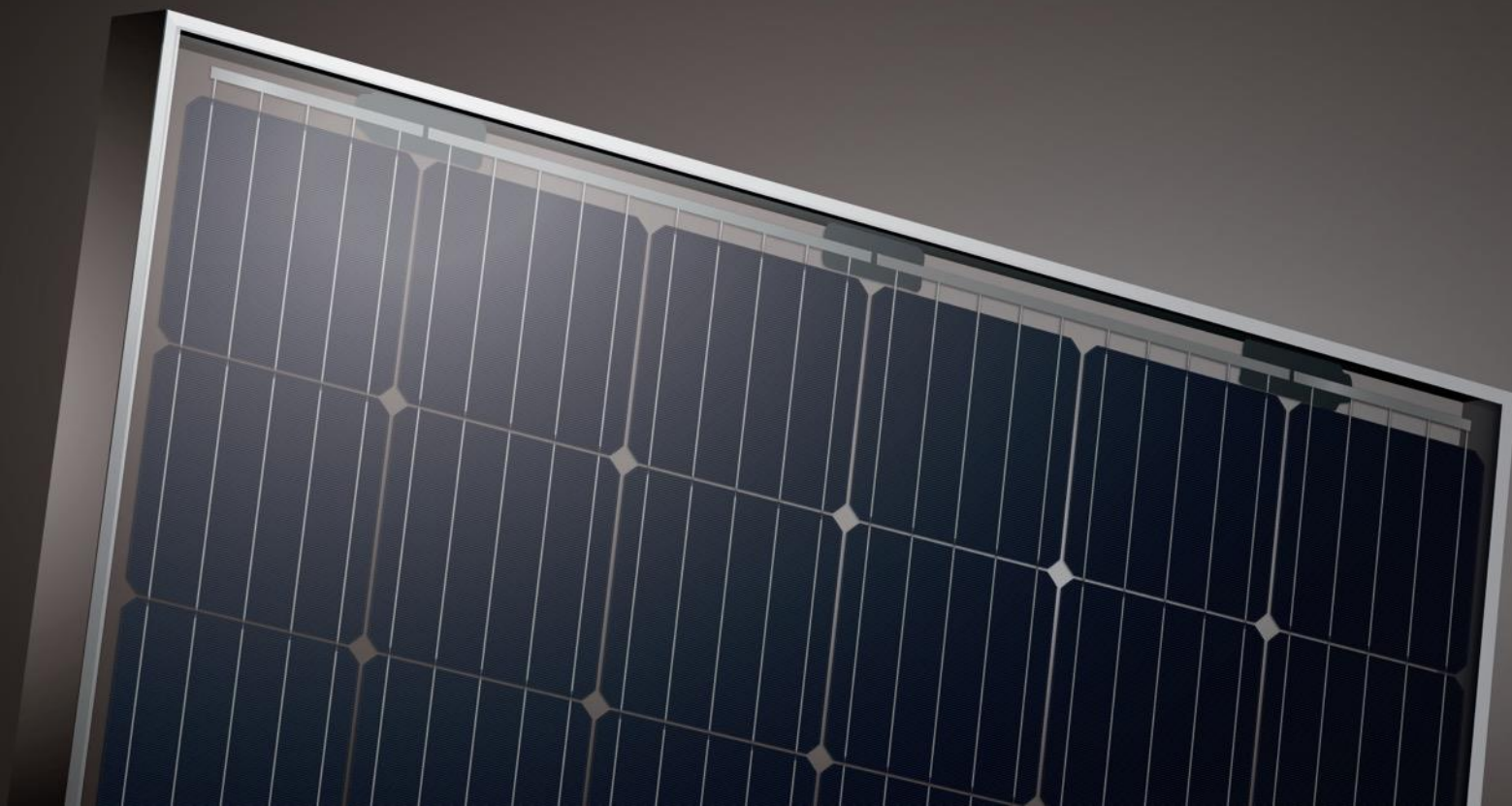


## **Cómo mejorar el desempeño de proyectos fotovoltaicos en Argentina a través de la innovación tecnológica**



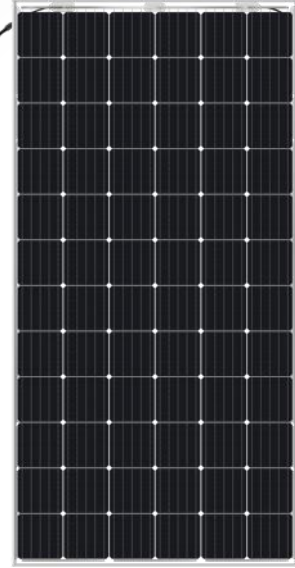
Octubre, 2019  
Por: Ivan Reyes

# Standard Products Mono PERC



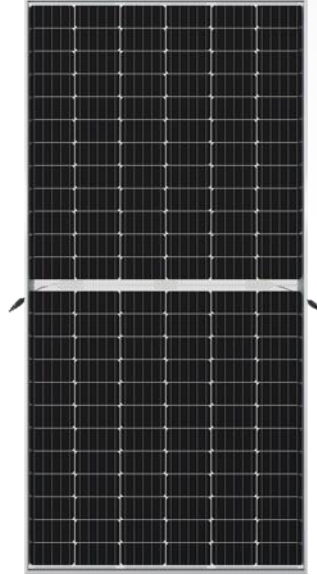
**Hi-MO 1**

60 Cells	300-325 Wp
72 Cells	360-385 Wp
Bifacial	NO
Status	Phase Out



**Hi-MO 2**

295-320 Wp
355-380 Wp
Full-Cell
Phase Out



**Hi-MO 3**

300-325 Wp
360-385 Wp
HC M2 Cell
Actual Product

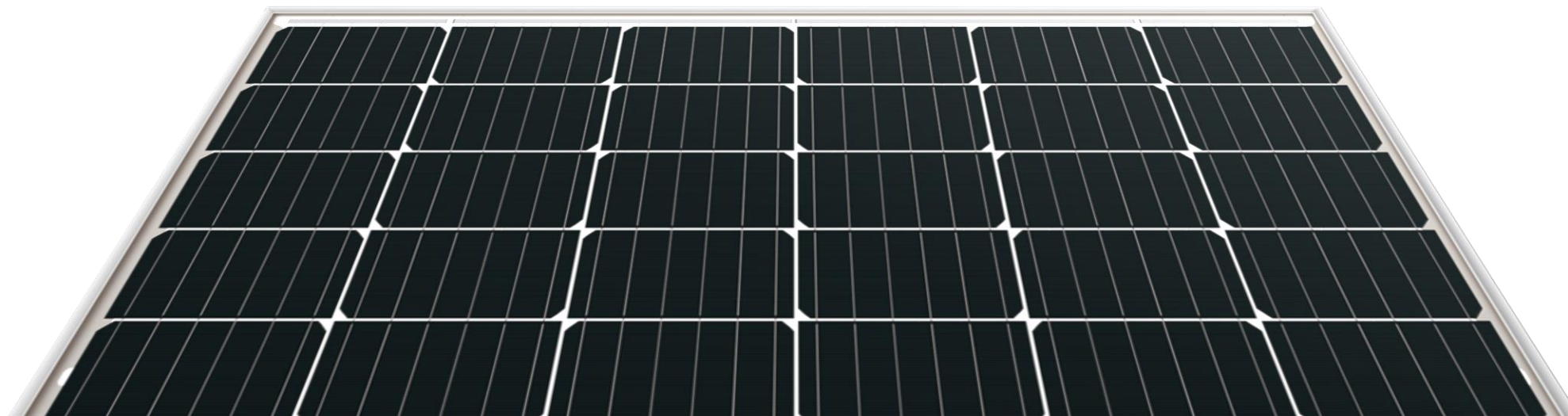
**HIGHER  
POWER**



Front Power Up to

**450W**

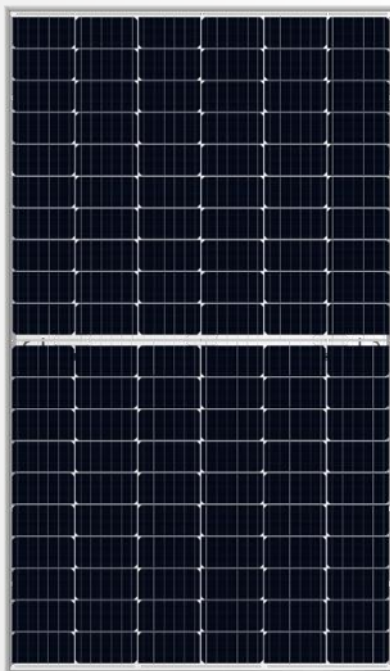
*~50W higher than other's '400W product'*



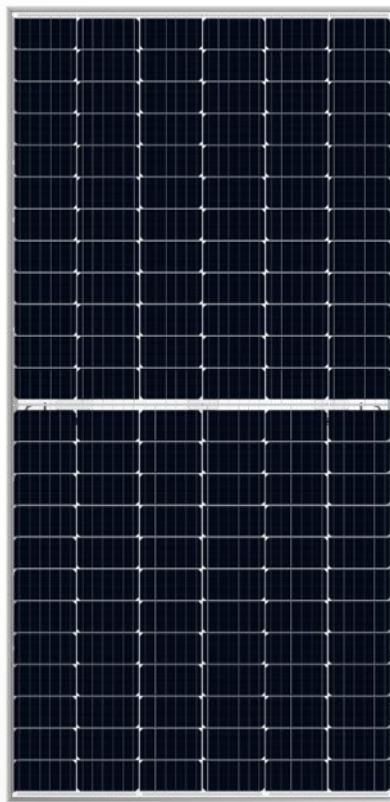
# New Product (as from Q4 2019)

## Hi-MO 4 Family

Hi-MO **4**

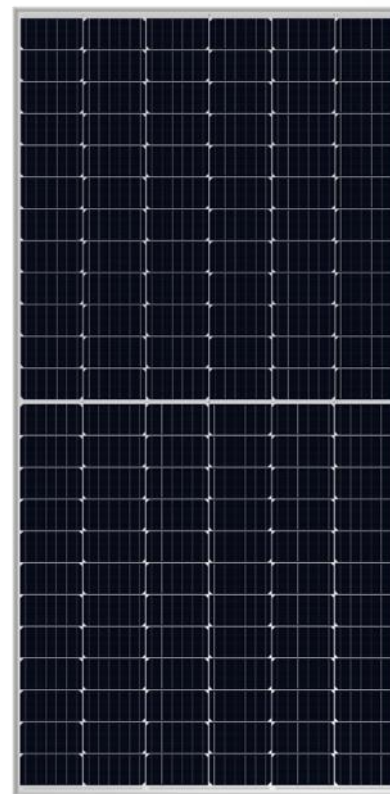


2x60 HC Cells



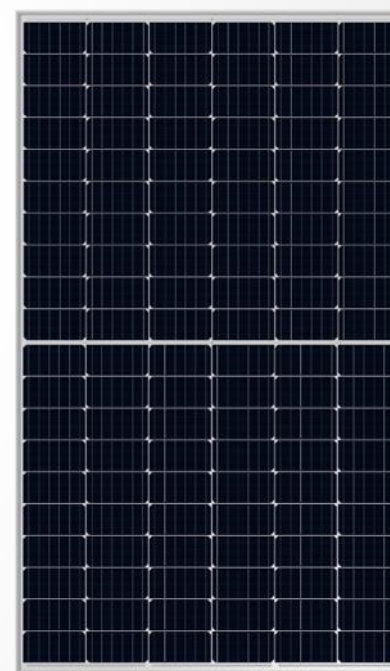
2x72 HC Cells

**Bifacial**



2x72 HC Cells

Hi-MO **4m**



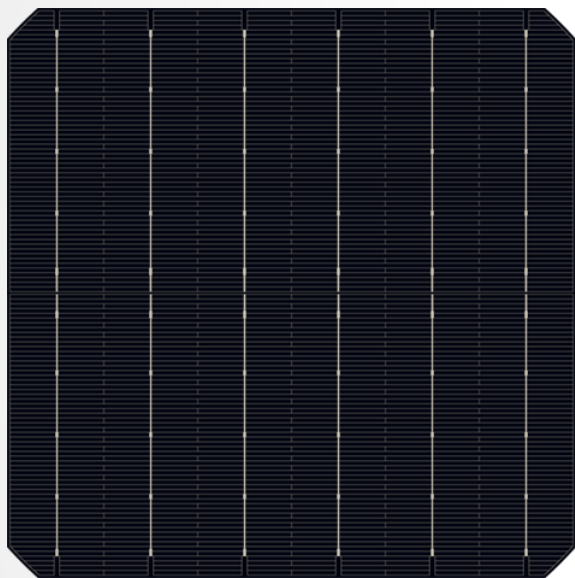
2x60 HC Cells

**Monofacial**



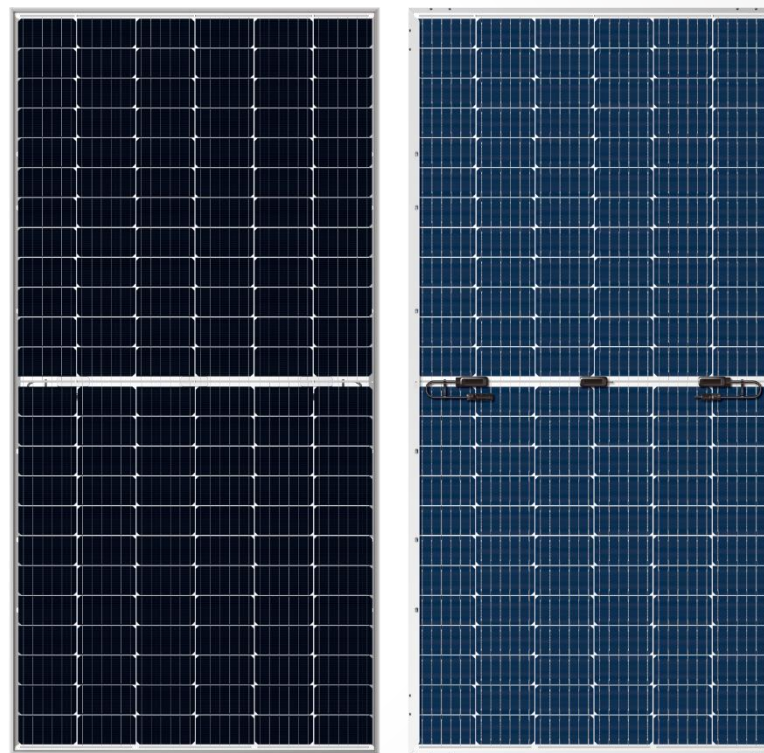
# Hi-MO4

## Cell



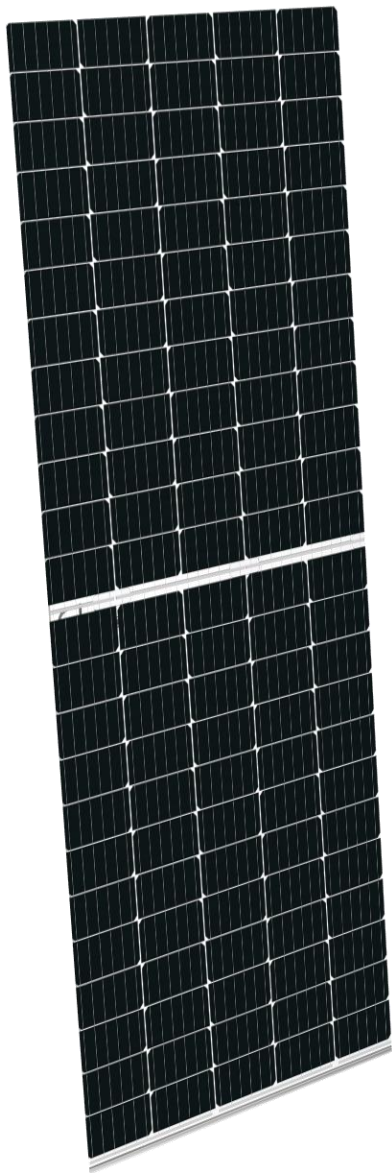
- ✓ Upgraded PERC technology
- ✓ Efficiency up to 22.5%
- ✓ 6 busbars
- ✓ Better light reception

## Module



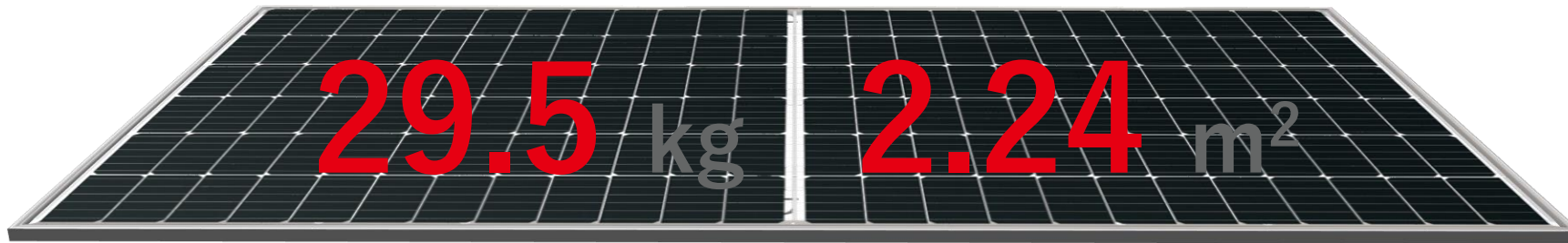
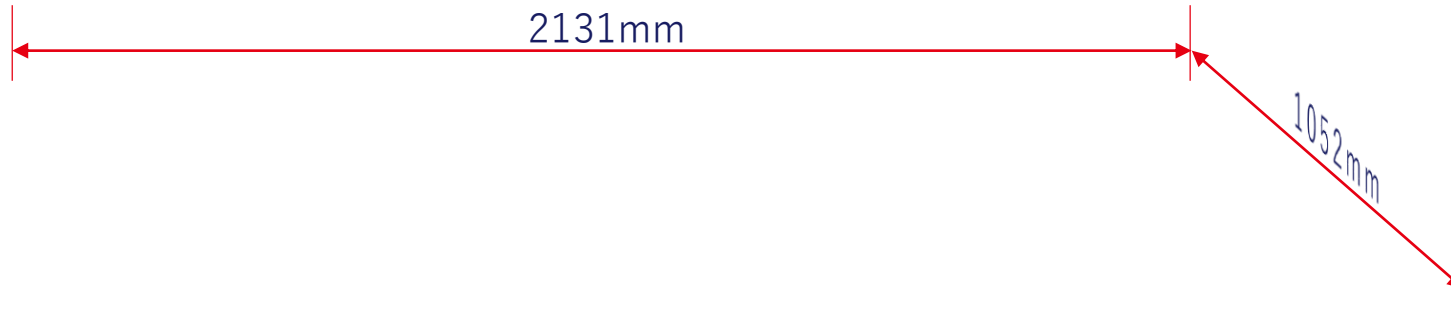
**Front power up to 450W**

# Half-cut Technology



- Reducing internal ohmic loss
- Increasing power of modules
- Hot spot temperature is reduced by 10~20°C
- Operating temperature is reduced
- Output power is improved when partially shaded or unevenly illuminated
- Better performance under high radiation conditions

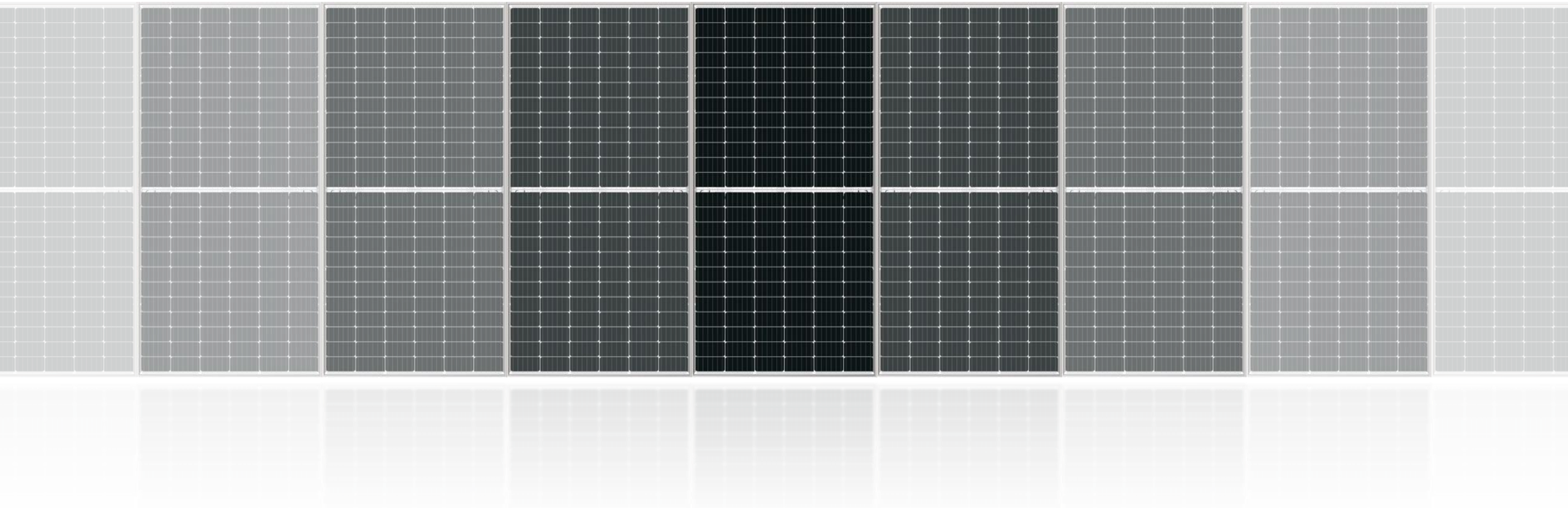
# Module Dimension

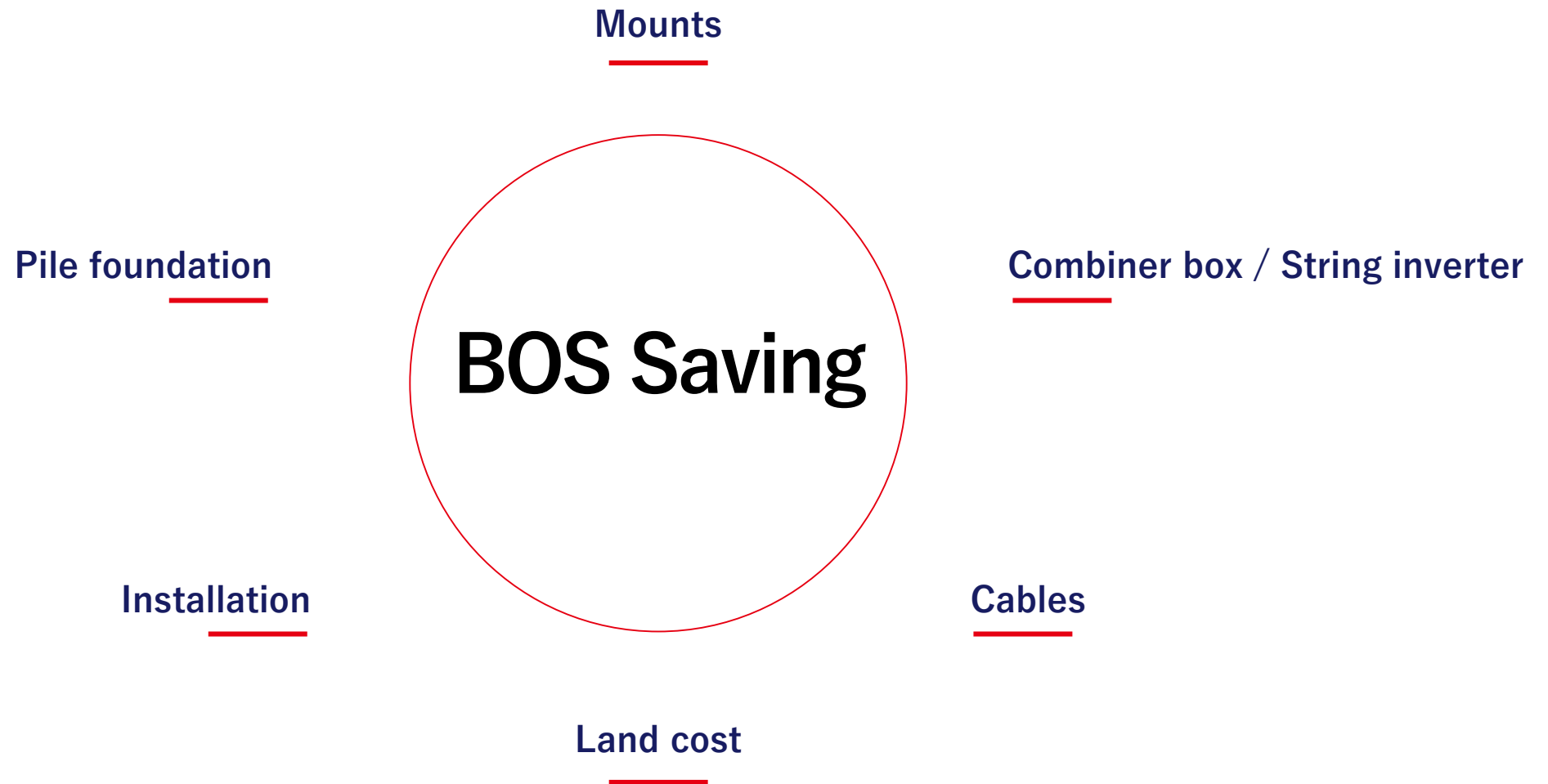




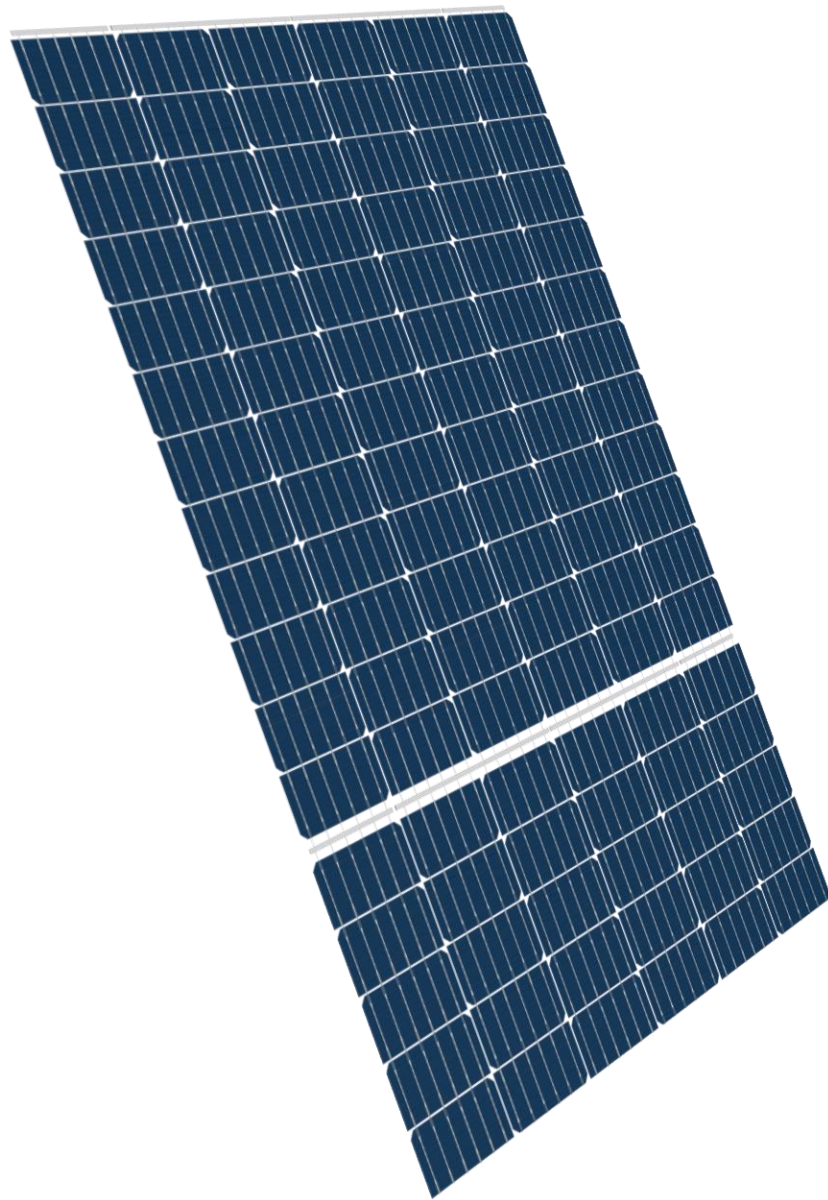
# String Length **Unchanged**

with Same Module Voc





**LONGi** Solar



# BIFACIAL ENERGY GAIN

# Bifacial Module

POE

Glass

- BiPERC cells → High bifaciality
- POE → Highly reliable

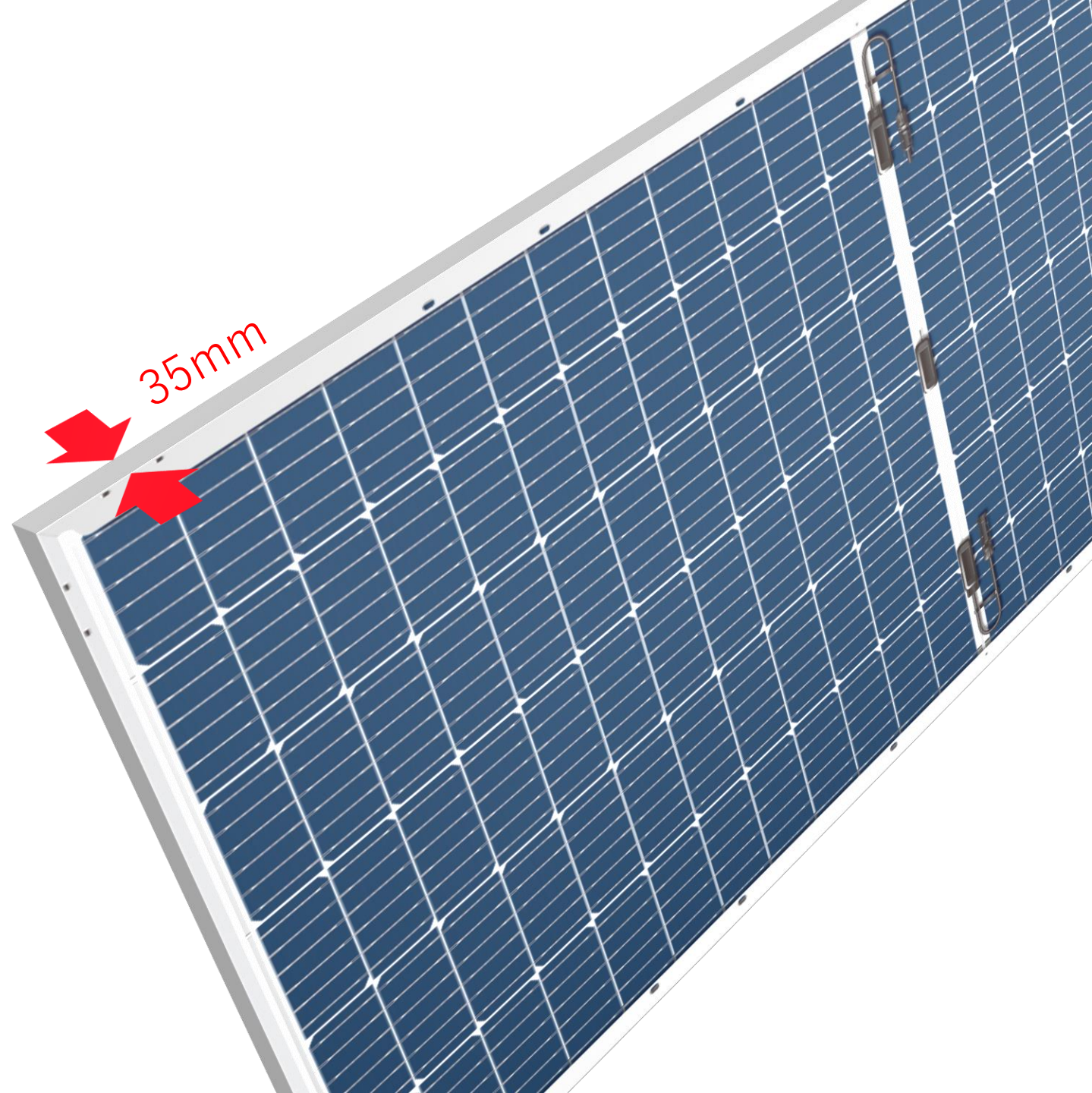
Bifaciality  $80\pm3\%$   
( $75\pm5\%$ -Partially glazed glass used)





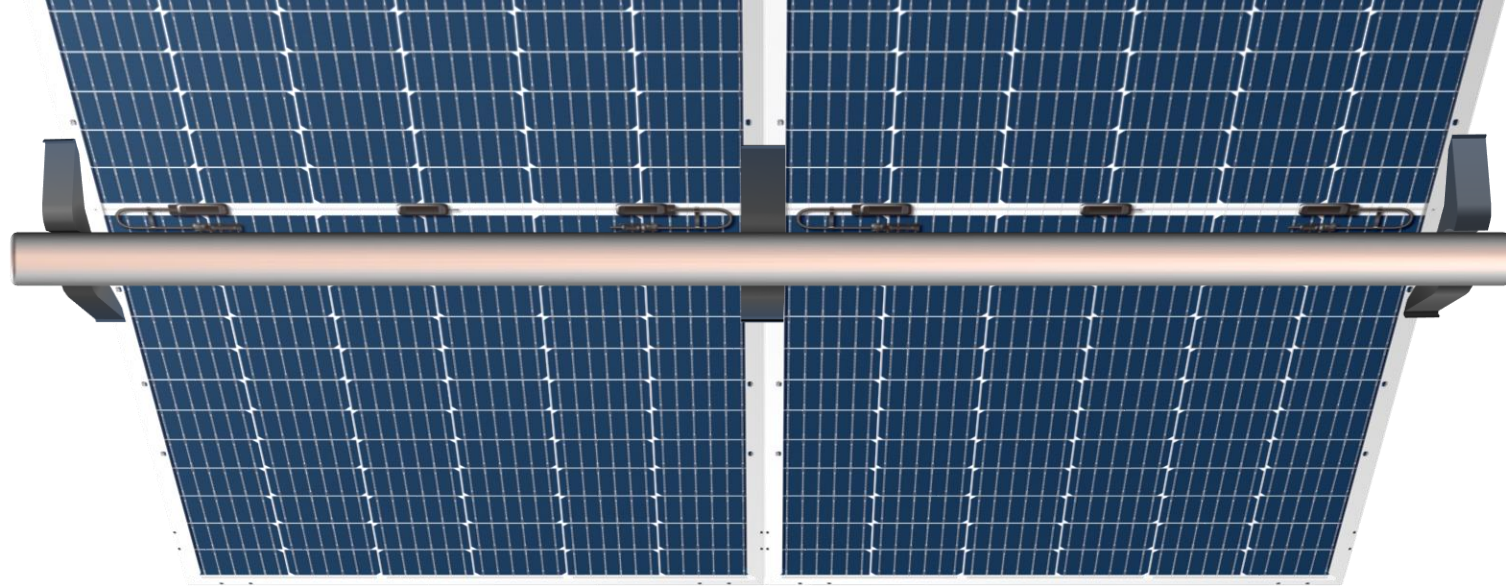
# Frame

- B Side width: 35mm\*,  
good load capacity



\*144 half-cell module





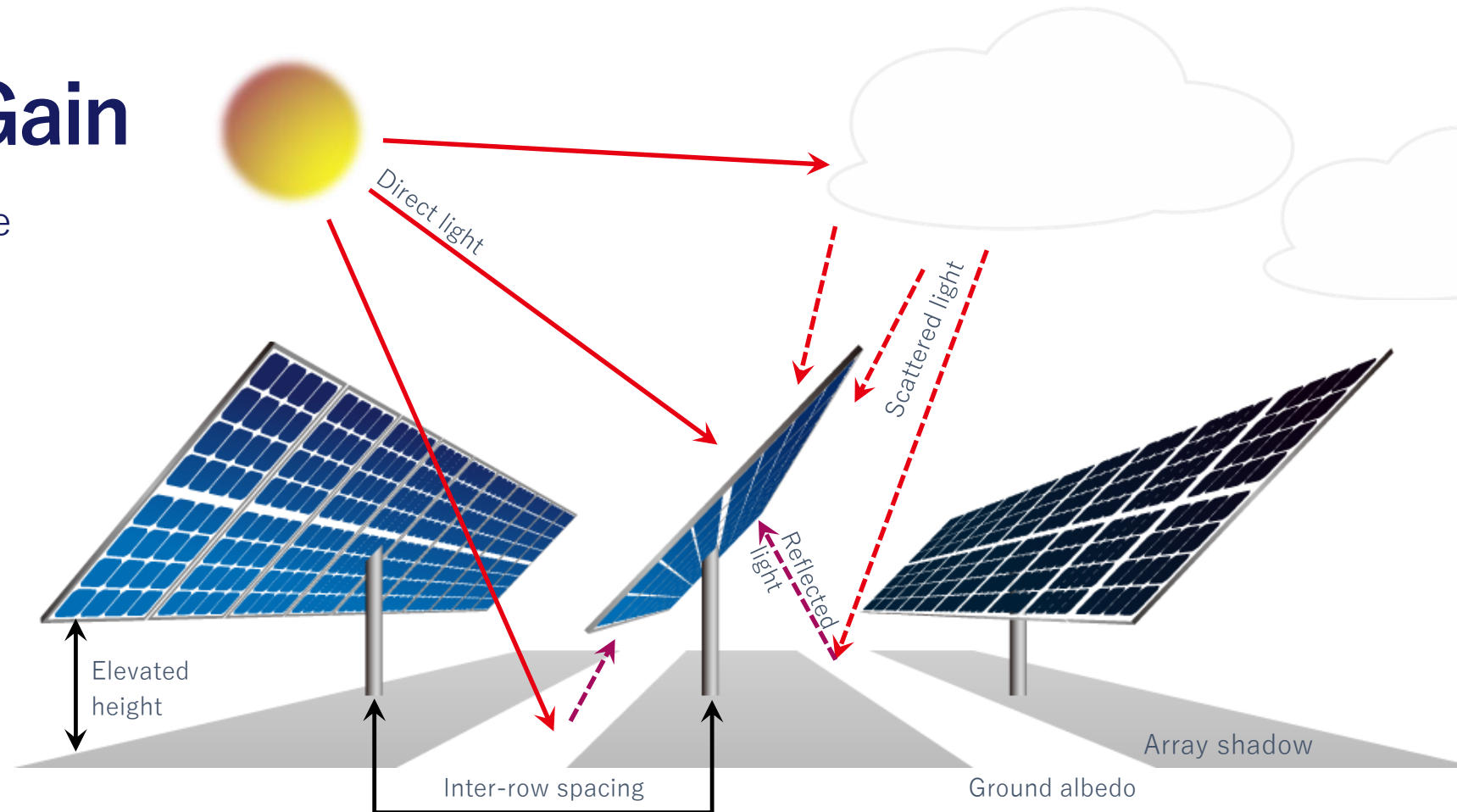
## Compatible with Mainstream Tracking System

- 400mm distance mounting holes\*
- Split junction boxes avoid shading cells

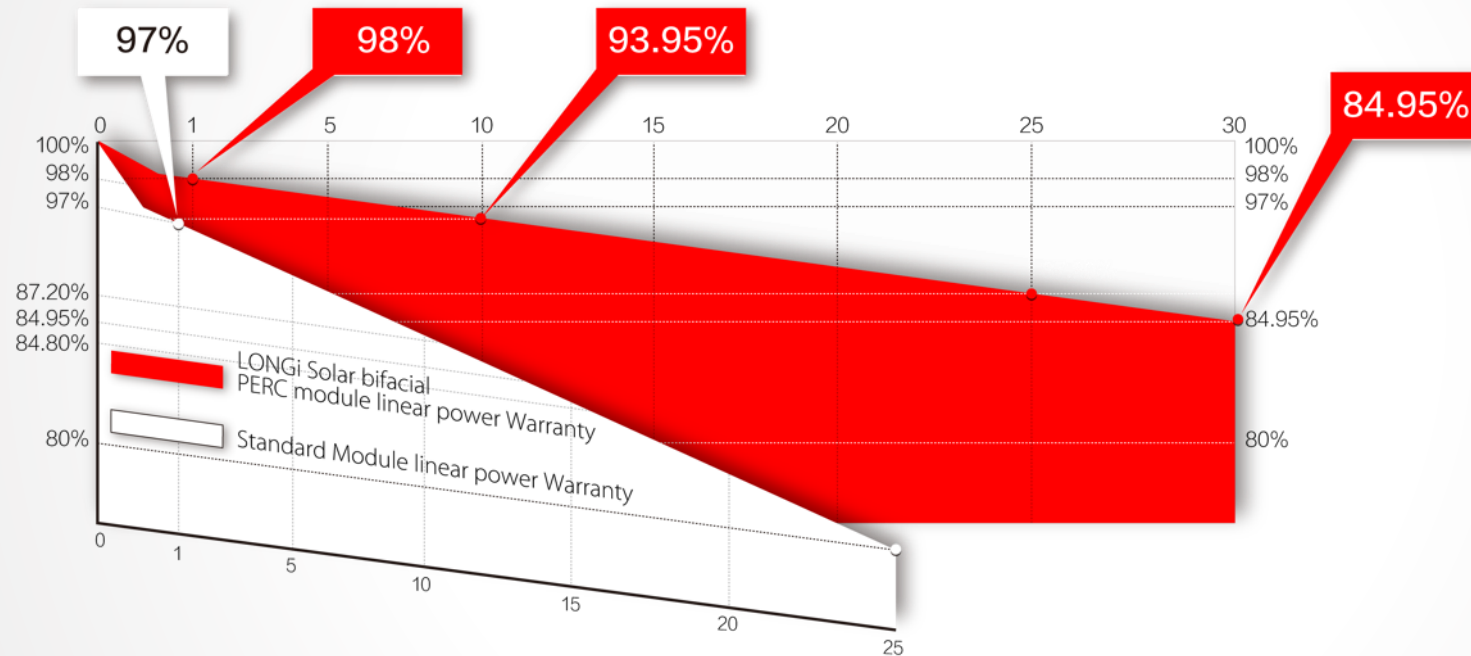
\*144 half-cell module

# Bifacial Energy Gain

Bifacial power generation can be simulated well by PV syst.



# Bifacial Module Power Degradation Warranty



## WARRANTY

10Y

**MATERIAL & CRAFTWORK**

10Y

**POWER-OUTPUT > 93.95%**

30Y

**POWER-OUTPUT > 84.95%**

1<sup>st</sup> year degradation < 2%, 0.45% annually through 30 years

# Bifacial PERC Pilot Projects

LONGi's bifacial modules have been tested in various environments  
The bifacial gains are in line with expectations



**TÜVRheinland®**  
Precisely Right.

**9%-sand**

Thuwal, Saudi Arabia



**TÜVRheinland®**  
Precisely Right.

**20%-white gravel**  
Chennai, India



**~10%-grass**

**15%-sand / concrete**

Ding'an, Hainan, China



**10.8%-asphalt**  
California, USA



**9.8%-gravel**  
Nevada, USA



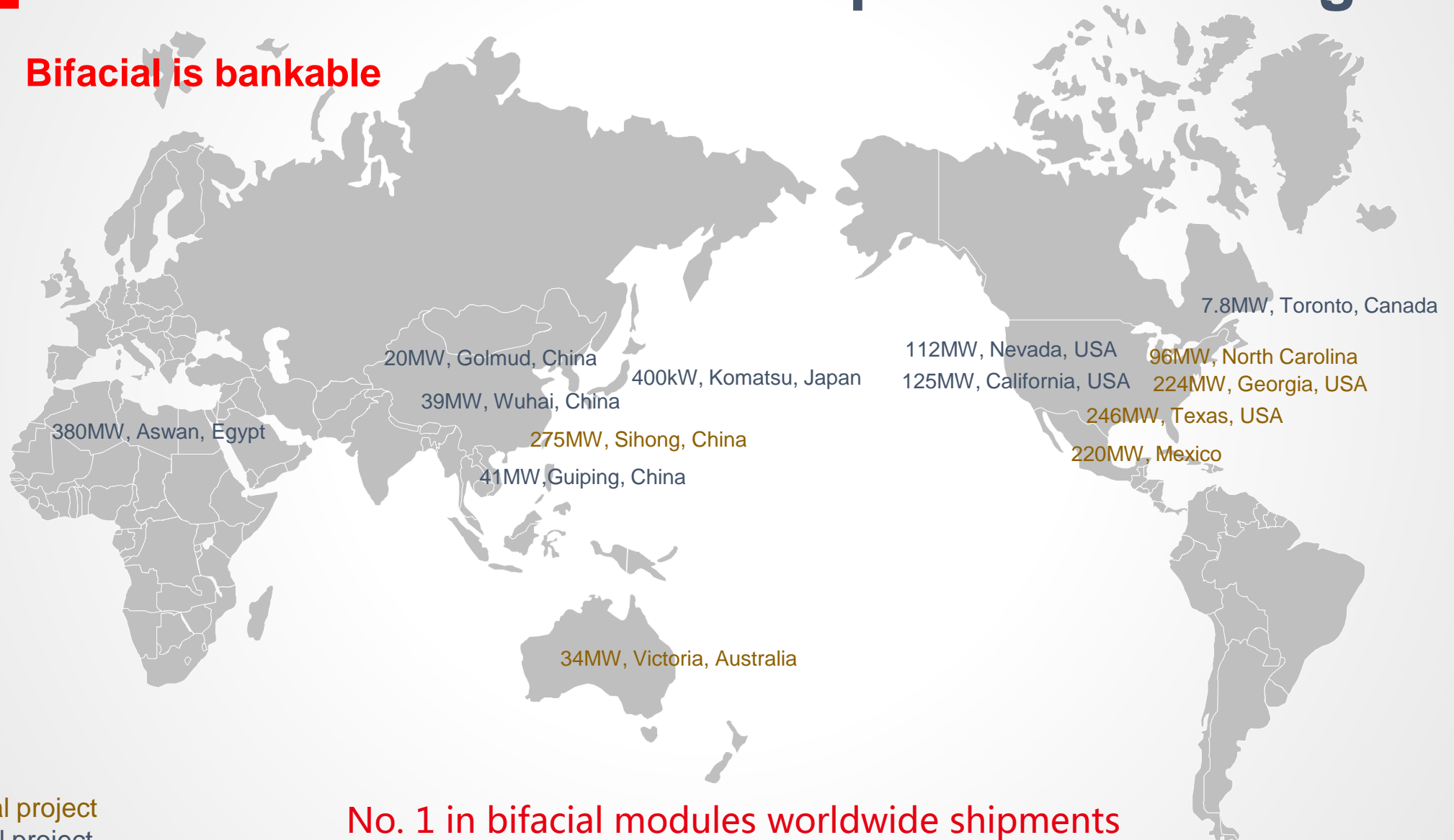
**8.0%-gravel (tracker)**  
California, USA





# LONGi Bifacial Module Shipment Reaching 2.5GW

**Bifacial is bankable**





# Hi-MO4's BOS Cost Savings

PV station in Cologne, Germany

Hi-MO **3**

**375**<sub>Wp</sub>

2.75MW

14\*4, 28 in series

Hi-MO **4**

**420**<sub>Wp</sub>

**-10.7%**

Number of modules / mounts

**-5.1%**

mounts cost

**-10.6%**

Pile foundation

**-11.8%**

Combiner box

**-7.9%**

Cables

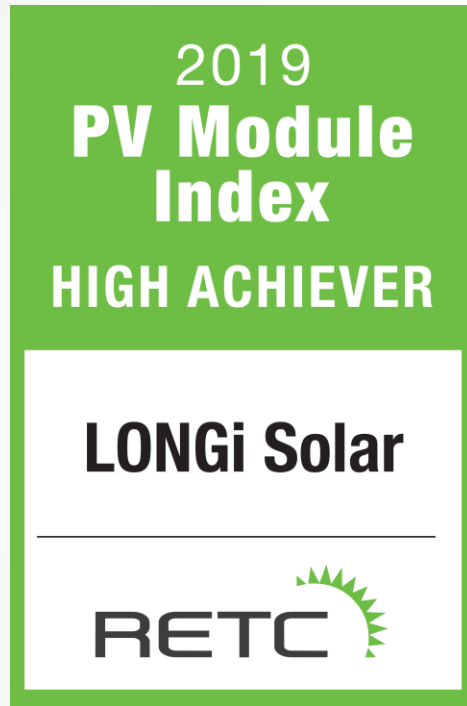
**-7.0%**

Installation of modules / mounts

**-1.2%**

Land occupation

# High Quality and Reliability



LONGi Solar is 1 of 2 Overall High Achievers in RETC's inaugural PV Module Index;

LONGi Solar has been named Top Performer in 4 consecutive years in PVEL's PV Module Reliability Scorecard

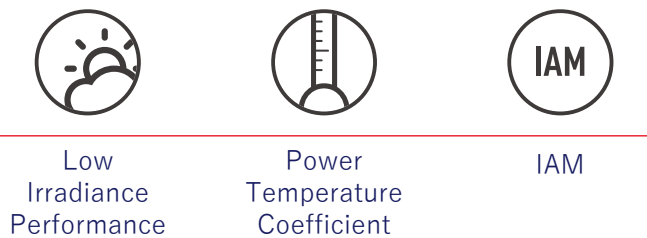
# Product performance

Winner of the TÜV Rheinland's 'All Quality Matters'  
from 2017 to 2019



**Simulation**  
Awarded in 2017、2008

**Outdoor power generation**  
Awarded in 2019



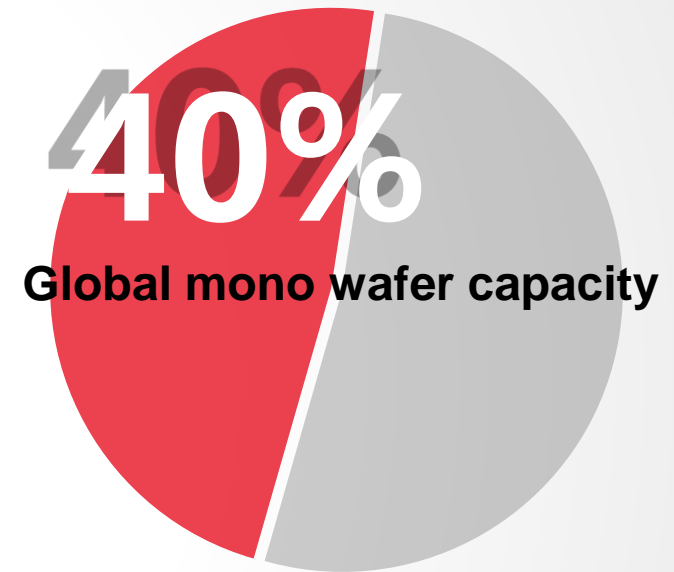
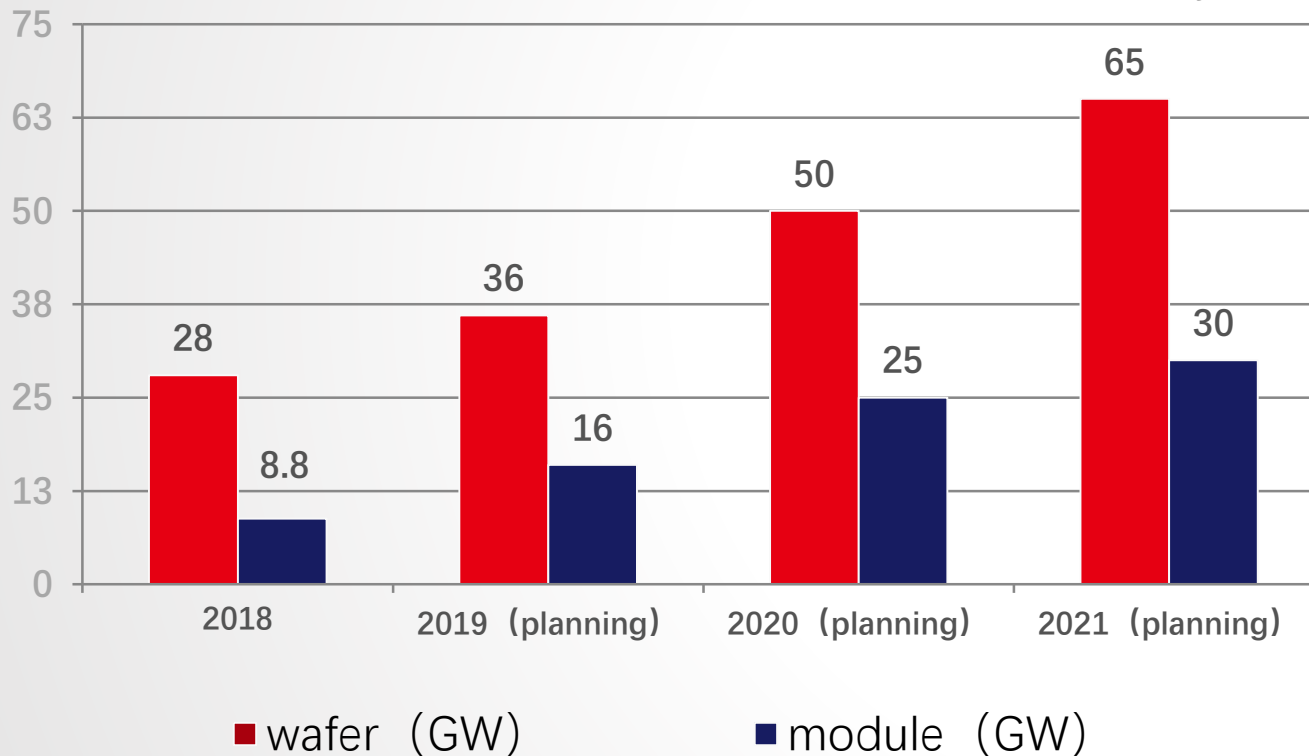
**LOWER**  
**LCOE**

# **LONGi Update**



# Largest Mono Wafer and Module Manufacturer

LONGi mono wafer & mono module capacity

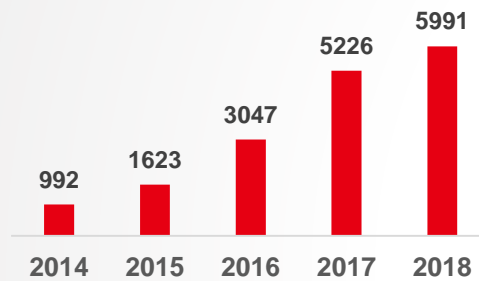


**Accounts for 40% of mono wafer capacity in the world in 2018.**

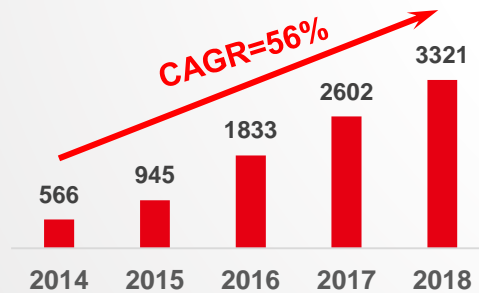
(Source: PV-infoLink 2018 global PV manufacturers capacity, production statistics )

# Strong Financial Performance

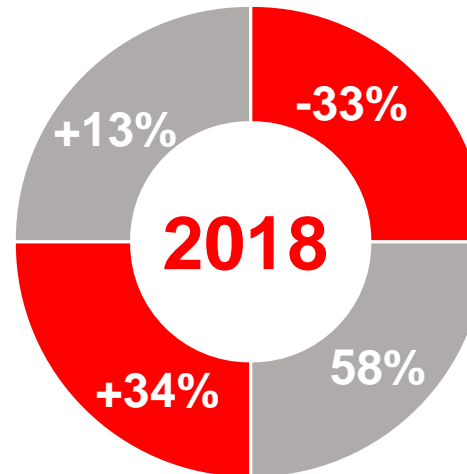
Total assets (Million USD)



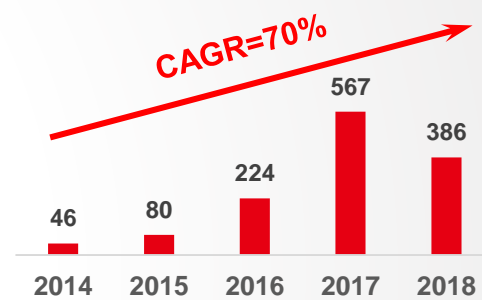
Revenue (Million USD)



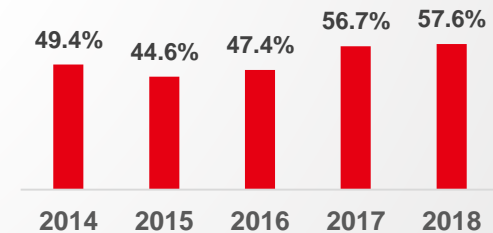
Market Cap  
~**US\$15B**  
as of 9/13/2019



Net Profit (Million USD)



Debt Ratio



# Leadership

Industry leading financial health

Adhering to the philosophy of **stable operation** and **sustainable development**, LONGi has maintained a low asset-liability ratio through the years.

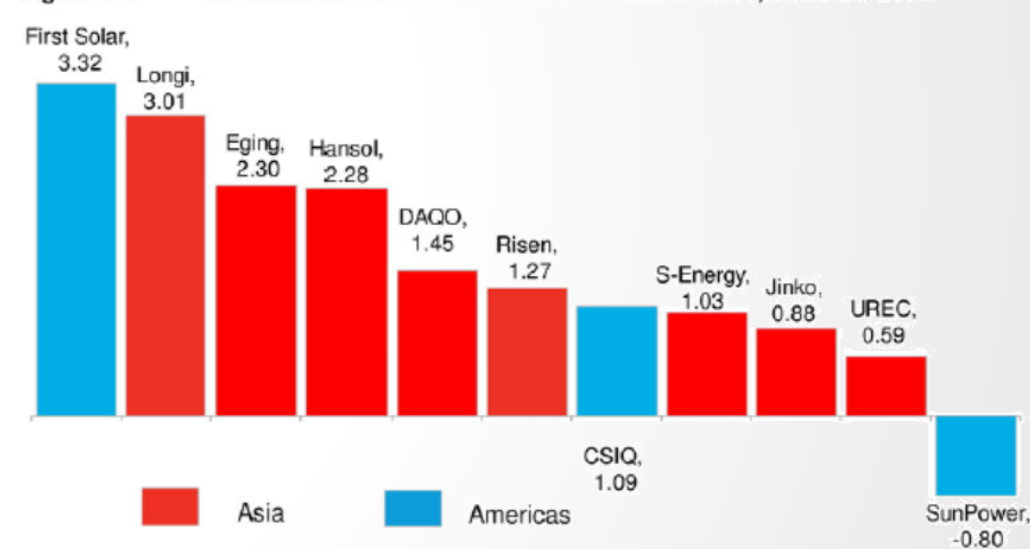
The strong return on asset, **good profitability** and **proven bankability** has been validated and recognized by industry authorities.

Table 3: BloombergNEF Tier 1 module maker list as of 3Q 2019

Firm/ brand	Annual module capacity, MW/year	Firm/ brand	Annual module capacity, MW/year
Longi*	15,000	Jinneng	2,000
Jinko*	10,800	REC Group*	1,500
Hanwha Q-Cells*	10,700	Waaree	1,500
JA Solar*	10,500	HT-SAAE*	1,500
Canadian Solar	9,400	Adani/Mundra*	1,200
Risen Energy*	9,100	Neo Solar Power/ URE	1,110
Trina Solar*	8,000	Vikram Solar*	1,100
First Solar*	6,200	Hengdian DMEGC	1,000
GCL System Integration Tech*	6,000	Jolywood	1,000
Talesun	5,800	ET Solar	1,000
Seraphim*	5,000	Lightway	1,000
Renesola	3,650	Boviet*	800
Chint/Astronergy*	3,500	Hansol Technics	600
ZNShine*	3,500	Vietnam Sunergy (VSUN Solar)	600
Akcome	2,600	S-Energy	530
LG Electronics*	2,500	AU Optonics	500
BYD	2,400	Shinsung	300
SunPower*	2,400	Heliene*	250
Eging	2,100	Sharp	210
Sumec/ Phono Solar*	2,000	Win Win/ Winaico	200
Total		139,050	

Source: BloombergNEF Methodology [here](#). Note: \* denotes a company for which technical due diligence reports are available from PVEL. Contact [Tara.Doyle@pvel.com](mailto:Tara.Doyle@pvel.com) for details.

Figure 10: Altman-Z scores of selected solar manufacturers, 1Q or 2Q 2019



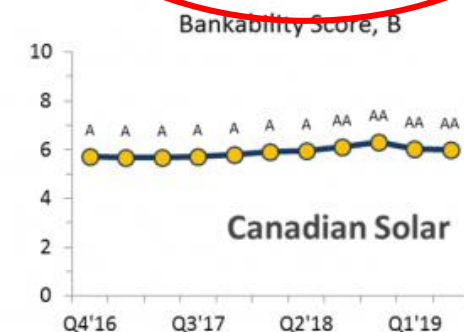
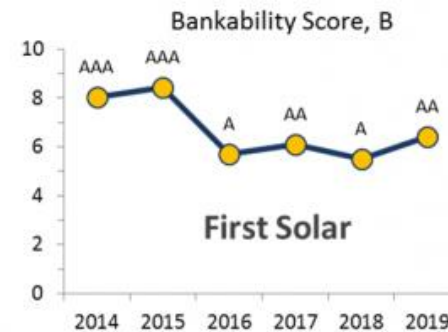
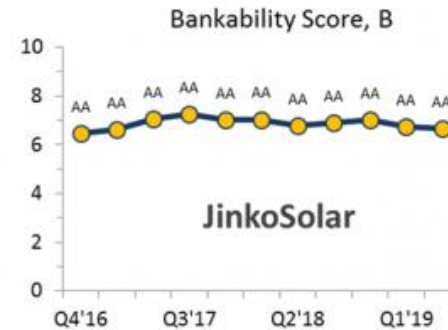
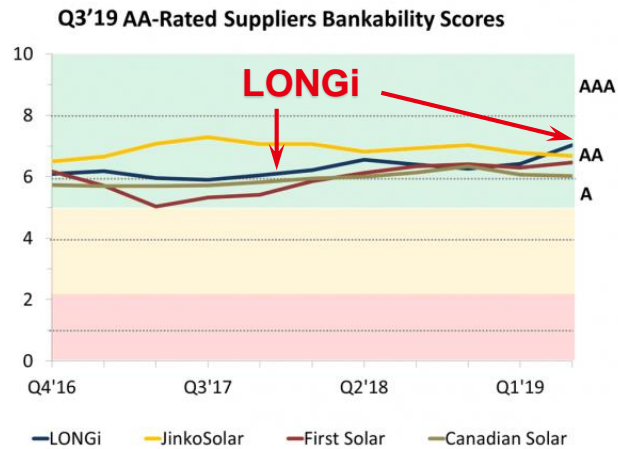
Source: Bloomberg terminal, BloombergNEF

Source: Bloomberg New Energy Finance

## PV ModuleTech Bankability Rating:

- **AA rating: 4**
- A rating: 4
- BBB/BB/B rating: 6

Total module suppliers: a few hundred



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# GRACIAS

Ivan Reyes

E-mail: [ivan@longigroup.com](mailto:ivan@longigroup.com)

