PV Module 4.0: a new era of ultra-high efficiency modules entering the mass market to deliver lowest LCOE

pv magazine Webinar

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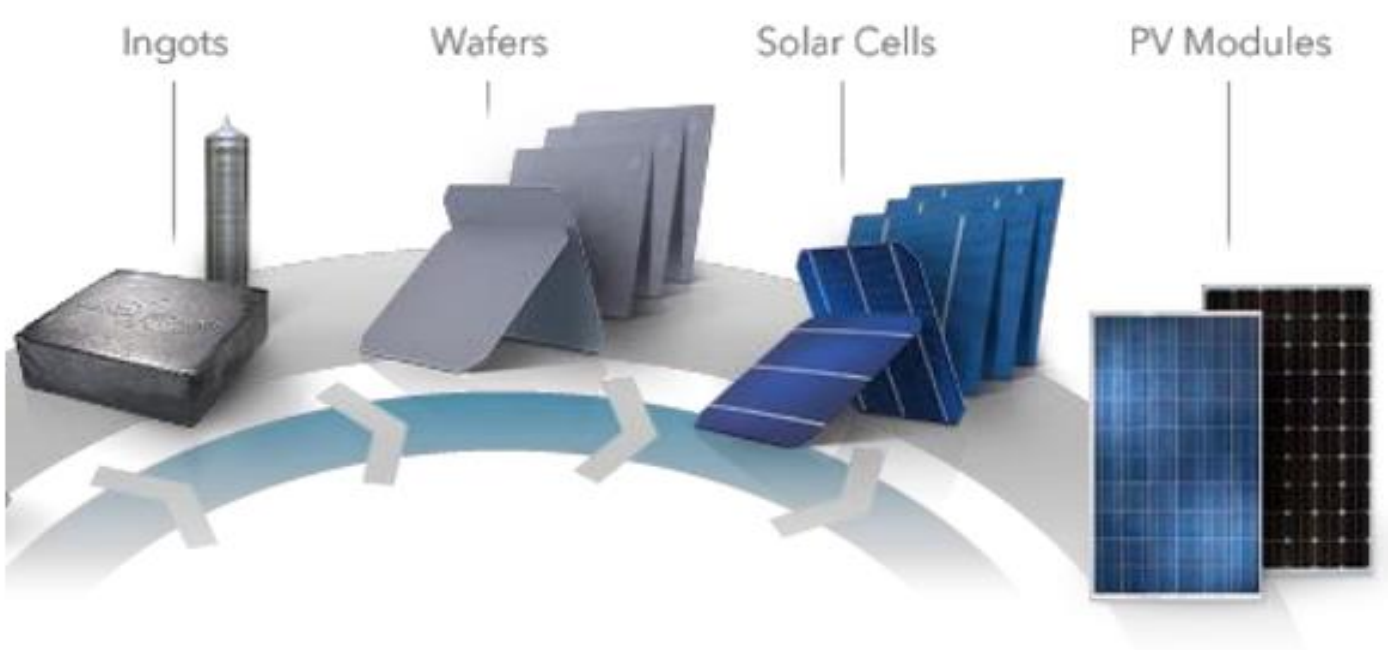
Jinko Solar
Building Your Trust in Solar

Agenda

1. About JinkoSolar
2. LCOE
3. New Cell Size Standard
4. Half Cut Technology
5. Bifacial with Transparent Backsheet
6. Case Study

About JinkoSolar

JinkoSolar Value Chain

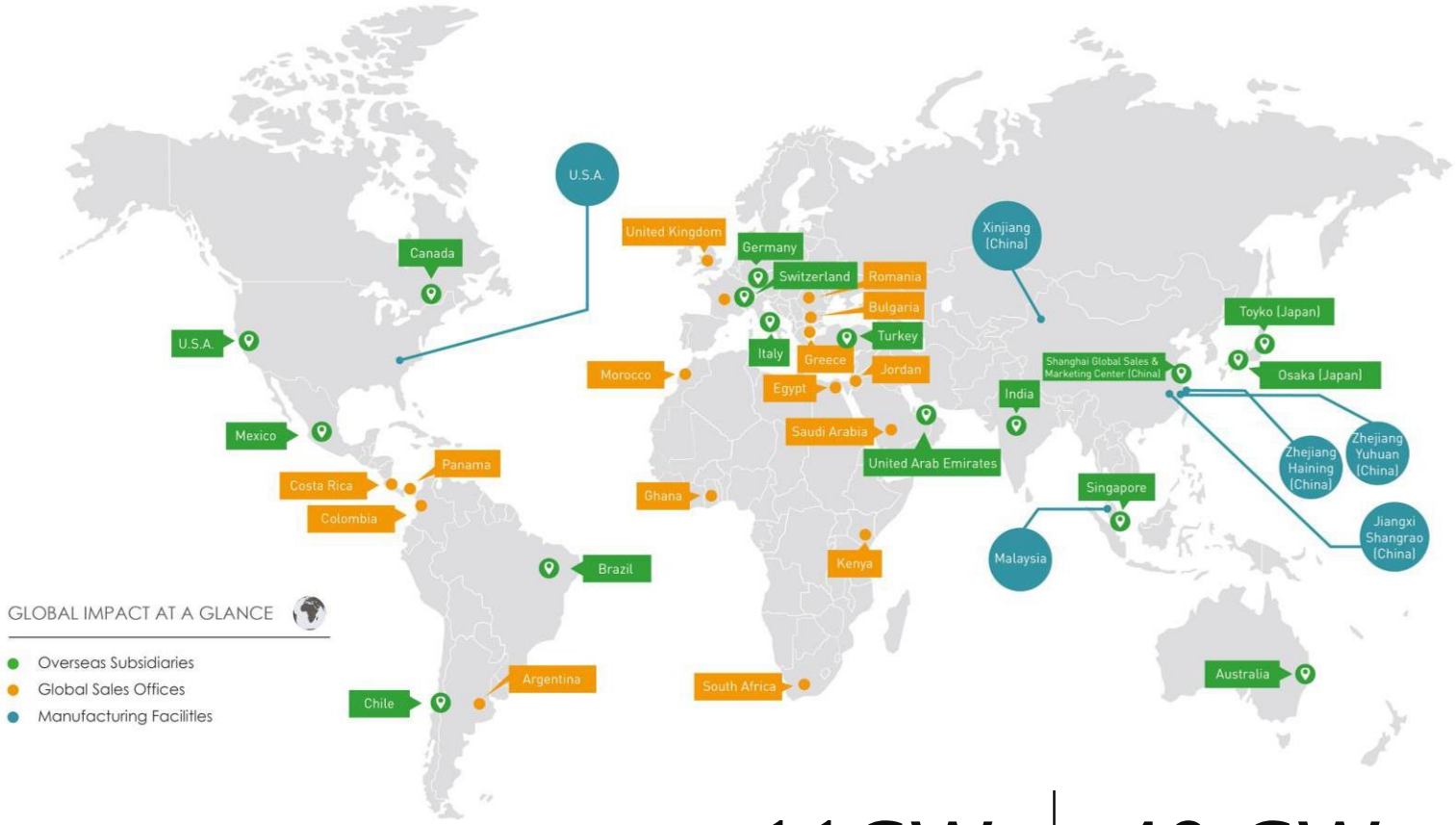


Quality Guaranty along the complete value chain

Ideal supply chain mgmt. with top-class components

Optimized cost structure with 10 years of experience

Global Presence



6 Global factories

30 Subsidiaries/ offices

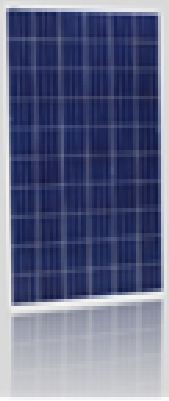
90 Countries with customers

12,000 Employees

11GW	40 GW
Module Capacity	Delivered

Products Development

Standard



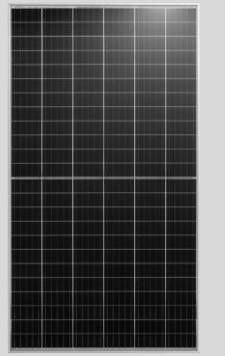
Dual Glass

Smart Module

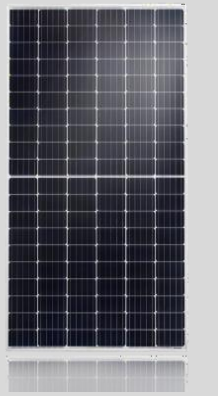
All Black

HIGH OUTPUT MODULES

Cheetah

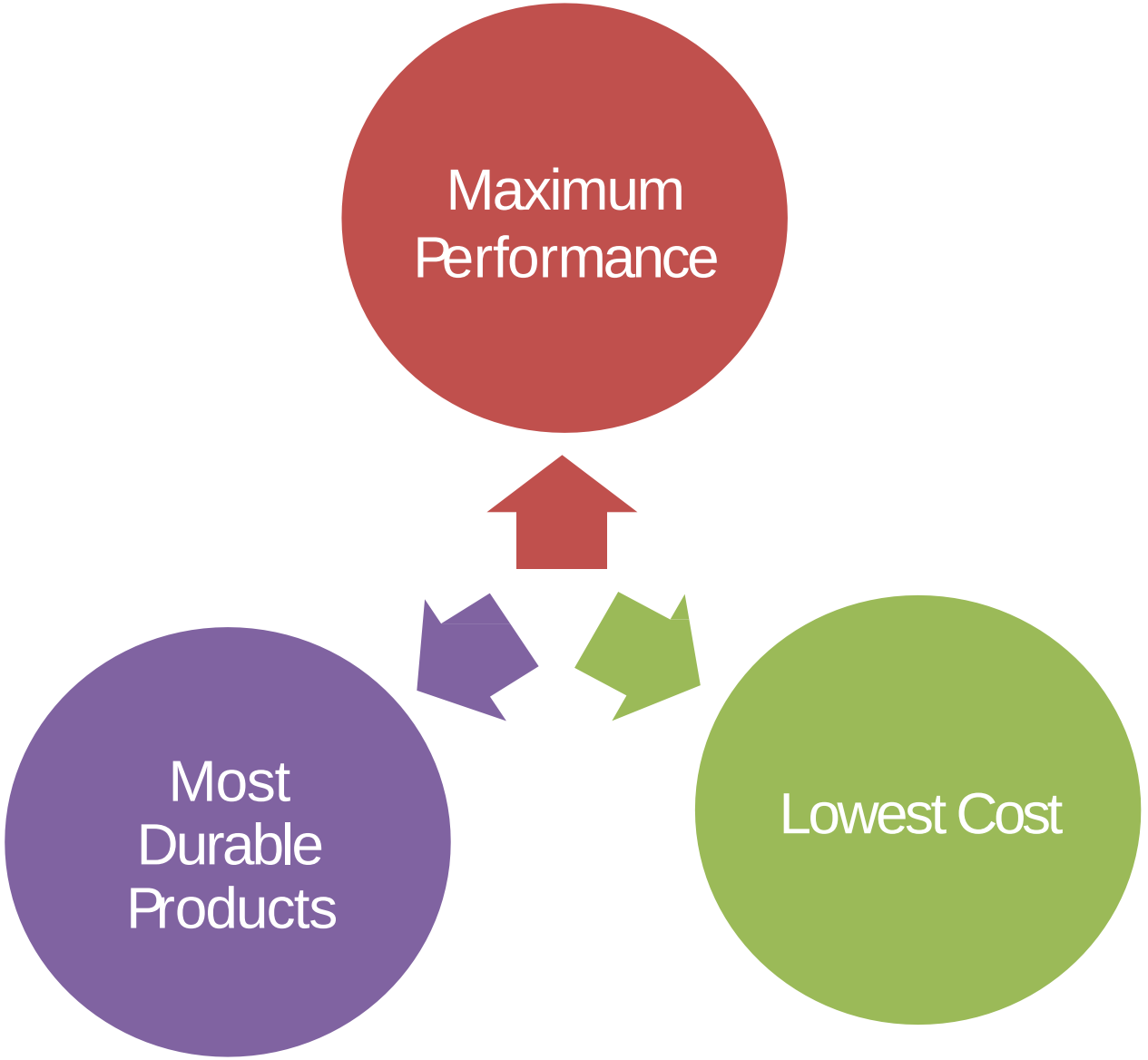


Swan



LCOE

Conflicting Demands



HOW TO DECIDE?

mono

fixed

Mono-facial

poly

with tracker

bifacial

Levelized cost of electricity (LCOE)

PV module costs (price of KW)	BOS costs	Financing costs	Land costs	O&M	Installation	Logistics and shipping	Taxes and incentives

$$LCOE = \frac{Total\ Life\ Cycle\ Cost\ (\$)}{Total\ Lifetime\ Energy\ Production\ (kWh)}$$

Performance

Efficiency	Annual degradation	Warranty
Temp coefficient	Reliability	Positive tolerance

2019 PV MODULE RELIABILITY SCORECARD - PV Evolution Labs (PVEL)

Solar JinKO
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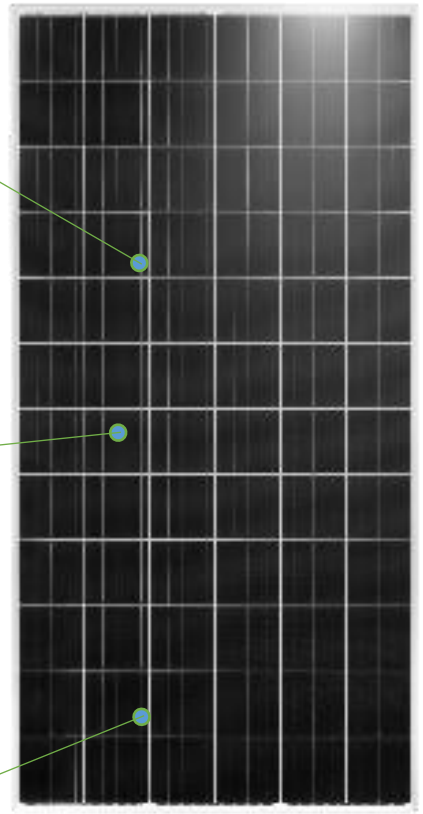
" increasing the annual module degradation rate from 0.5% to 1.5% will cause the site's real Levelized Cost of Electricity (LCOE) to increase by 13.6%"

"a poll conducted by PVEL where 70% of survey respondents replied that an **underperformance of 3-6% is enough to render their projects financially nonviable"**

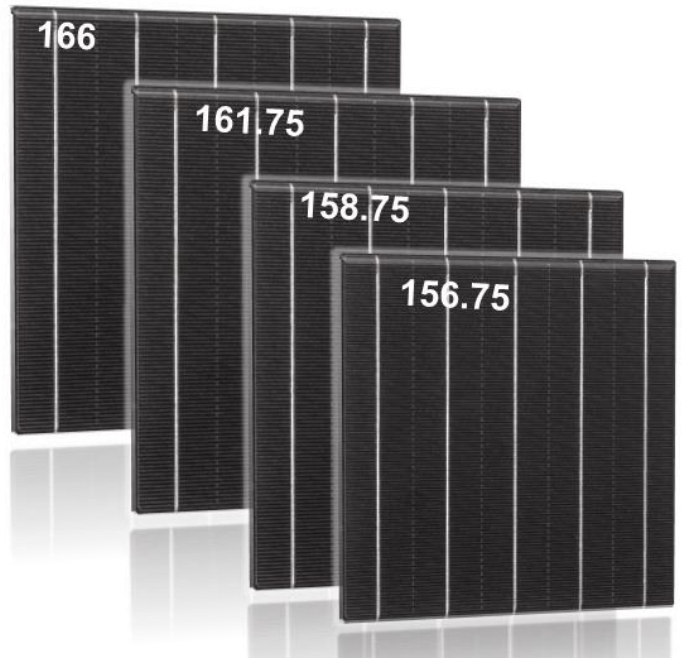
New Cell Size Standard

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



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

Lower BOS costs

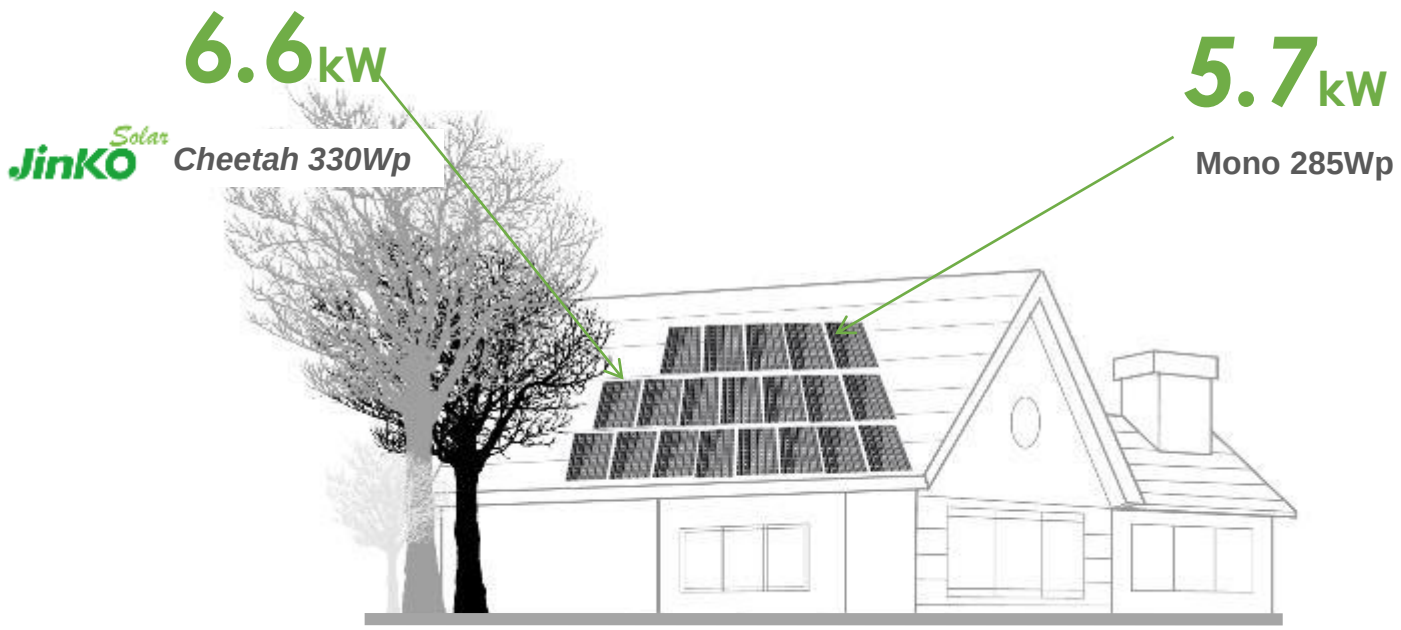


Product Type	Cell Type	Cell Dimen.	No. of Cells	Module Dimen.
Mono PERC 72	Mono PERC	156.75x 156.75mm	72	1956x992 x40mm
Cheetah 72	Mono PERC	158.75x 158.75mm	72	1979x1002 x40mm

Benefits of JinkoSolar Cheetah

Higher Power and Module Efficiency

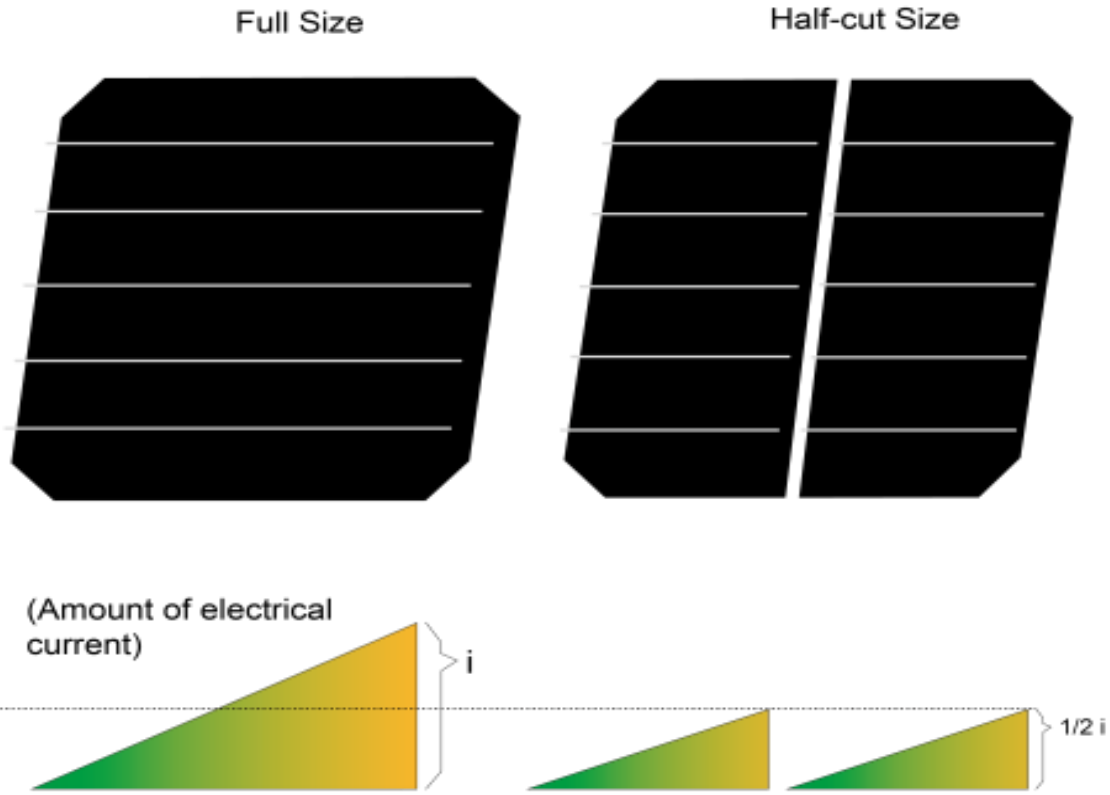
* The capacity of a solar power system with 20 module (***60 Cells***)



- **Higher module output power to maximize installed Wp**
- **Save PV array space for future system expansion**

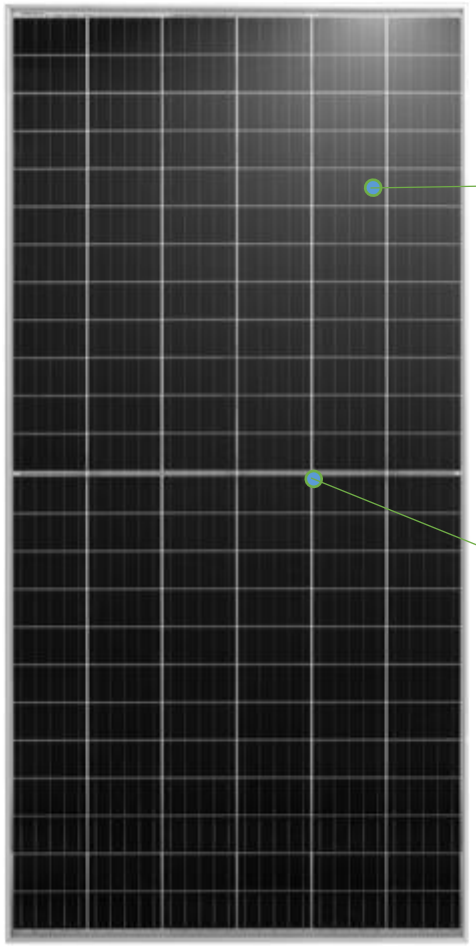
Half Cut Technology

Half Cell Technology



Electrical current (i) flowing on busbar is halved

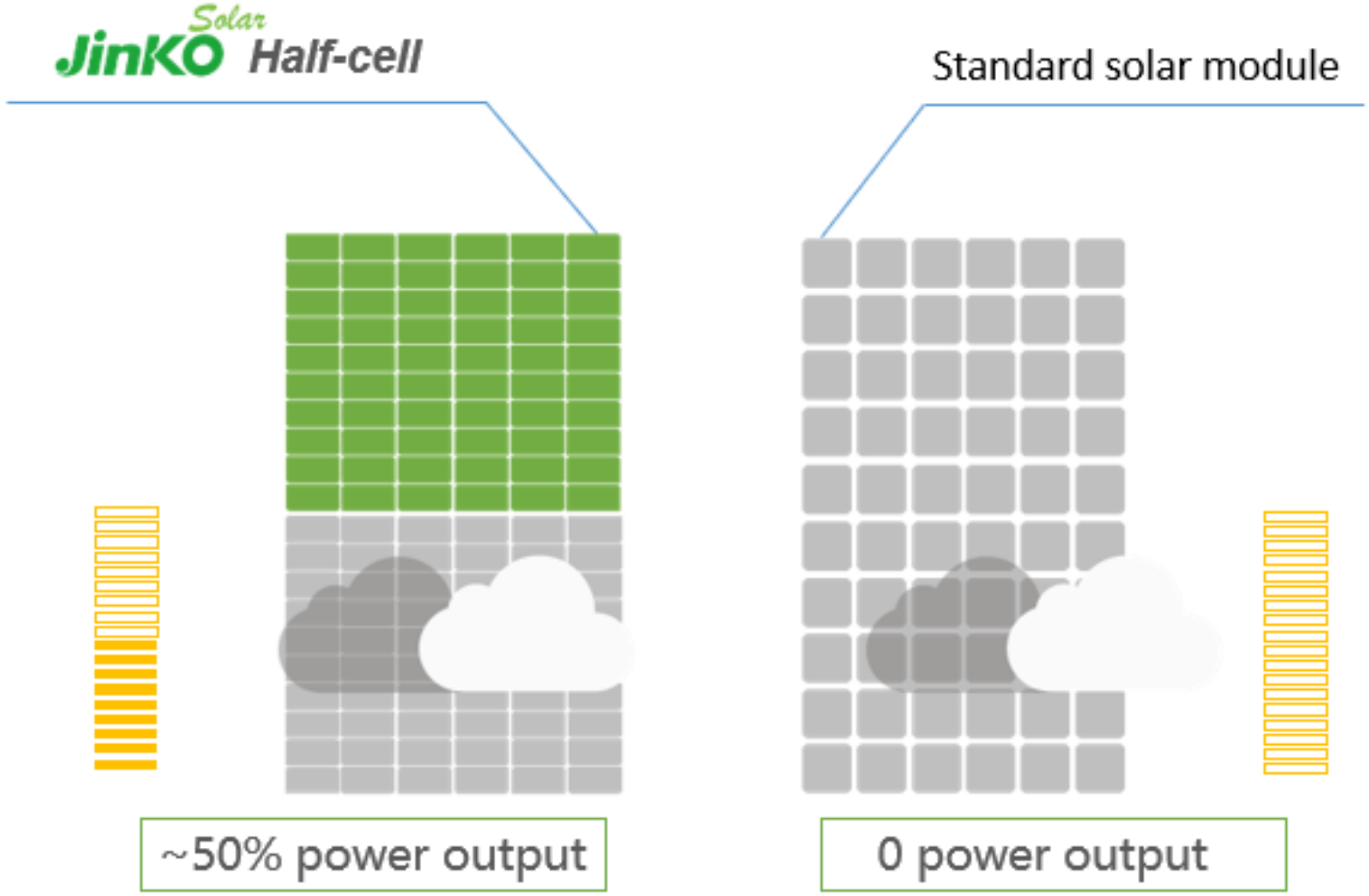
Resistive losses in a HC module is 1/4 of a full-sized cell



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

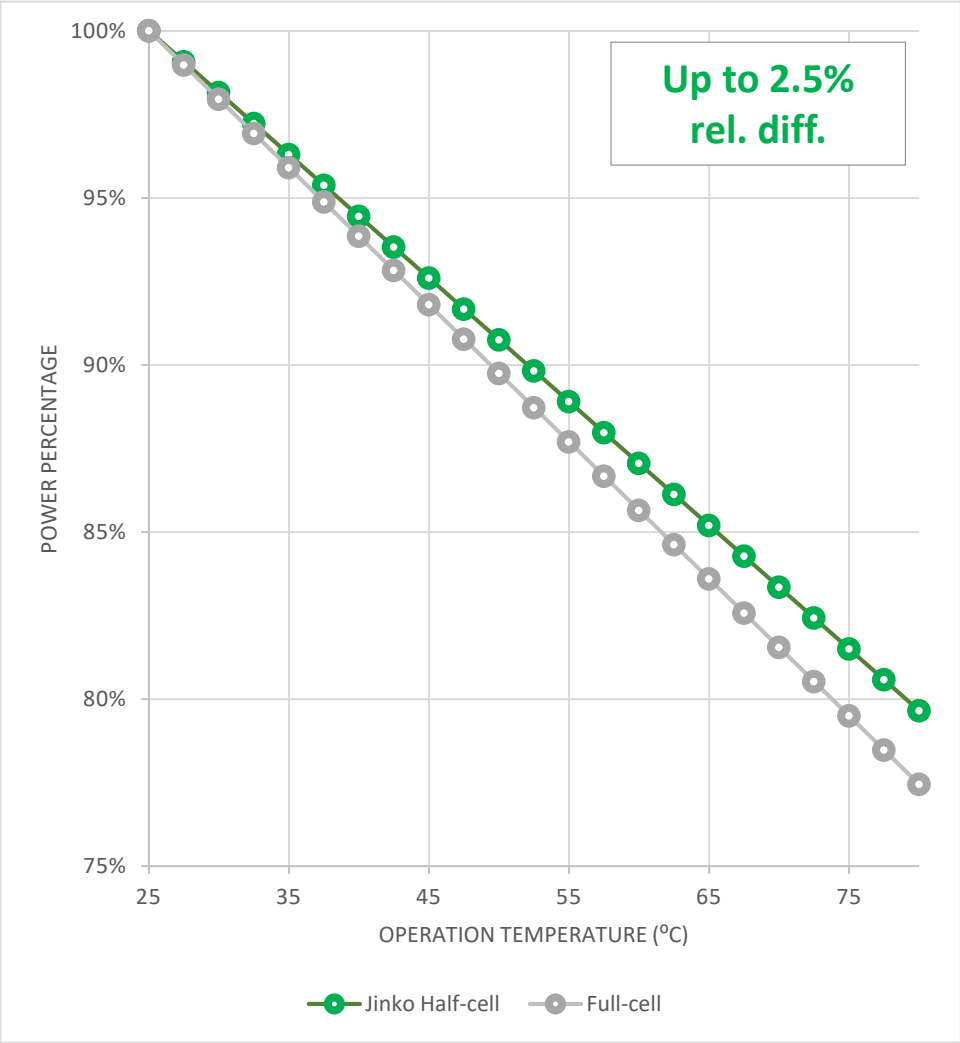
Lower thermal losses

Advantages of Half cell



Lower shading losses of HC compared to normal module, in certain shading conditions

HC Technology advantages: Temp. Coef.



Same nameplate power:

400 Wp Mono-Si Module

Op. Temp.: 65 °C

Conventional → -0.40% → 336Wp

Half-cell → -0.36% → 342Wp

Difference > 2% rel.

Superior Power Generation at Higher Temperatures

Benefits of JinkoSolar Cheetah

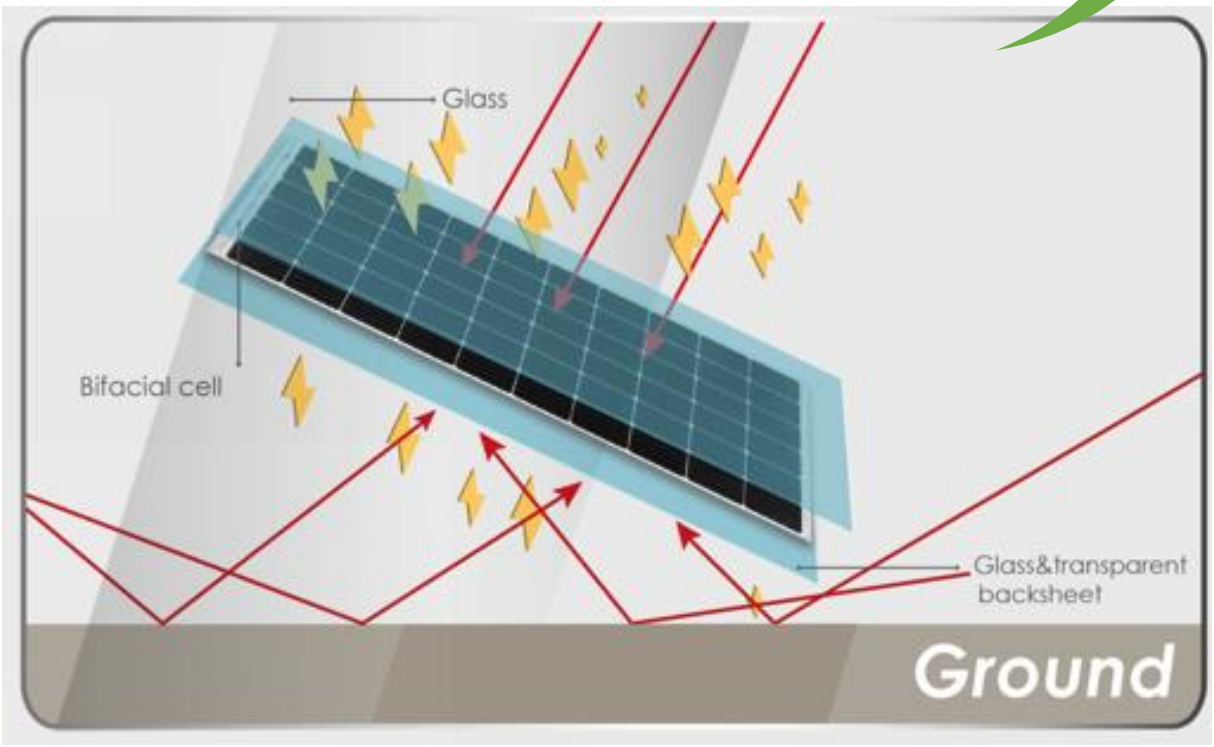
PROJECT	Pro.1	Pro.2
Project Capacity (MWp)	Mono	Cheetah
Module Power (Wp)	380	400
Power Warranty (year)	25	25
Temperature Coefficiency of Power (%)	0.39	0.37
First Year Degradation (%)	3	3
Annual Degradation (%)	0.7	0.7
ANALYSIS RESULTS		
LCOE (US cent/kWh)	7.08	7.00
IRR	9.04%	9.35%

Project Location: Los Angeles, USA
Project Capacity: 100MW DC
Latitude: 34 Deg.
Longitude: -118 Deg.
Installation Type: Fixed

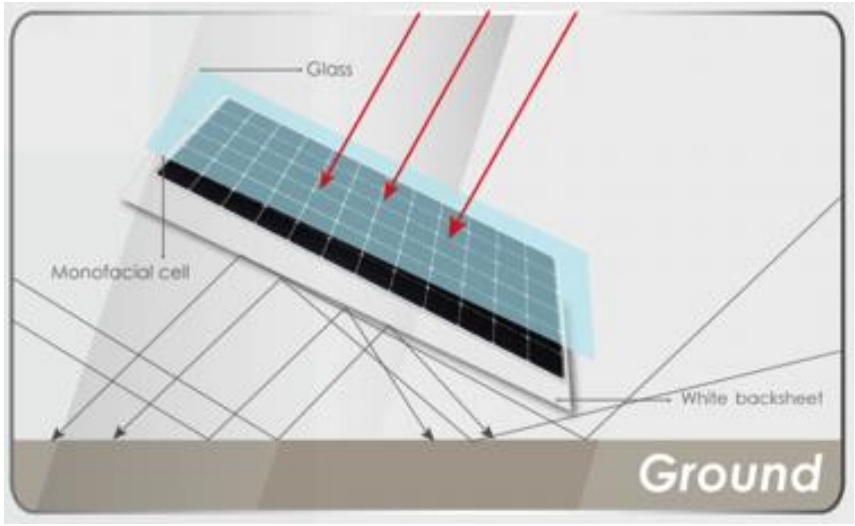
Bifacial with Transparent Backsheet

Bifacial Introduction

Power generation gain up to
20%



Bifacial: Double power generation



Monofacial: Single power

Bifacial Introduction

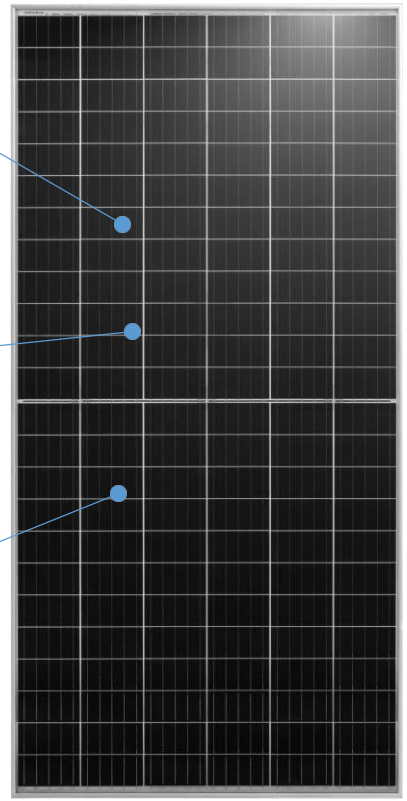
Dual Glass Bifacial

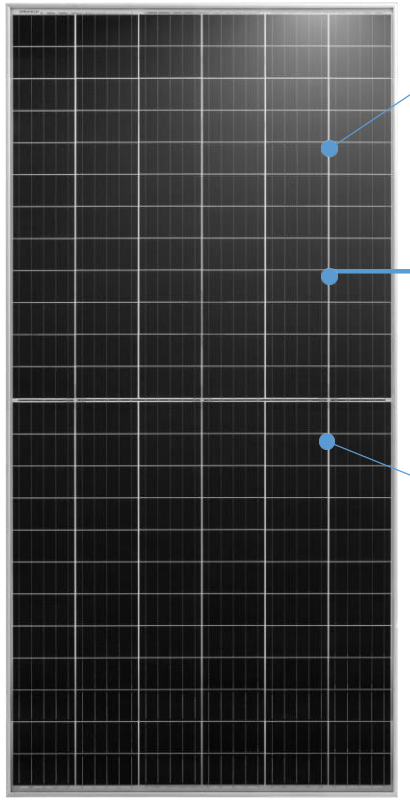
Transparent Back Sheet Bifacial

Advanced 158.75 square cell to achieve higher power and efficiency

Combining with HC to low risk of hot spot because of higher current

Gain 5-20% more energy to improve IRR





Also Gain 5-20% more energy

Keep same weight with normal module

Reliable and easy to clean with Tedlar film

Innovative Technology

JinkoSolar Wins Intersolar Award 2019 for its Swan Bifacial Module

MUNICH, May 17, 2019 — JinkoSolar Holding Co., Ltd. (the "Company," or "JinkoSolar") (NYSE: JKS), one of the largest and most innovative solar module manufacturers in the world, today announced that it won the Intersolar Award 2019 in the Photovoltaics category for its Swan bifacial module with transparent backsheet from DuPont.

Benefits of Transparent Backsheet

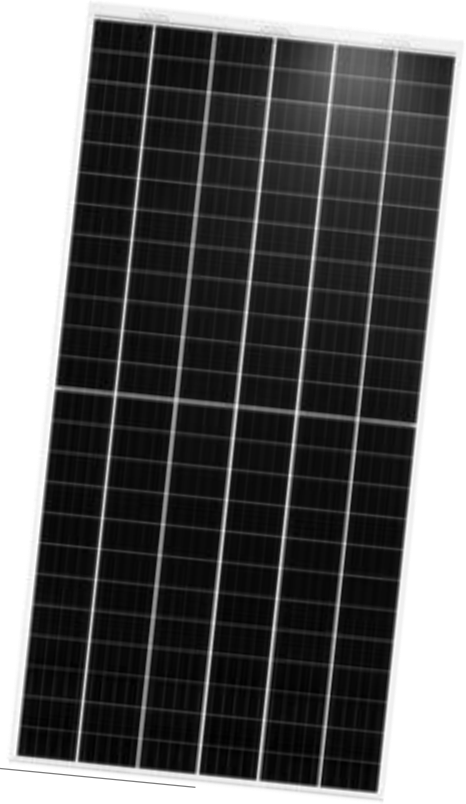
Weight Lighter

Installation Standardized

BOS Cost Cheaper

Energy Gain Equal

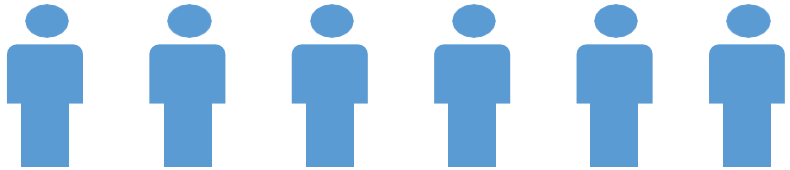
Warranty 30-year lifetime



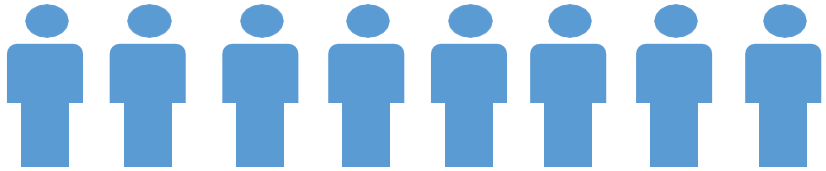
Bifacial with Transparent backsheet	Bifacial with Dual glass
2031×1008×40mm	2031×1008×40mm
23.3kg	31.8 Kg

Labor cost saving

Bifacial with transparent backsheet



Bifacial modules with dual glass



↓ 3% BOS Cost

↓ 15% Mounts Cost

↓ 20% module installation l abor cost

↓ 5% O&M Cost

Case Study

Case Study - 100MW

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* Location of the Project: 100MW Ground Mounted Top Runner Project in Weinan, Shanxi	Monofacial With Tracking System 380W	SWAN With Tracking System 415W	
Initial Year Productivity (MWh)	134,184	146,370	↑
LCOE (yuan/kWh)	0.248	0.239	↓
IRR	11.07%	12.17%	↑

Case Study - 100MW

Building Your Trust in Solar

* Location of the Project: 100MW Ground Mounted Top Runner Project in Weinan, Shanxi	Bifacial With Tracking System 415W	SWAN With Tracking System 415W	
Initial Year Productivity (MWh)	145,990	146,370	↑
LCOE (yuan/kWh)	0.244	0.239	↓
IRR	11.50%	12.17%	↑

Thank You!