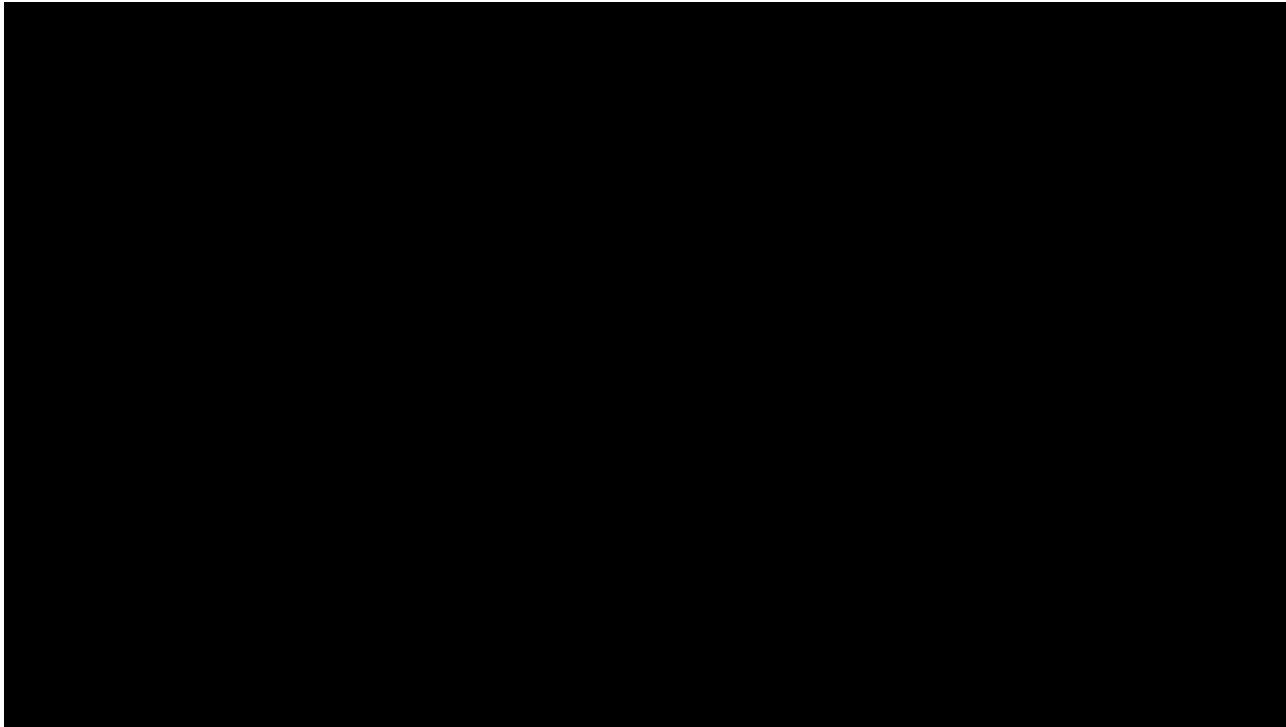
#	Module Supplier	Y/Y
1	JinkoSolar	≡
2	JA Solar	↑
3	Trina Solar	↓
4	LONGi Solar	↑
5	Canadian Solar	↓
6	Hanwha Q-CELLS	↓
7	Risen Energy	↑
8	GCL-SI	↓
9	Talesun	↑
10	First Solar	↑

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Source: PV TECH

Manufacturing 4.0- Jinko Smart Factory



Location: Shangrao, Jiangxi Province, China.

Capacity: 1GW modules per year.



Thank You!