

Trina Solar Vertex

Opening the New
500W+ Module Era

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1 Why we developed VERTEX

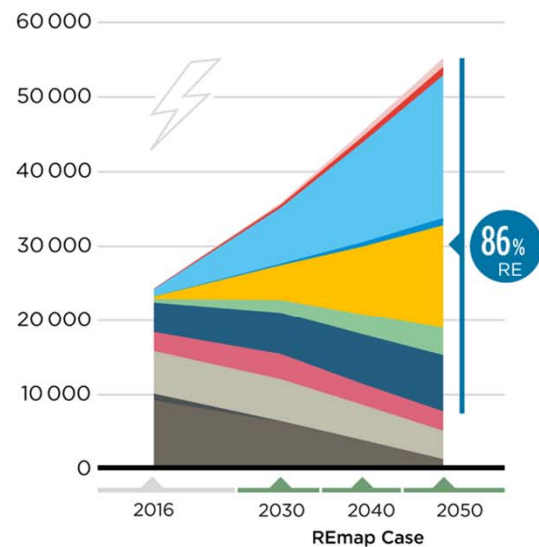
2 What is VERTEX

3 When we launch VERTEX

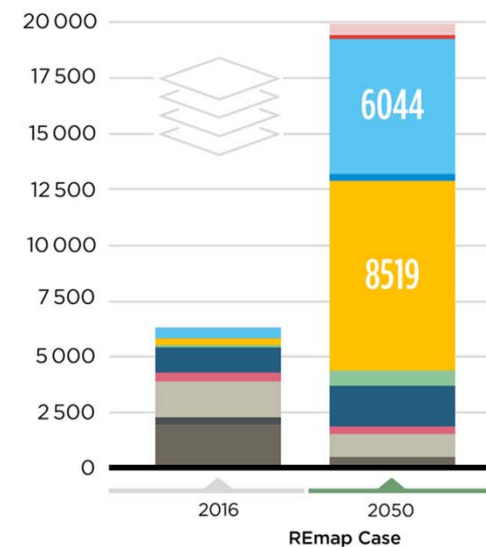
Outlook

Global energy structure and PV development trends

Electricity generation
(TWh/yr)



Total installed power capacity
(GW)



According to IRENA:

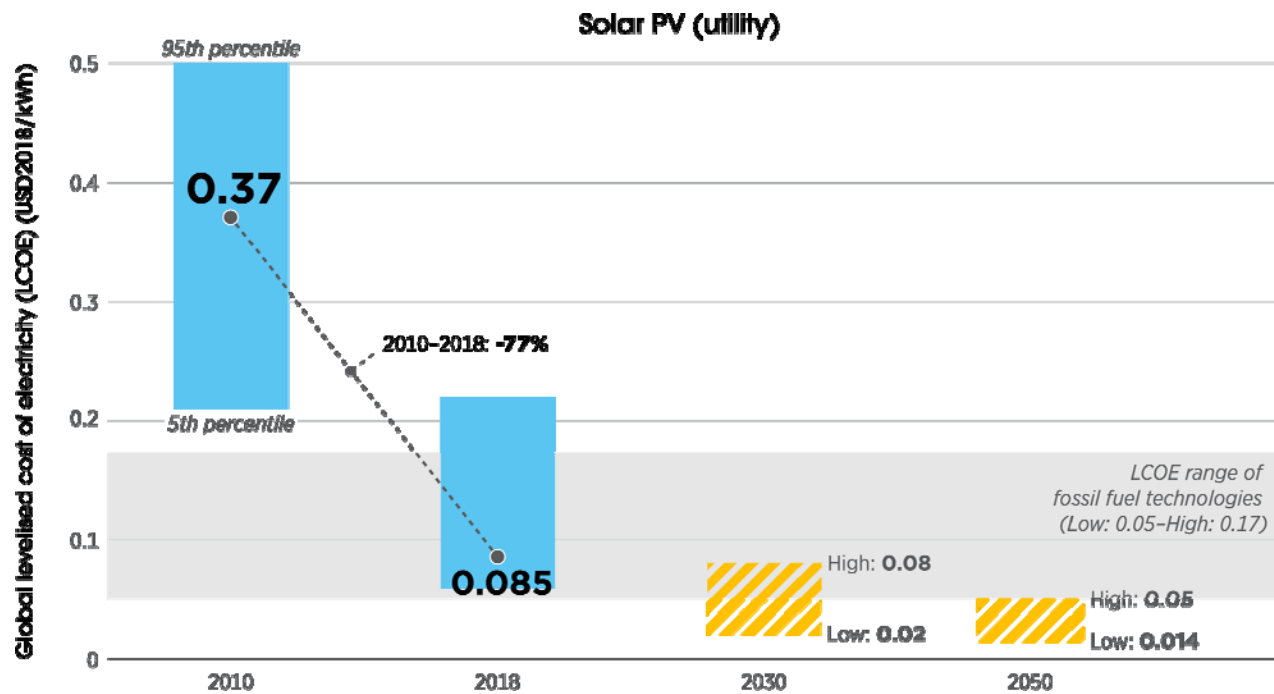
Photovoltaic power will lead the global energy revolution. Global solar capacity will reach 8.5 TW by 2050.

Source:
IRENA Roadmap to 2050

LCOE Trend

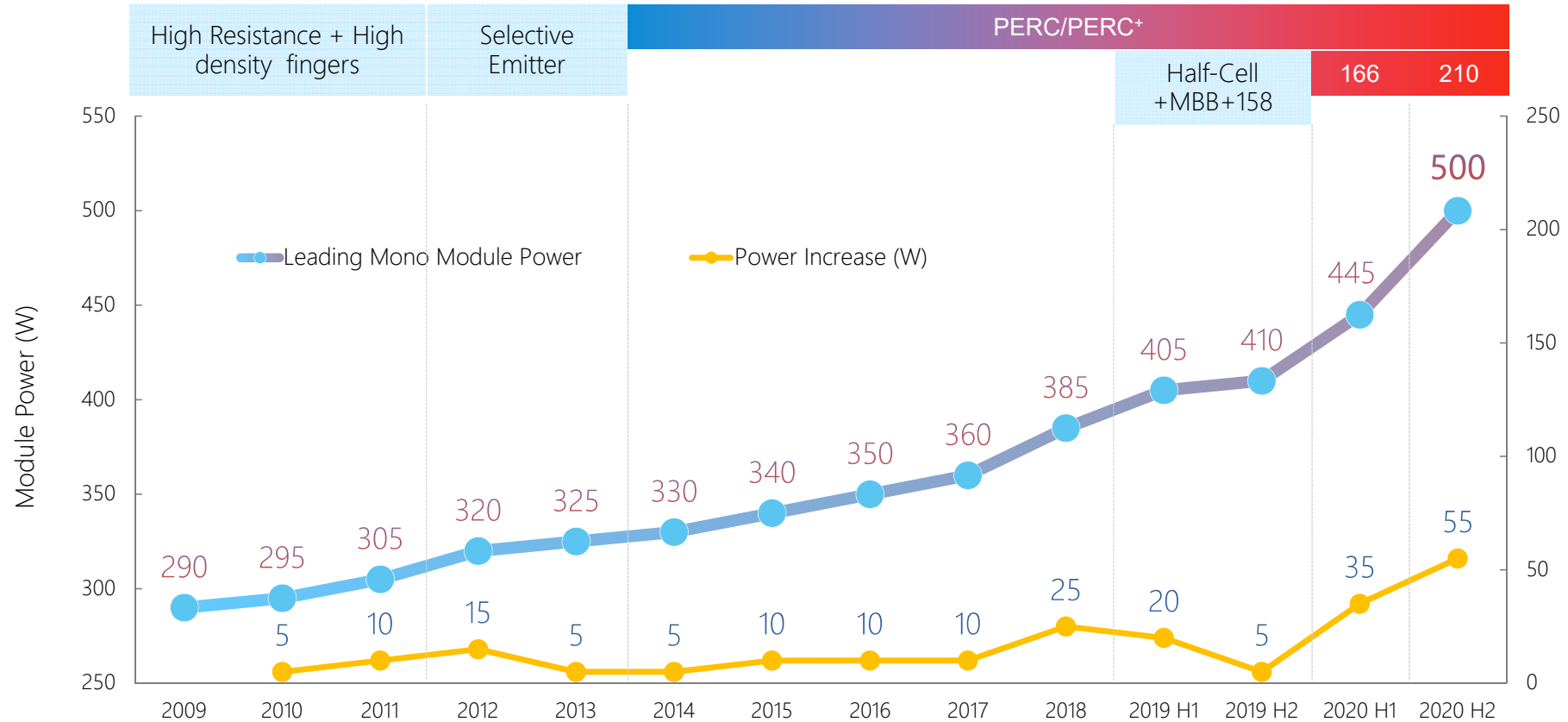
The global weighted average LCOE of utility-scale PV plants is estimated to have fallen by 77% between 2010 and 2018.

The LCOE for solar PV is already competitive now compared to all fossil fuel generation sources and will be fully competitive in a few years.



Source:
IRENA report 2019 11

Module Power Trend (72 cell module size)



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Vertex opens the 500W+ Module Era

Trinasolar



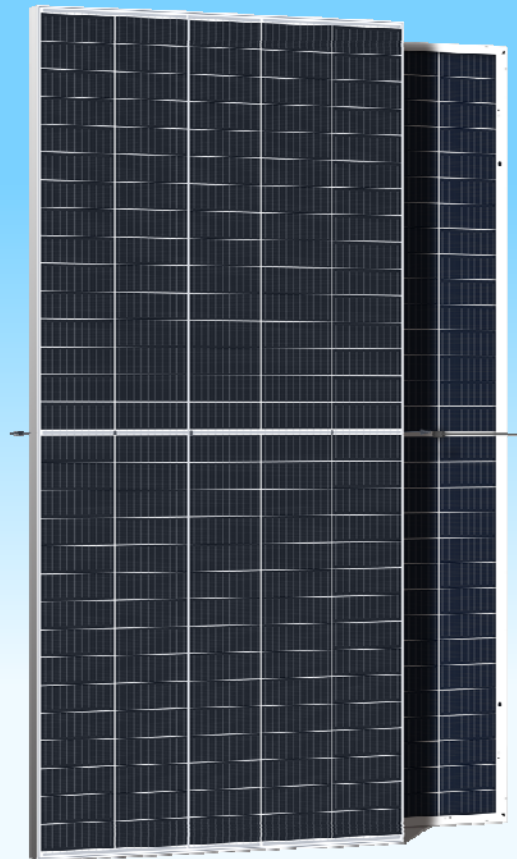
High Power

Maximum expected power : 500W+.



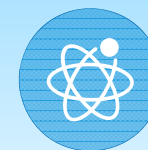
High Efficiency

Benefit from square mono cells and high-density technology, the efficiency of Vertex can reach up to 21%.



High Reliability

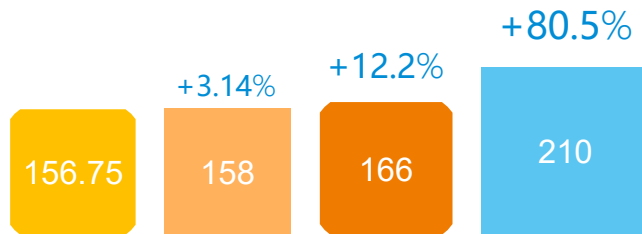
Lower initial & annual degradation.
30-year power warranty.



High Power Generation

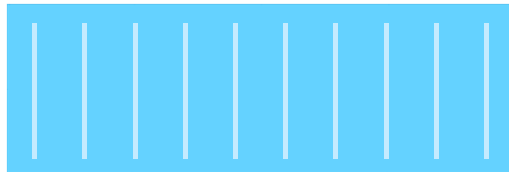
Excellent temperature coefficient and low irradiation performance.
5% - 30% of additional power generation brought by the back side.

Integration of Innovative Technologies



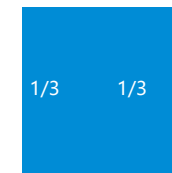
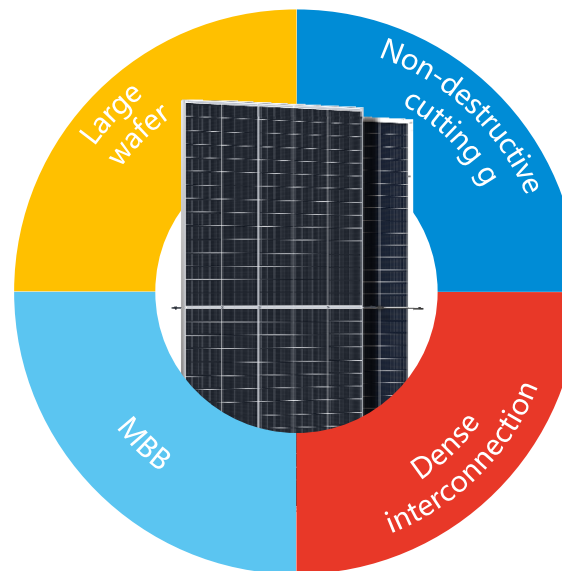
The largest wafer size:

Largest silicon ingot technology from semiconductor industry



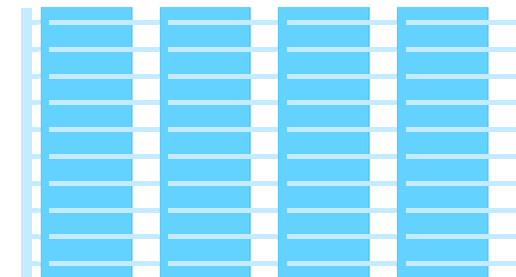
MBB (Multi-Bus bar):

Multiple bus bars match large size wafer perfectly



Non-destructive cutting

and 1/3 split cell balance V_{oc} and I_{sc} well

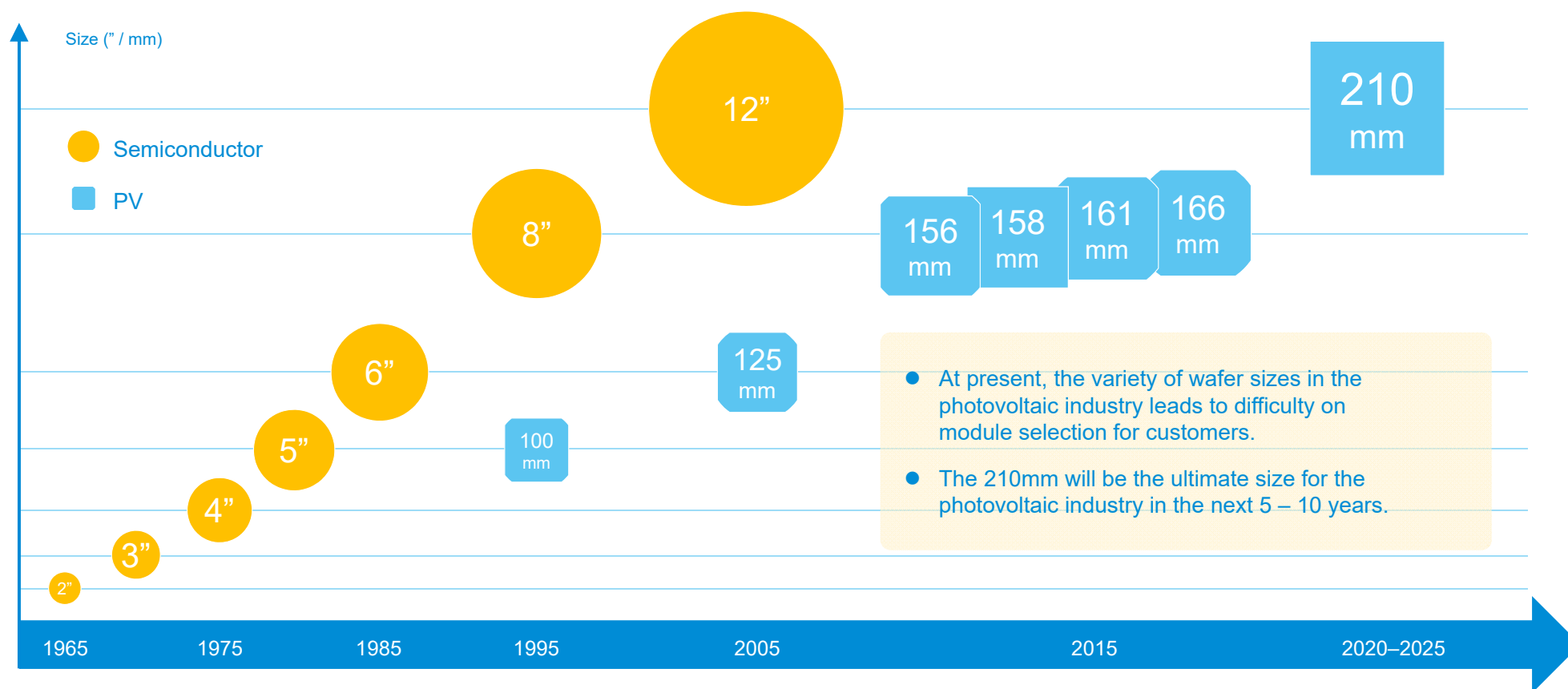


High-density encapsulation technology:

Minimized space between cells to improve module efficiency by 0.2-0.3%

Technical Characteristics 1

Size trend of silicon wafers in semiconductor and PV industry



Technical Characteristics 2

1/3 split cell balance V_{oc} and I_{sc} well

Dividing the cell into three pieces is the optimized layout.

Parameter	Full cell	Half cell	1/3 cell	1/4 cell
P_{max}	473W	495W	500W	502W
Mono-facial I_{sc}	18.2A	18.2A	12.1A	9.1A
V_{oc}	34.3V	34.3V	51.5V	68.7V
Process risk	Low	Low	Normal	High

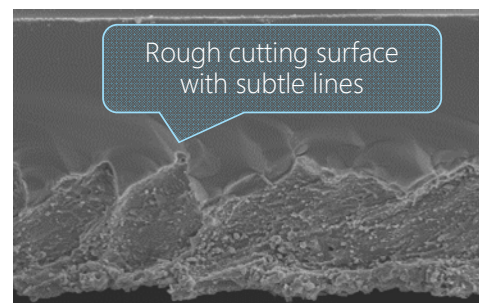
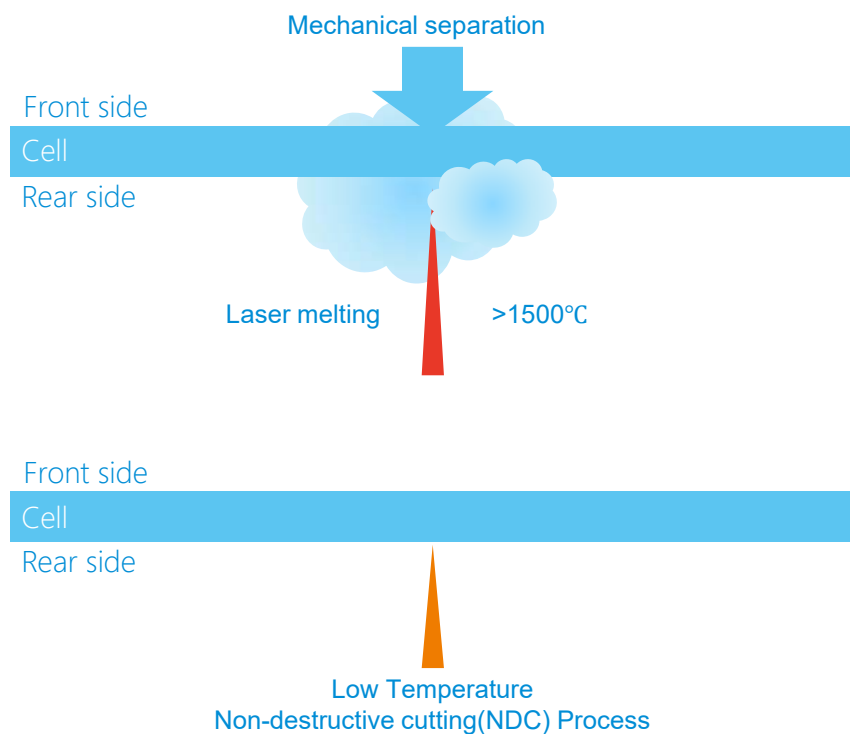
I_{sc} too high: Reliability risk

V_{oc} too high: BOS cost increases because of less modules per string

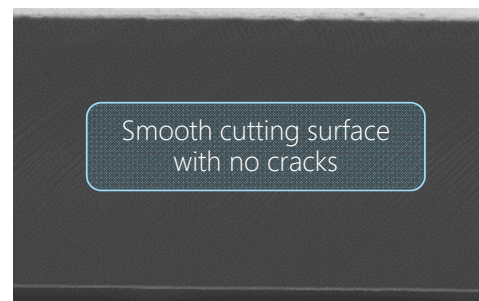
Technical Characteristics 3

Non-destructive cutting (NDC)

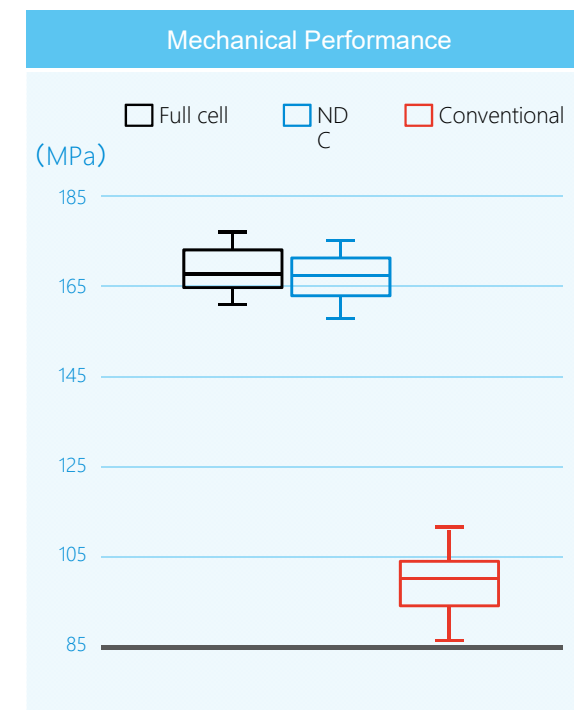
Benefit from Non-destructive cutting technology, the cell can be designed to have three uniform pieces.



Section after traditional cutting



Section after Non-destructive cutting



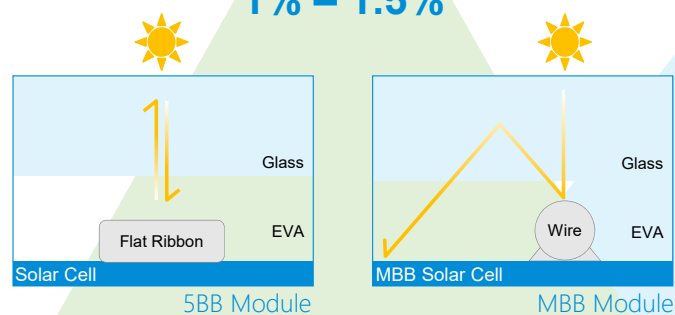
Technical Characteristics 4

MBB technology

Module efficiency improvement
0.4% – 0.6%

Optical performance

Power improvement
1% – 1.5%



Electrical performance

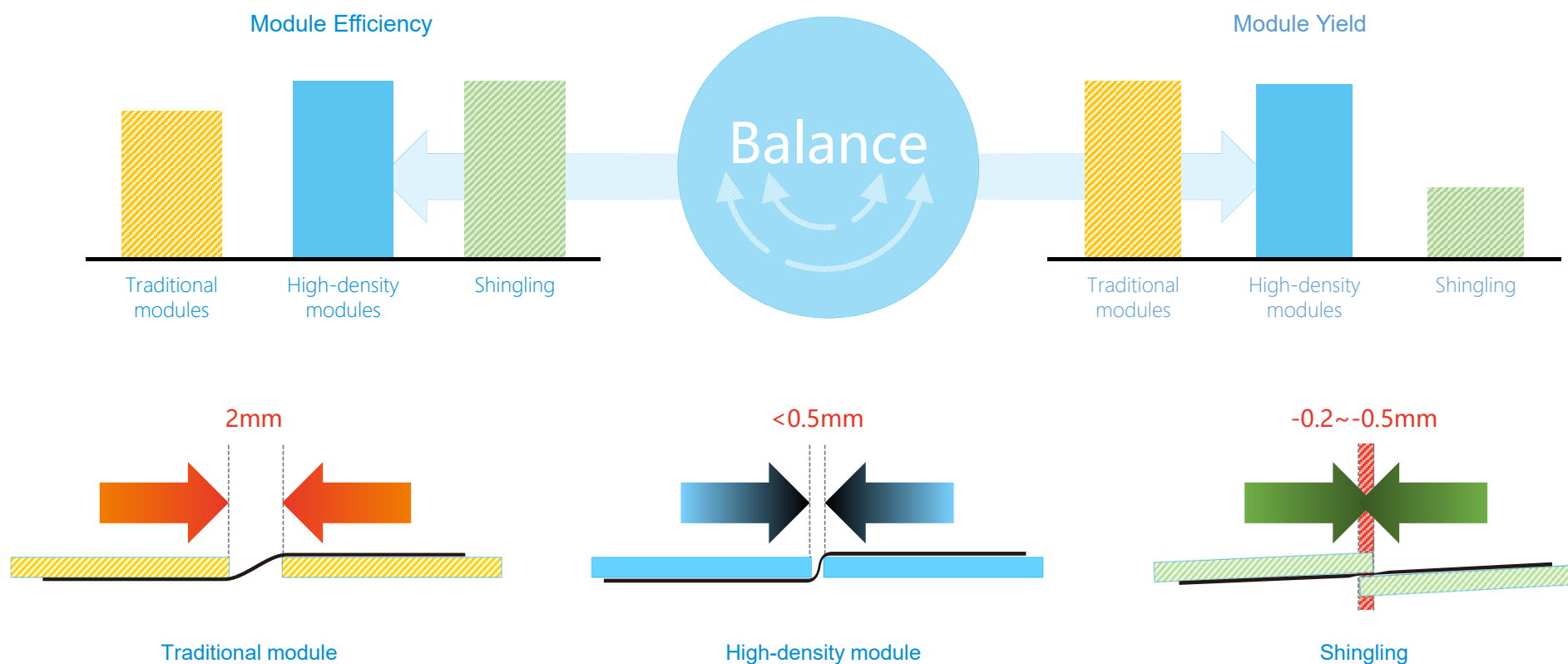
Power improvement
1% – 1.5%



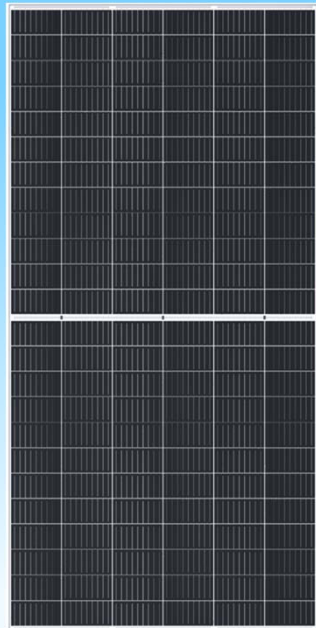
- ▶ Shorter current path
- ▶ Lower series resistance 10-15%

Technical Characteristics 5

High-density cell interconnect technology

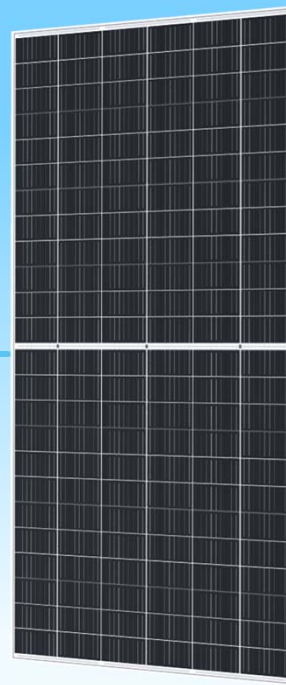


Value to the PV System



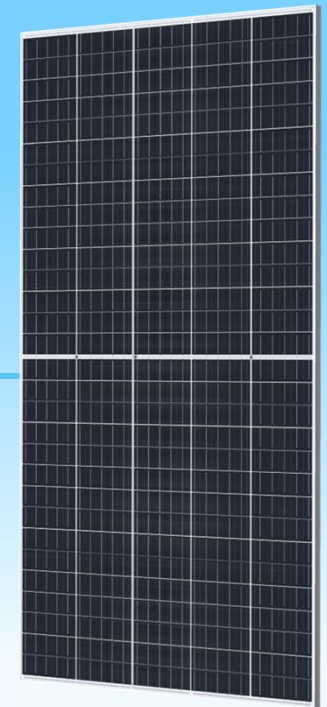
410W

Reduced BOS cost*
5 – 6%
Improved Power Warranty
2%



450W

Reduced BOS cost*
12 – 14%
Improved Power Warranty
2%



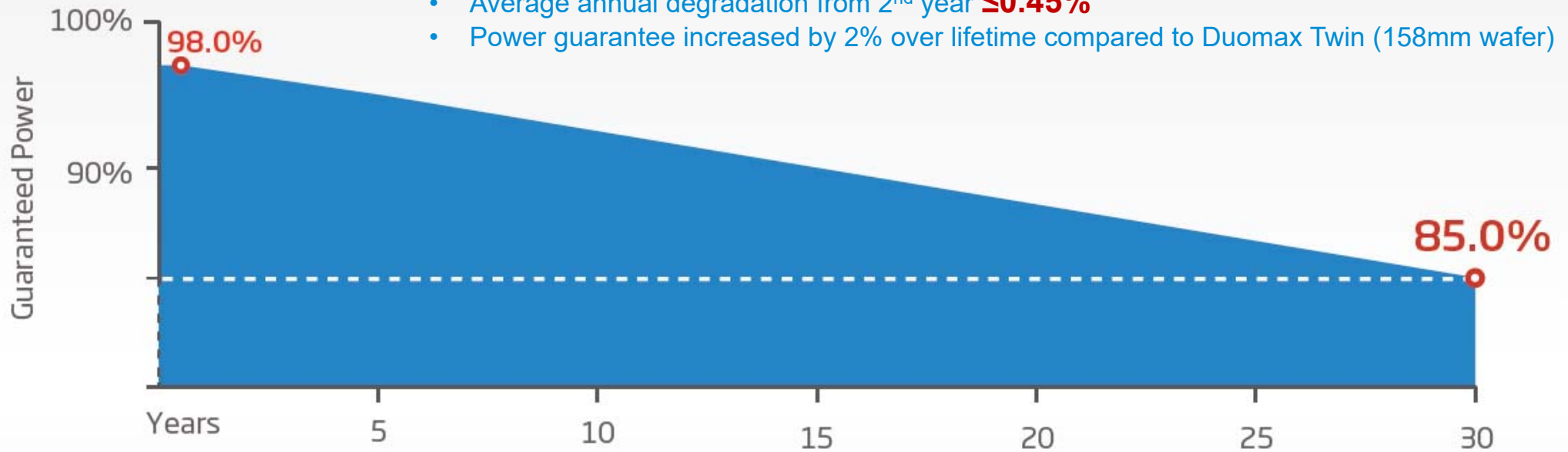
500W
Vertex module

* Based on sample projects in Spain

Improved Power Warranty

Trina Solar VERTEX (Bifacial Dual Glass) Performance Warranty

- 1st year degradation $\leq 2\%$
- Average annual degradation from 2nd year $\leq 0.45\%$
- Power guarantee increased by 2% over lifetime compared to Duomax Twin (158mm wafer)



PV System Compatibility



Compatible with
mainstream inverters.



Compatible with
mainstream trackers.

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Outlook



Q3

2020 Q3 mass production



5GW

Capacity will reach more than
5GW by the end of 2020



Vertex

500W+ high power
with 21% high efficiency



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