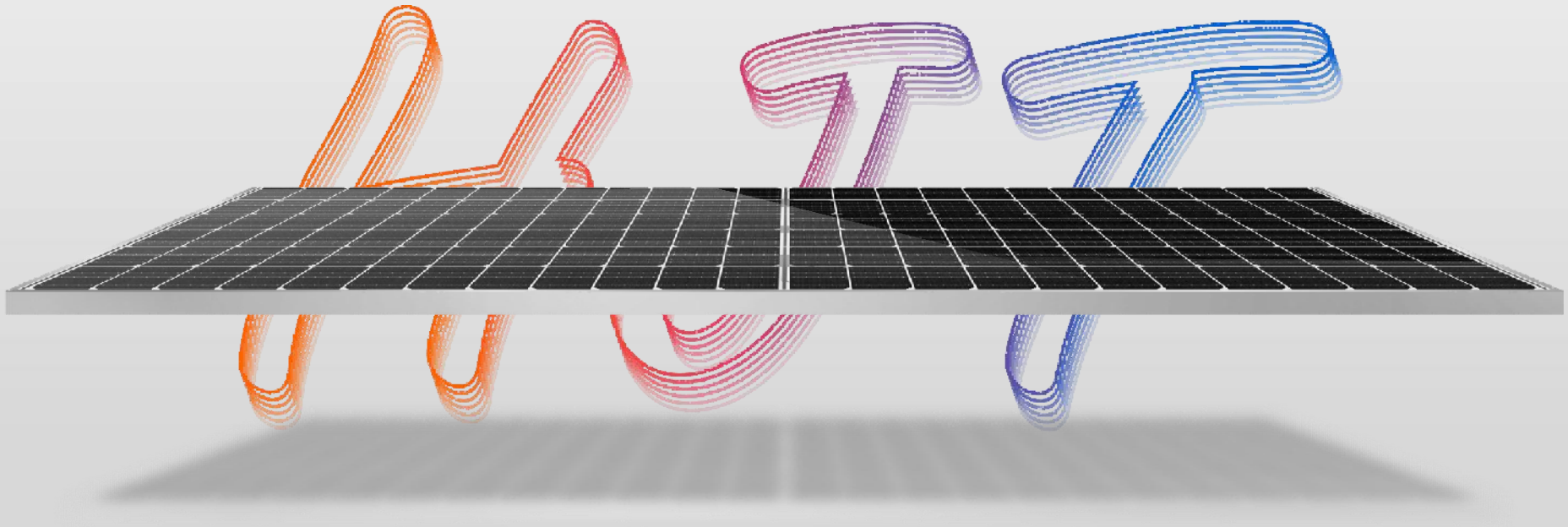
HUASUN

LEADING NEW PHOTOVOLTAIC ERA

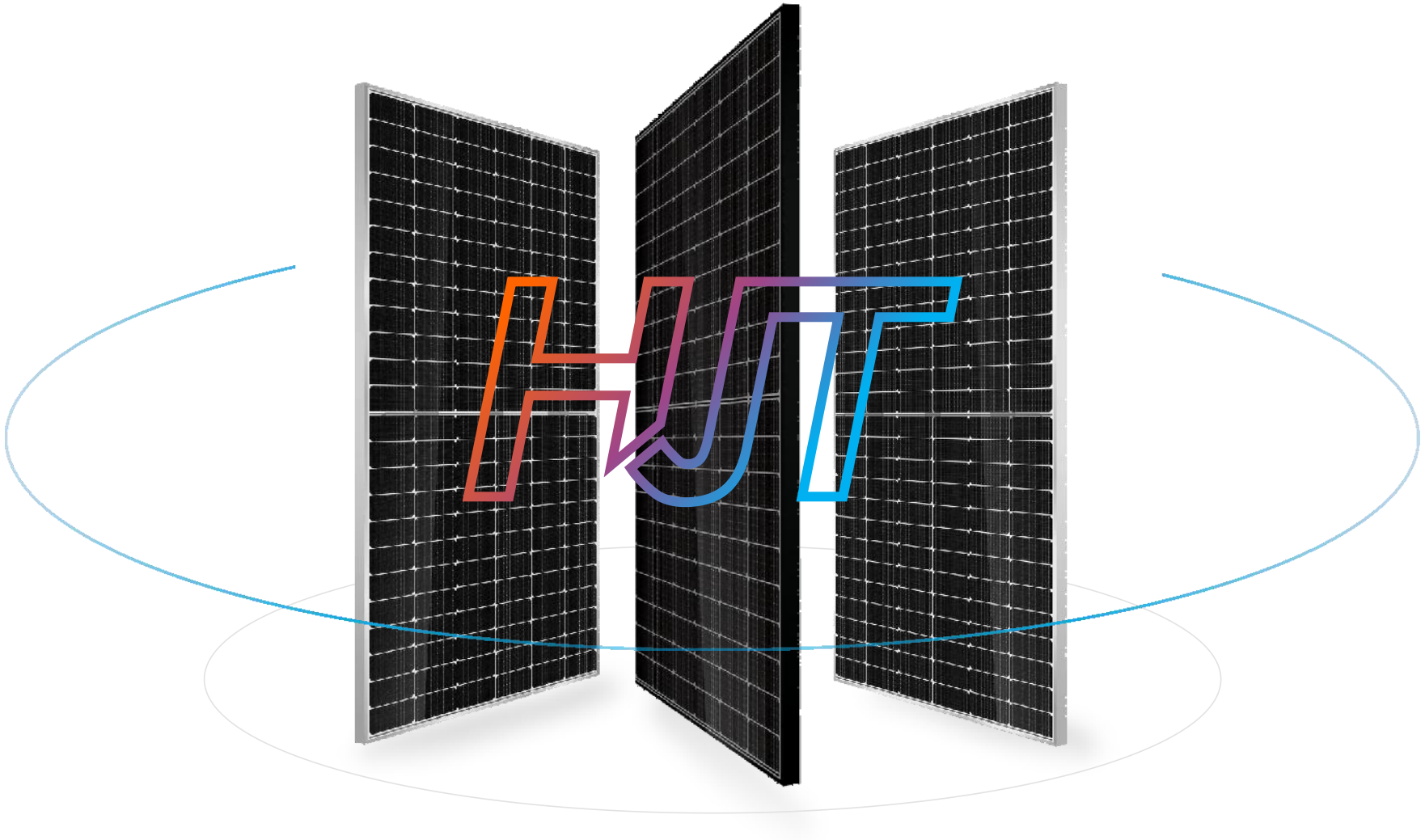


Anhui Huasun Energy Co., Ltd

CONTENT

HUASUN

Leading Massive Industrialization of HJT Solar Cell & Module



About Huasun

Anhui Huasun Energy Co., Ltd. (hereinafter referred to as "Huasun"), founded in July 2020, is a technological innovation enterprise specializing in the development and application of ultra-high efficiency N-type silicon based heterojunction (HJT) solar cells and module technology as well as large-scale manufacturing.

Under the mission of "bringing superior solar energy into life, making home more livable and beautiful", Huasun adheres to the operation philosophy of "Integrity, Open-mind, Ecology, Mutual benefits", focusing on the research and development of high-efficient HJT technology, manufacture of HJT products and provision of clean energy solutions. Huasun strives to provide customers with the most effective clean energy solutions of greater performance and better returns.

Headquarters
Xuancheng•Anhui

Sales Center
Nanjing•Jiangsu

Founded in
2020.07

Intelligent manufacturing base
176,000㎡

Headcounts
2,300+

Core Tech/Product
HJT Solar Cell/Module

Front runner in New Photovoltaic Era
Pioneer of HJT mass production

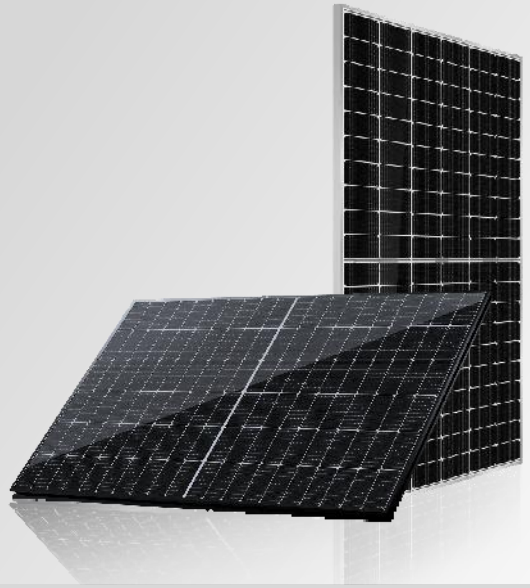
Specializing in the development and application of ultra-high-efficient N-type silicon based heterojunction (HJT) solar cells and module technology，with leading industrial R&D and innovation ability, Huasun strives to provide customers with PV products in higher performance and better quality.

2022 Q2
HJT Solar Cell Capacity

2.7GW

2022 Q2
HJT Solar Module Capacity

2.7GW



Super Team

Huasun actively responds to climate change solutions, gathers the most experienced talents in HJT field , and forms a super R&D team led by authorities in the industry, to explore effective approaches to improve solar cell efficiency, and challenge the low-cost but productive mass production of HJT cells and modules.

15Y+
Team members' average experience in tech development and management in top solar companies

200+
Talents in HJT field

1 Chief Scientist
National High-tech R&D program as well as
National Key Basic research Project

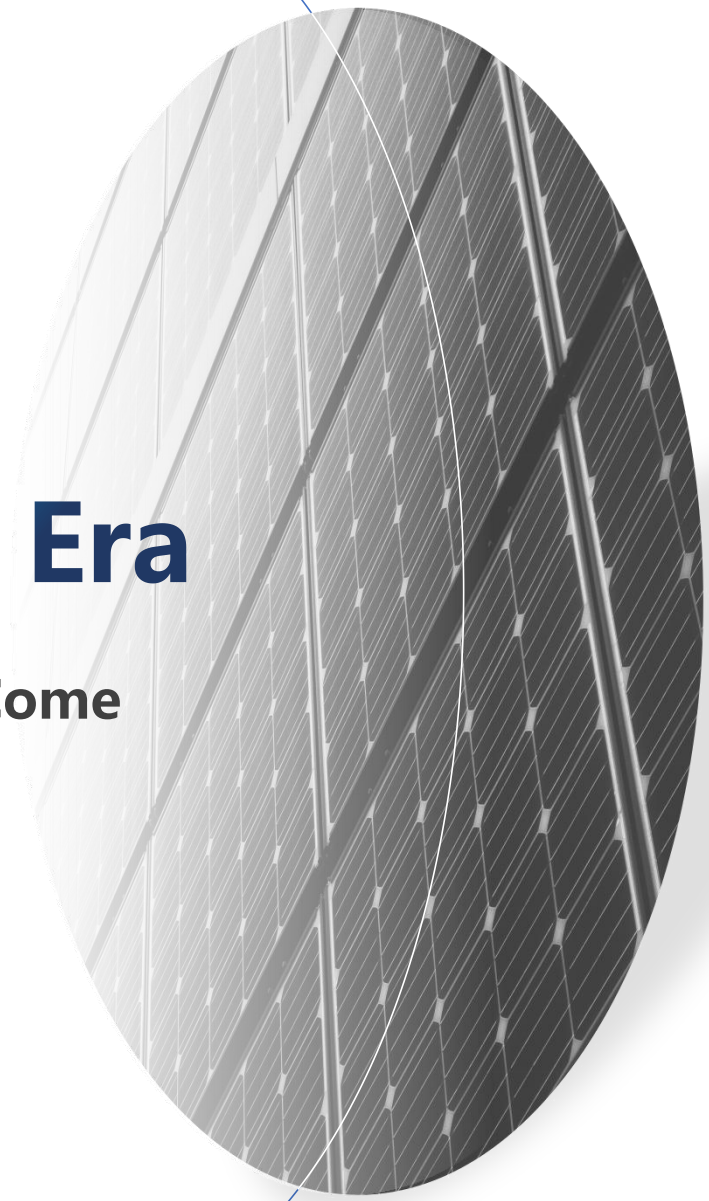
2 Leading Talents in HJT Field

7 Ph.D

33 Masters

New Photovoltaic Era

HJT • The Future Has Come

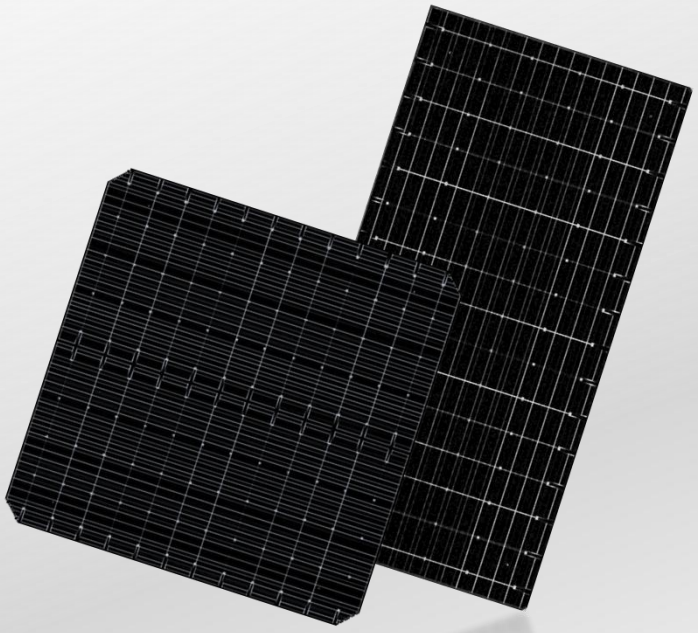


Compare with PERC, HJT has great advantage in efficiency, performance and low carbon footprint. Huasun believes that HJT will become the next mainstream technology in New photovoltaic era, leading the development direction of PV industry.

HJT

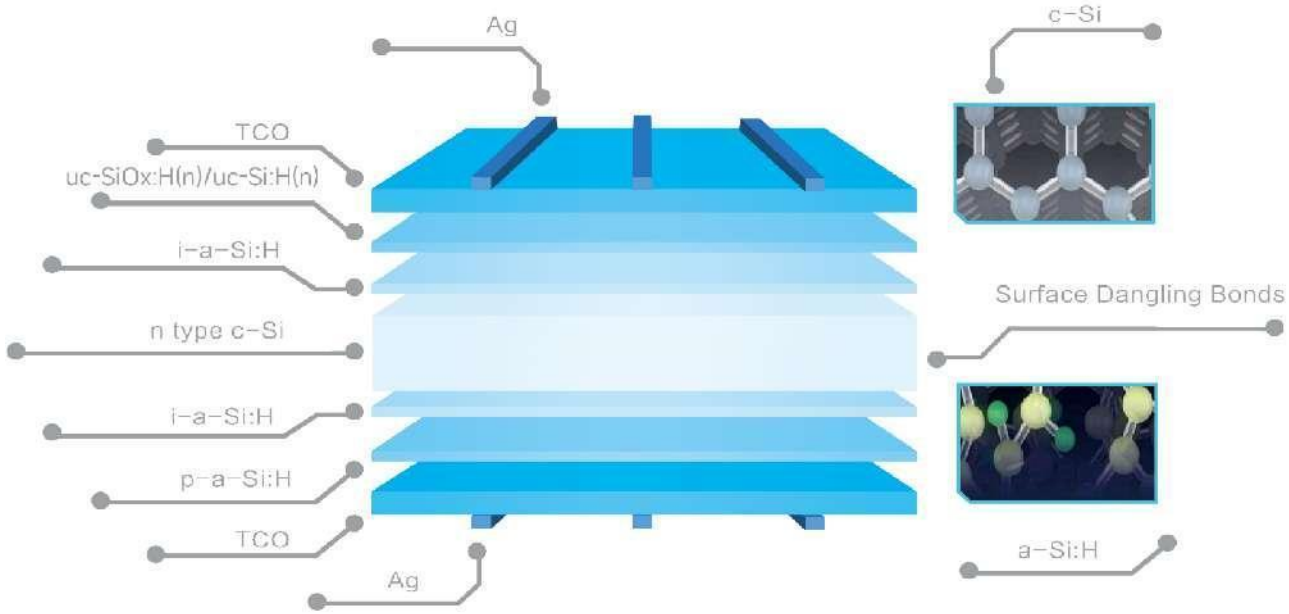
New Generation
Mainstream platform Cell Tech

HJT



HJT cells combine the advantages of crystalline silicon and thin film technologies, with excellent light absorption and passivation effects, and are superior to PERC in efficiency and performance. It is one of the solar cell technologies that increase conversion efficiency and power output to the highest level and also represents the development direction of the new generation of cell platform technology.

The natural bifacial symmetrical structure of HJT cells can effectively improve the power generation capacity on module’ s backside. The extremely low temperature coefficient enables modules to maintain stable power generation performance in high temperature environments. Excellent low-light performance increases modules’ power generation period and further improves power output.

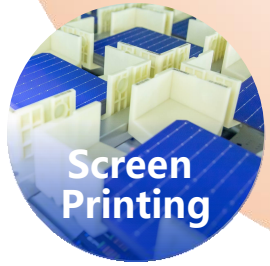


HUASUN

HJT VS Other PV Tech

Wafer	Tech Roadmap	Cell Effi R&D (%)	Difficulty&Compatibility of Current Equipment	Cost of Equipment	Manufacturing Difficulty	Production Process	Massive production Status
P-type	Upgrate PERC	24.03	PERC + SE Compatible, easy to remodel	Low	Monofacial: lower difficulty less process Bifacial: hard	10+	In Common
N-type	**HJT**	**26.81**	**Partially compatible**	**Higher**	**Fewer process, symmetrical design, thinfilm technology**	**4**	**Huasun owns 2.7GW Plan over 20GW**
	IBC	25+	Partially compatible	Very High	Complicated process, very difficult, lack of module equipment	20+	200MW at present
	TOPCON	26.4	Compatible with N-PERT production line if 3~5 processes added	High	Hard	12	Plan > 50GW
	N-PERT	23.5+	Partially compatible with PERC	Lower	Less process, not difficult	10+	1-2GW at present eliminate soon
	Tandem/Combinated Cell tech	28+	HJT+IBC = HBC HJT + Perovskite = Tandem	Combination of 2 tech	Currently very high	25+	Very small

HUASUN



HJT Production Process

Fewer manufacturing process compare with other solar cell technologies

4 Steps HJT **VS** **>10 Steps** OTHER

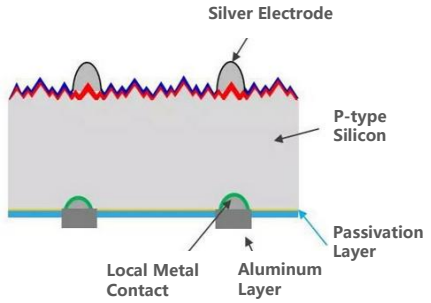
Massive Production effi. Advantage

PERC

A mature cell technology, has already reached its efficiency limit of 24.5%

Cell Efficiency range

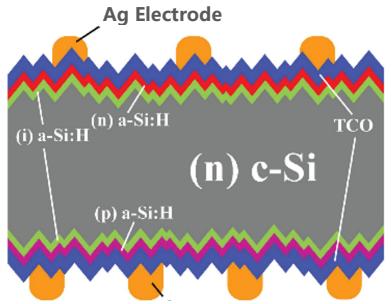
22.5~23.5%



Reach efficiency limits with no clear direction to improve

Avg. Efficiency in mass production

24.75%+



Clear path to improve cell efficiency with huge potential.

HJT

The initial efficiency at start of massive industrialization has exceeded PERC, and is going to reach 25.5-26% during 2022-2023.

* Huasun HJT cell’ s average efficiency in mass production is 24.75%; Maximum efficiency of single production batch is 24.9%; Maximum efficiency of single piece is 25.3%

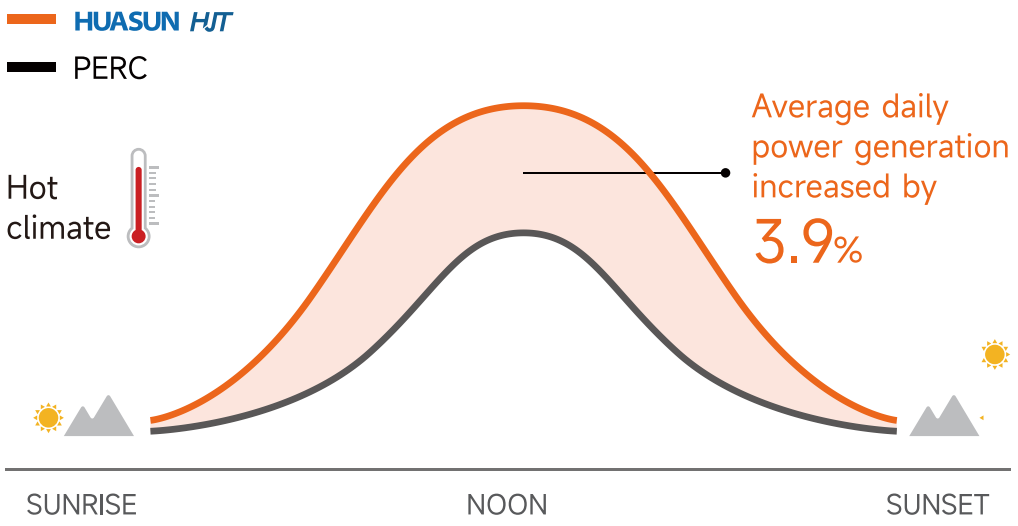
Superior Temp. Co-efficient

Industry Leading

-0.26%/℃

Temp. Co-efficient

-0.26%/℃ Temperature coefficient means HJT solar panels generate about 3.9% MORE electricity than PERC panels in a hot climate.



Product	Temp Coefficient %/℃	Maximum power 500W, the efficiency loss under 65℃	Efficiency loss in a hot climate
Mono	-0.45	90W	18.0%
Mono PERC	-0.38	76W	15.2%
HJT	**-0.26**	**52W**	**10.4%**

Extremely Low Attenuation

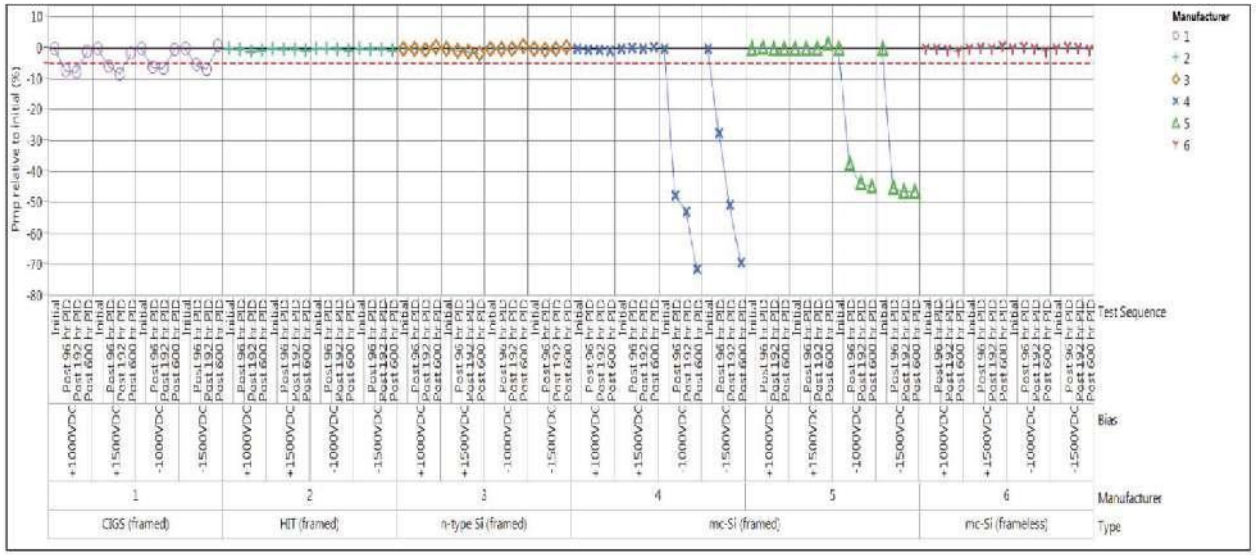
NO

PID

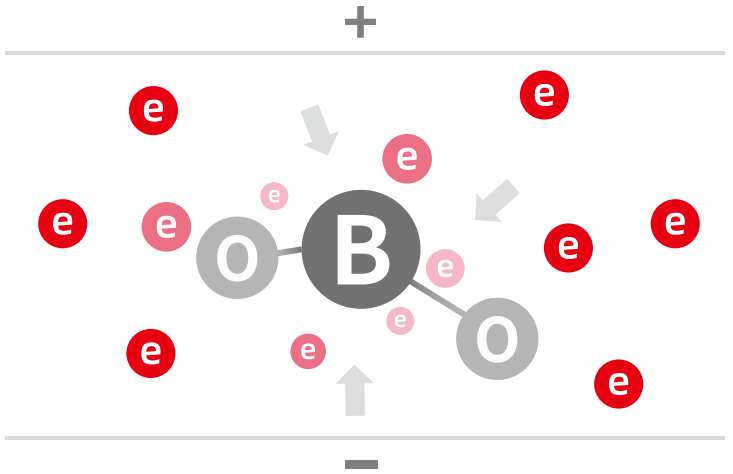
LID

N-type wafer does not have B-O bond，resulting in no LID effect, which fundamentally guarantee the products' durability and yield.

TCO film on HJT cell is conductive，so the charge will not polarize on the surface，which can prevent the potential-induced attenuation, avoiding PID from the structure. Huasun HJT modules adopt EPE as encapsulation, which has stronger waterproof performance. With double-glass design , material inside modules will not be corroded, so PID attenuation can be prevented.



来源：CFV solar test lab



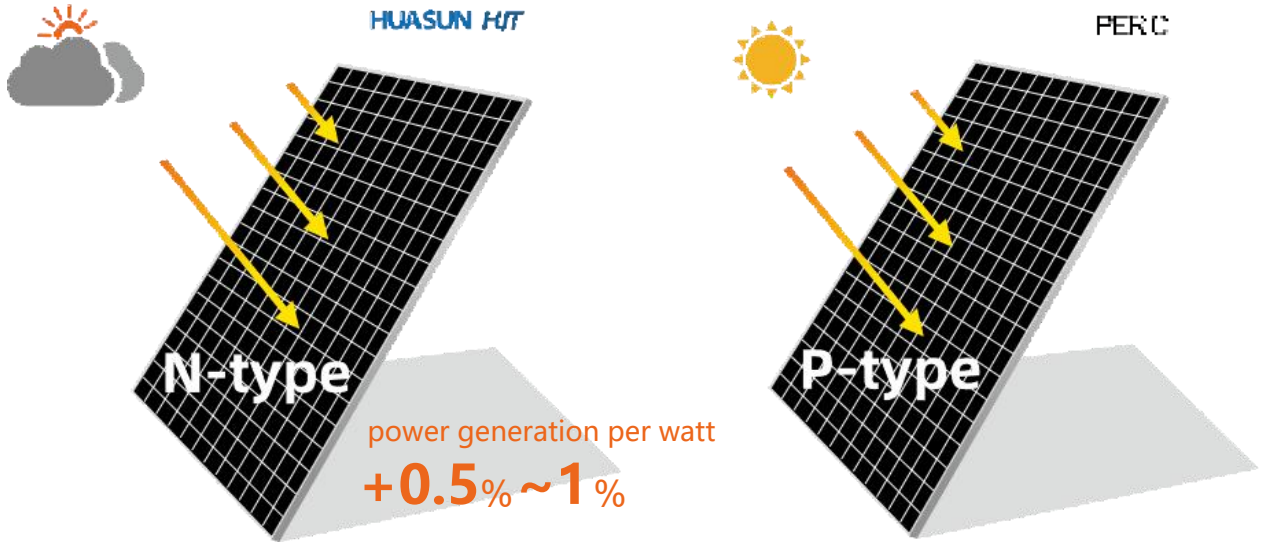
Normal solar cells have B-O band which leads to LID

Great Weak-light Performance

Energy yield in weak light environment

+0.5~1%

Compared with the P-type monocrystalline silicon wafer, the N-type wafer has a better low-light effect, which contributes about 0.5~1% energy yield to the power generation per watt.

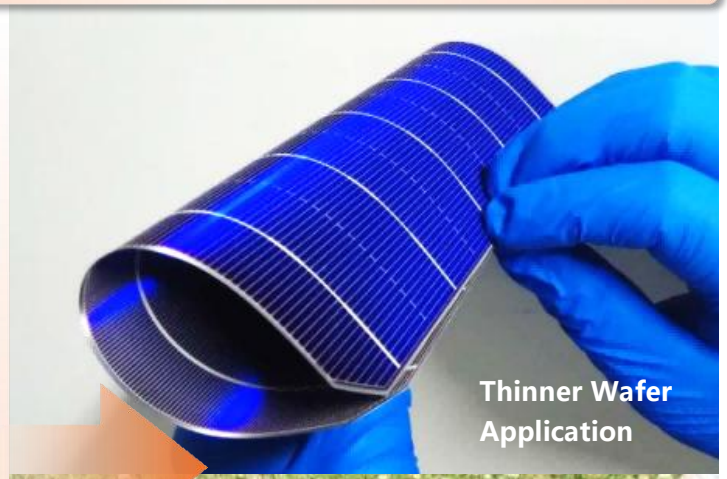


Normal Solar Modules

- To ensure the absorption of light, wafer thickness cannot be thinner than 180μm.
- The wafer and Al-BSF(back surface field) with different co-efficiency thickness can’ t be changed, so micro-cracking can happen.
- Defects happen when producing with thinner wafer under 800-900℃ .

HJT Module (Thinner Wafer Adoppted)

- HJT cell can be produced with thinner wafer, to save wafer cost and reduce module price.
- HJT cell’ s processing temperature is lower than 250℃, resulting in less cracks or defects.
- A mature HJT technology can realize 100μm wafer.
- Shingled and zero busbar technology can be applied.



Ultra-low Carbon Footprint

Till the end of 2022, Huasun can get an estimated CO_2 carbon footprint of HJT module manufacturing as low as 397g/W, by applying and improving various methods to reduce the carbon emission during HJT solar cell processing.

Higher efficiency

Higher efficiency leads to a much lower CFT per watt.

Lower process temp.

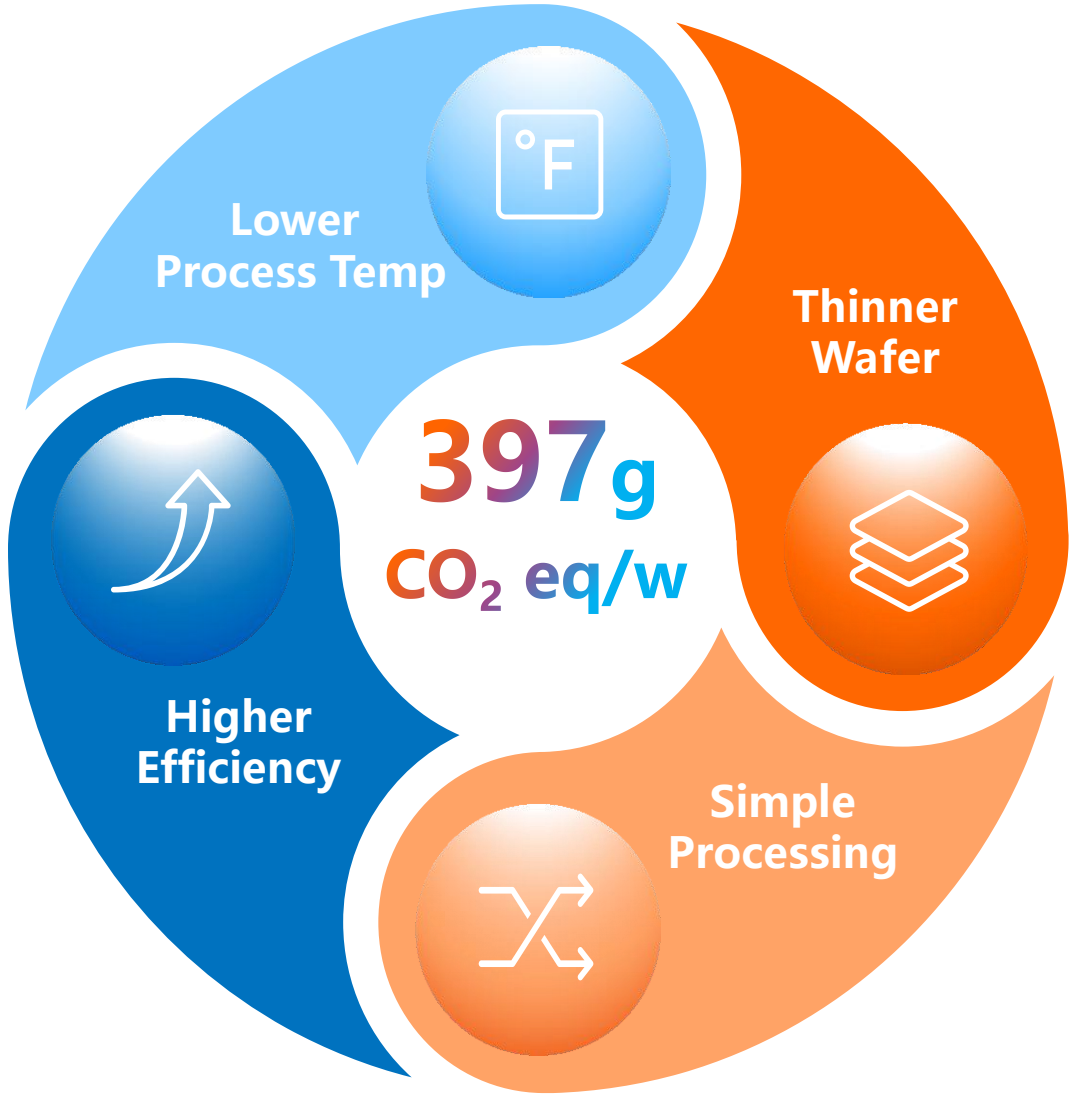
Low temp. processing consume less energy.

Thinner wafer

Being able to adopt Thinner wafer helps to reduce wafer CFT per piece.

Simpler processing

Simpler cell processing takes less energy consumption from manufacturing

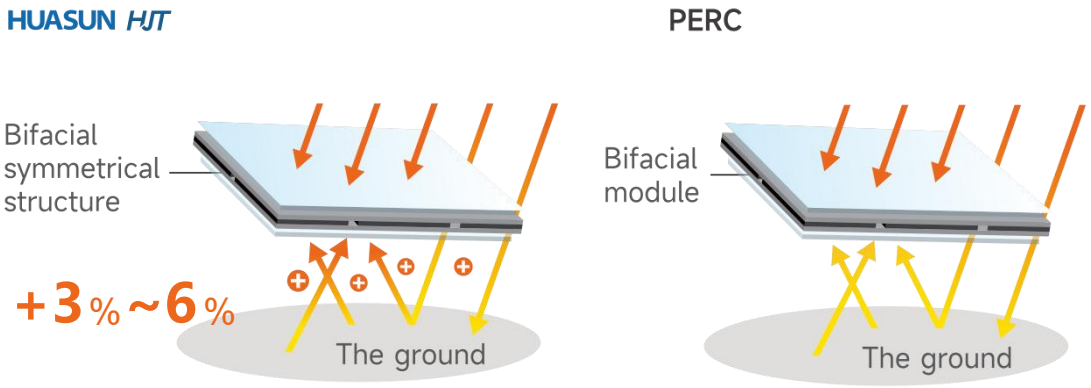


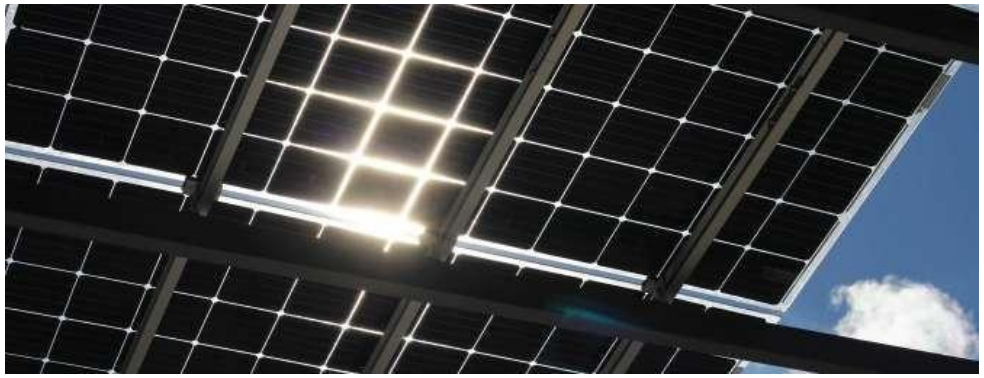
Bifaciality Benefits

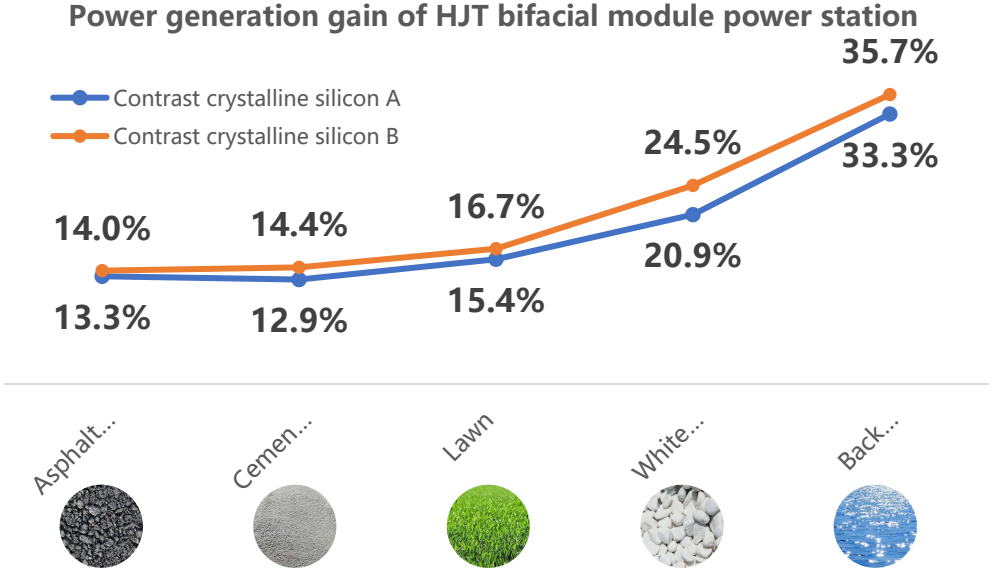
Higher bifacial energy yield

+3~6%

HJT’ s natural bifacial symmetrycal structure makes the bifacility up to 95%. The power generation per watt of HJT cells is about 3%-6% higher than that of bifacial PERC cells. In practical applications, the output gain of Huasun HJT bifacial modules can reach more than 30%.







* According to Huasun data： the output gain of Huasun HJT bifacial modules can reach more than 30%

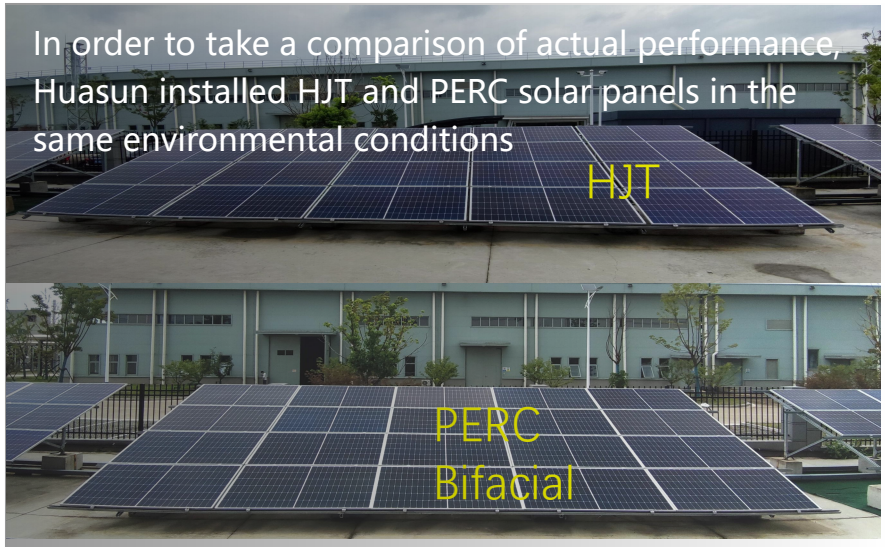
Real Installation Contrast

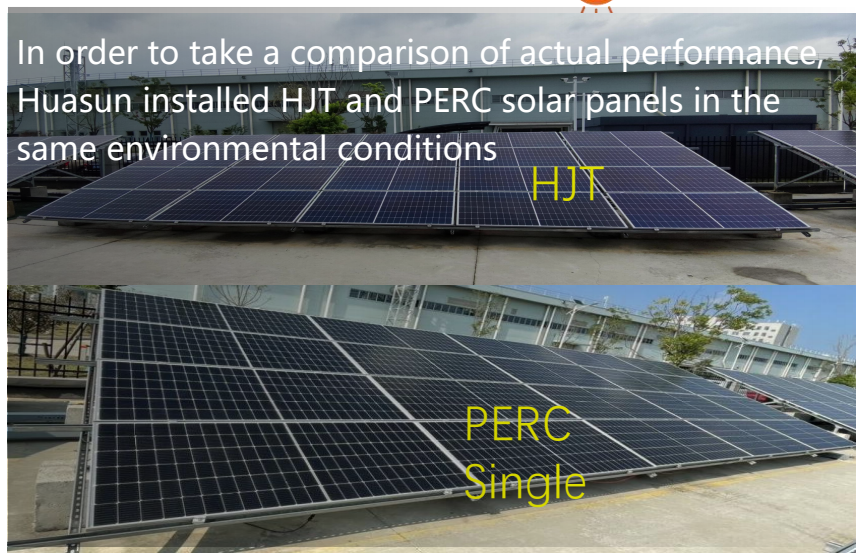
+7%~13%

Yield of HJT bifacial module is 7-13% higher than PERC mono-single module

+3%~6%

Yield of HJT bifacial module is 3-6% higher than PERC bifacial module.



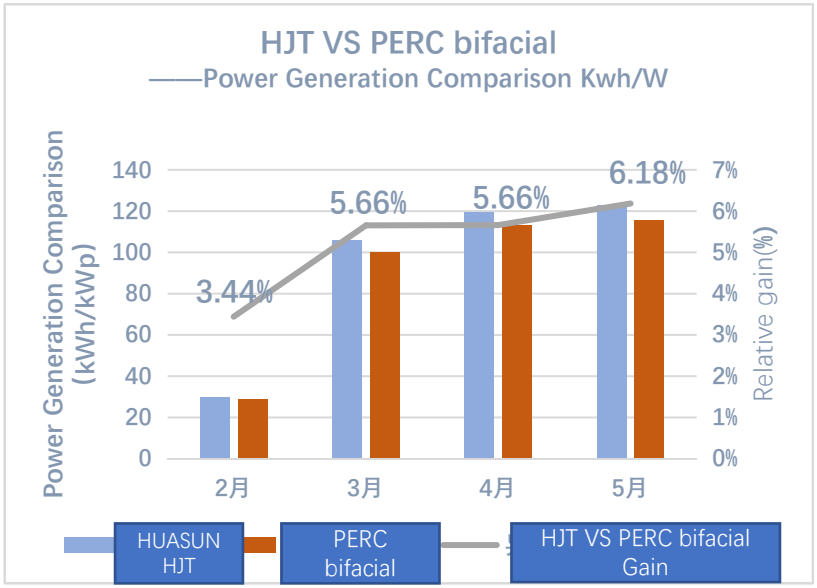


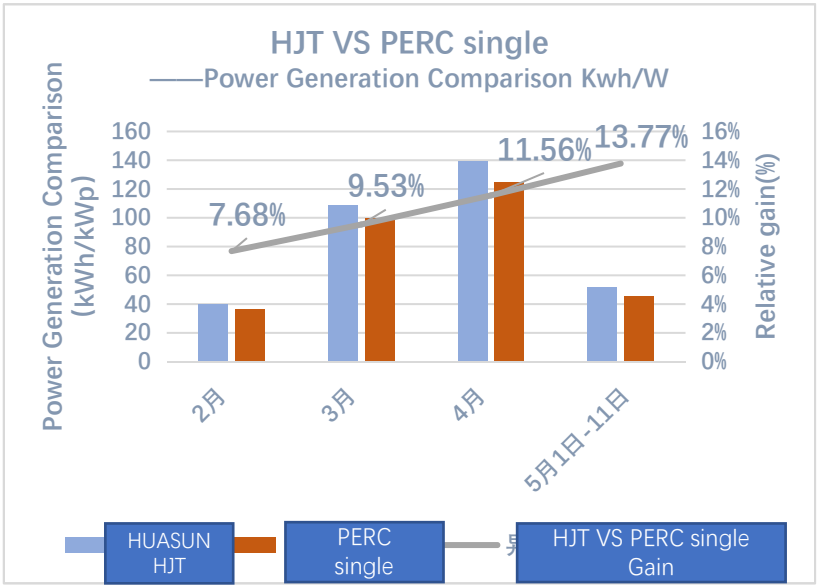
Environment of Installation

- Time of Installation: September, 2021
- Project location: Anhui Xuancheng
- Ground environment：Cement
- Temp of installation：2.9~28.3℃
- Installed QTY：5pcs of HuaSun 460W HJT bifacial modules, 5pcs of 450W PERC single modules, 5pcs of 450W PERC bifacial modules

Data analysis

- HJT bifacial vs Perc bifacial (during test date)： Power gain 3~6% (460W HJT bifacial module equals to 488W Perc bifacial module)
- HJT bifacial vs Perc single：Power gain 7~13% (460W HJT ifacial equal to 520W Perc mono single)





Real Installation Contrast

Third party demonstration base:

- CTC state inspection group Hainan outdoor demonstration base (Ding'an, Hainan)

Module project:

- Huasun HJT Bifacial double-glass module 460W 166mm 144cell
- Other PERC Bifacial double-glass module 445W 156mm 156cell

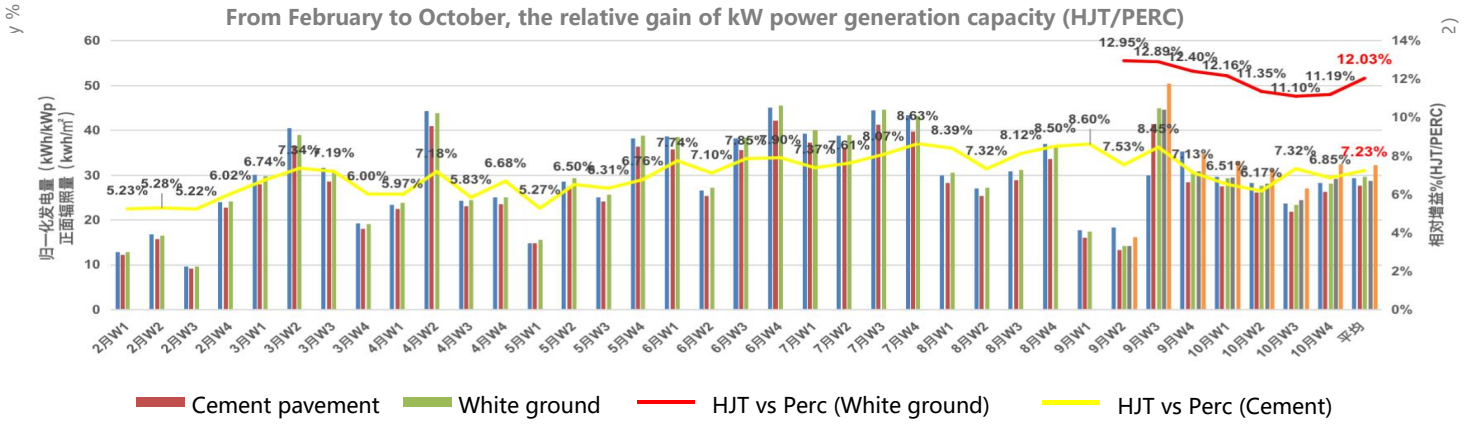
Empirical scheme:

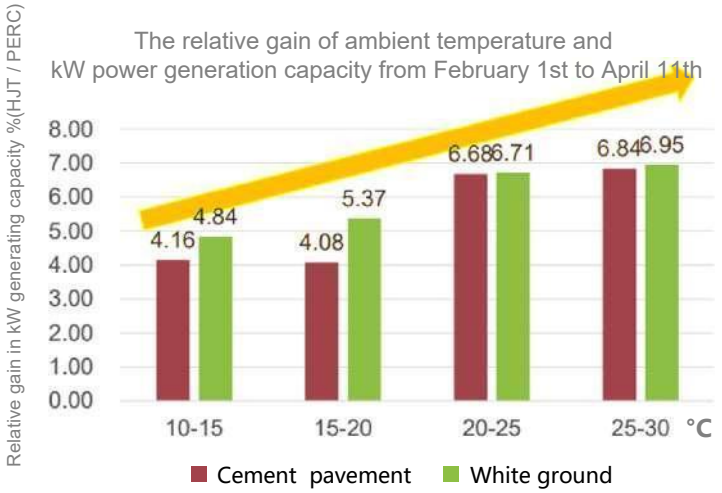
- Modules are connected in series to HUAWEI inverter, to monitor the power data HJT modules and PERC modules on white ground and cement pavement

More power generation:

Same installation capacity HJT module VS PERC Bifacial double-glass module: average power gain

+12.03% (White Ground) **+7.23% (Cement Pavement)**





Stronger power generation:

- Higher Temperature, more obvious advantages of HJT. HJT increase power generation **+6~12%** per watt than PERC Bifacial double-glass module

HUASUN

Extreme Temperature Coefficient

Thinner Wafer Adopted

Great Weak Light Performance

Ultra-low Carbon Footprint

HJT

A Promising Technology for LCOE Reduction

By using doped microcrystalline silicon or doped microcrystalline oxygen (silicon carbide) and further increasing the doping concentration, Huasun reduces the doped layer resistance and lifts the light transmission performance, thereby increasing the current density and cell efficiency.

Huasun HJT solar cells have the merits of high conversion rate, low temperature coefficient, no PID, no LID, and uniform color, etc. Compared to other solar cell technologies, Huasun HJT cell production requires only four low-temperature process steps, resulting in higher productivity and lower losses.

Extremely High Bifaciality

Unique SMBB Technology

Extremely Low Attenuation

NO LID
NO PID

Himalaya Series HJT Solar Cell

HIMALAYA • HJT CELL

Extreme Temperature Coefficient

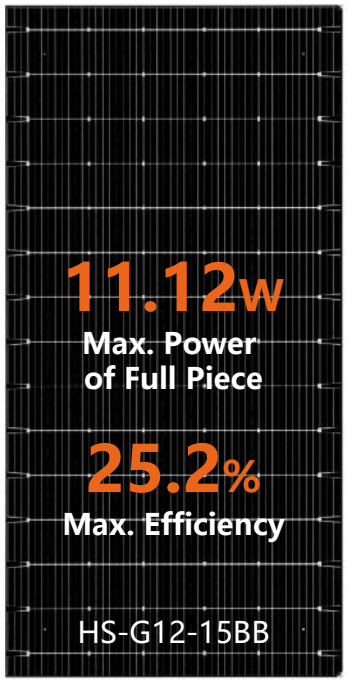
-0.26%/℃

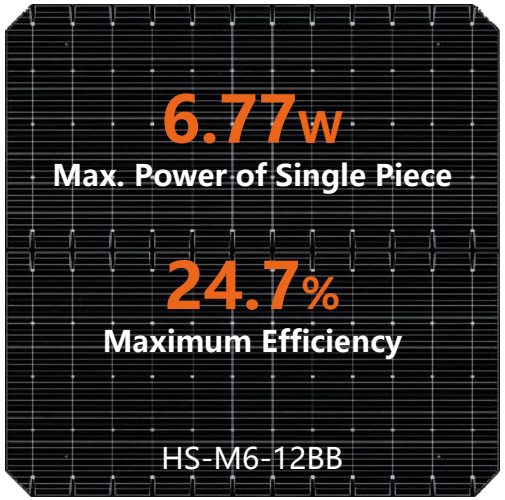
Natural Structure

Bifacial
Symmetrical

NO

LID
PID





Unique SMBB Technology

- Less silver paste consumption
- higher cell efficiency
- lower cost

Better Power Generation Performance

- Ultra-low temperature coefficient ensures modules' higher power output in high temperature environments
- No LID, NO PID, leads to lower power loss
- Great weak light performance ensures higher power generation in low light environment

More Energy Yield

- The natural bifacial structure of HJT cells can raise modules' bifaciality to over 85%, and gain more power output.

Pioneer of Large-scale Intelligent Manufacturing

Huasun’ s factories are equipped with whole sets of temperature and humidity control equipment. All production lines are controlled by centralized software, and each production equipment can detect and report any faults online, ensuring product quality and improving production efficiency.

24.75%+

Average effi. in mass production

The average efficiency of 210mm HJT cell in mass prodution has reached 24.75%+

14,400

pcs/hour

The first GW-level low-cost 166mm HJT cell production line in the industry

IINP Mature Technology

The first IINP mass production line, increasing the production efficiency by 0.2%

Low-cost Mass Production Technology

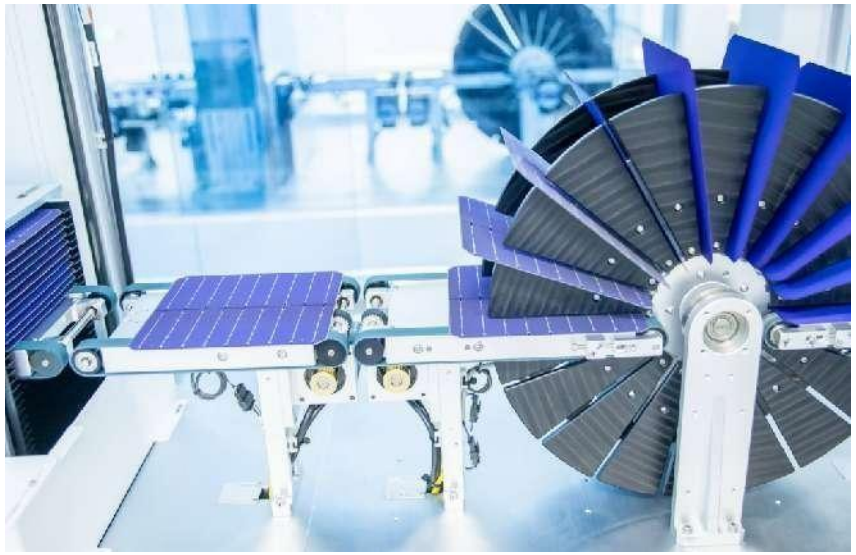
The first to introduce silver-coated copper paste and new printing technology, greatly reducing the cost of mass production

MES System

MES system for the whole line, precise management and control by big data, tracking and tracing single chips

210mm HJT Production Line

The first GW-level high-capacity production line of microcrystalline process, with an average cell efficiency in mass production over 25%



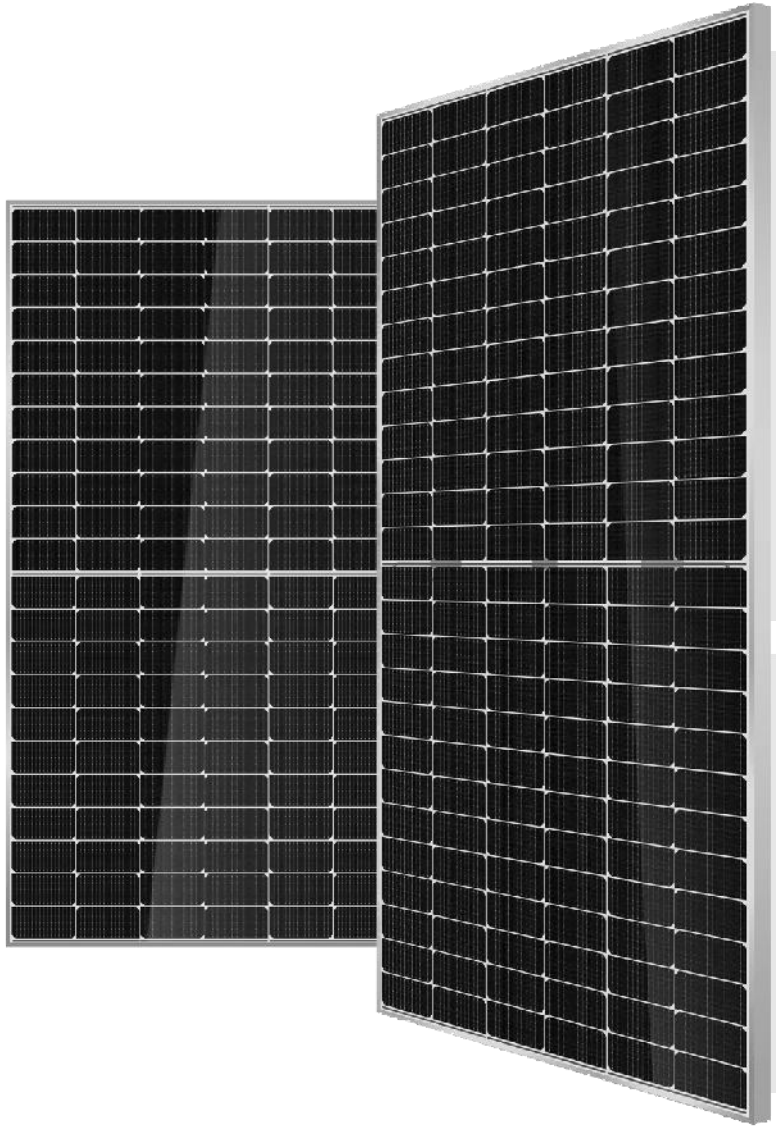
Leading HJT production

Huasun's R&D team spare no efforts to improve HJT product efficiency while reducing cost in mass production and has achieved several key breakthroughs.

As the front runner in HJT technology and mass production, Huasun has realized low-cost and large-scale manufacturing of high-efficienct HJT products. During production, Huasun drives a further cost reduction in process, equipment and materials by scale production.

15 Years
PRODUCT WARRANTY

30 Years
PERFORMANCE WARRANTY



-0.26%/℃
Industrial leading temp. coefficient

↑ 8~10%
The energy yield that Huasun HJT module could gain compared to PERC

< 12%
Power degradation in 30 years

High Bifaciality
HJT has natural bifacial symmetrical structure

High Reliability
Extremely low attenuation, low PID and low LID loss

Materials for Module

High Quality Result From Advanced Materials

Non-destructive Cutting Technology
Non-destructive smooth cutting surface, no heat affected area, little impact on cell efficiency

Encapsulate With EPE
High barrier from water vapor, anti-PID, high cross-linking degree, high light transmittance

Sealing With PIB Based Sealant
The edge of the module is sealed with PIB based sealant to improve water resistance.

Double Glass Design With Frame
Front/back mechanical loading up to 5400/2400Pa

Racking System Adaption
A whole set of racking solutions can be designed

High Reliability

High Power Generation

Huasun cooperated with first-class material suppliers around the world, providing products that exceeded industry quality standards.

Lower Temperature Coefficient
Compared to PERC, HJT has lower temperature coefficient, to raise power output. HJT's advantages are more obvious in high temperature, high irradiation area

Higher Bifacial Energy Yield
HJT cell's bifaciality can reach 95%, which would bring more energy yield.

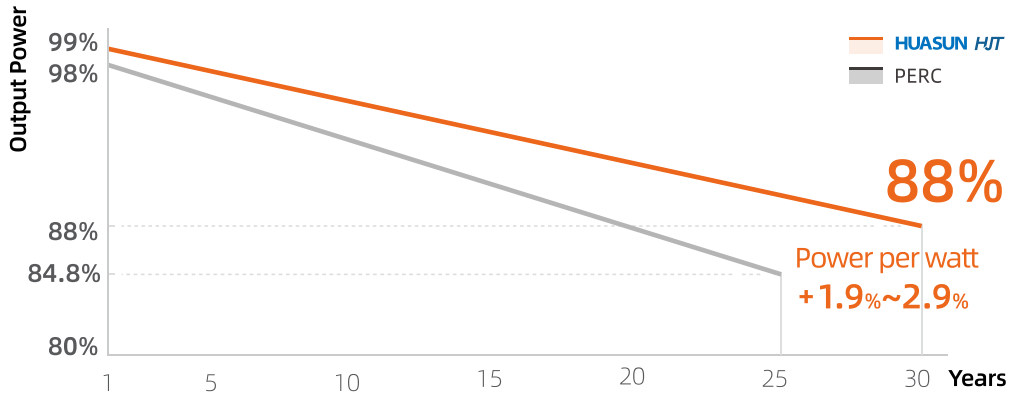
Better Weaklight Performance
The minority carrier lifetime of N-type cell is high, resulting in a better power generation ability in weak light condition than PERC.

NO LID, NO PID in cell
N-type wafer has no B-O bond, and TCO conducts electricity on HJT cell surface without insulating layers, so LID and PID can be eliminated in principle.

Lower Lifetime Degradation Rate
1% attenuation in the 1st year, the annual attenuation from the 2nd year is 0.375%, and the power is not less than 88% until the 30th year.

Excellent Module Eminent Warranty

Huasun’ s HJT solar modules all have 15-year product warranty and industrial leading 30-year linear performance warranty. Huasun has absolute confidence in our module manufacturing. Compared to traditional modules, HJT modules have more power output and higher reliability, and can save more cost. Huasun’ s HJT products all passed the industry's professional third-party tests to ensure the best quality and yield guarantee.



15 Years PRODUCT WARRANTY

30 Years PERFORMANCE WARRANTY

Factory system certification

Huasun ensures that all aspects in manufacturing are in the leading position in the industry via continuous efforts.
The company has passed the latest ISO system certification, and will continue to actively improve various system in the future to provide sufficient guarantee for customers.

Product certification

Huasun HJT modules have passed the most stringent tests in the industry and obtained a range of certifications about product quality and safety. At present, Huasun HJT products have gained the following certifications.

TÜV
CE
MCS
JP-AC
CQC
Green Building Material Certification of HIT Module Technology from CTC

HJT

Innovation Leads the Times

Innovator of HJT Technology

HUASUN always insists on the forefront of photovoltaic technology and continuous investment in R & D, only to bring better and sustainable value to customers. Every technological upgrading leads the technological transformation of the photovoltaic industry and promotes global energy transformation and green development

The world is at stake, energy efficiency challenge gives us a chance to show our strengths

100million+

The annual R&D investment of HJT technology over 100 million yuan

285Patents

107 invention patents,
175 utility model patents
3 design patents

200+

HJT talents in R&D team

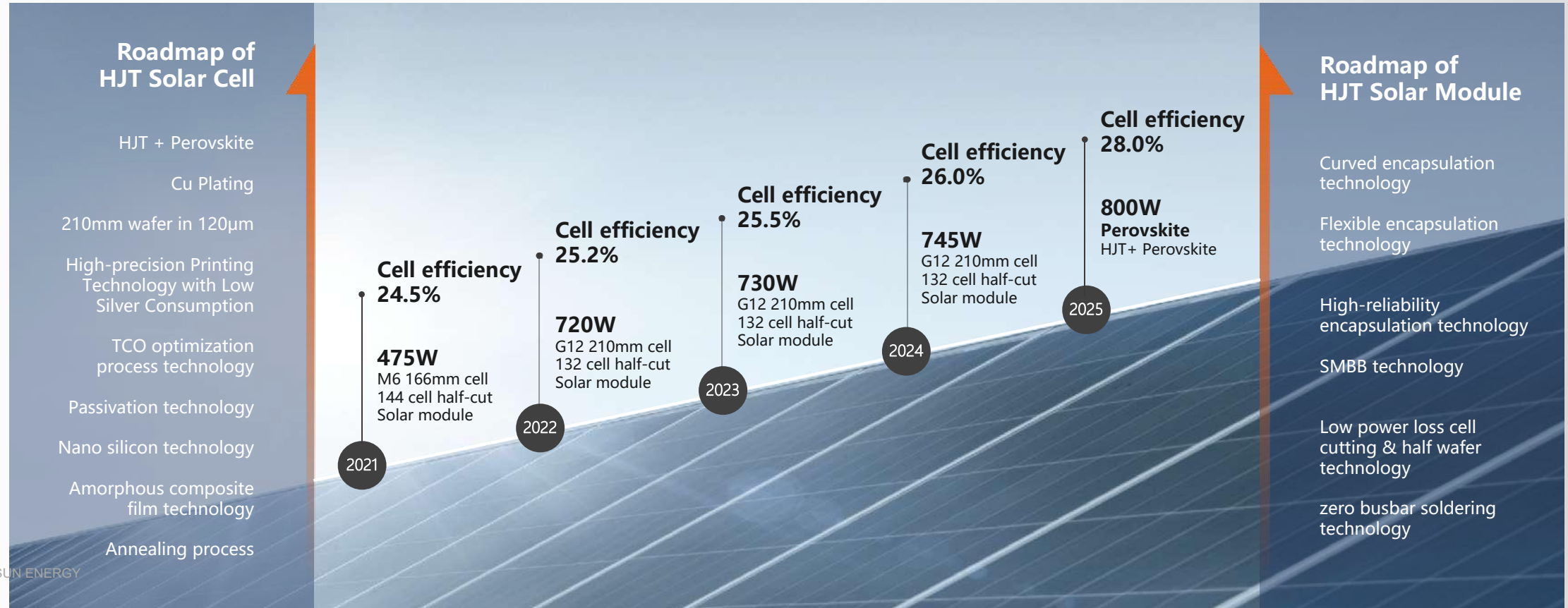
Technology leads the future

Taking HJT as the core, Huasun would like to enhance clients' confidence of solar energy's future via higher product efficiency, more stable power generation performance, better quality assurance and platform-based technology expansion capabilities.

Huasun simultaneously laid out the R&D of single-microcrystalline, double-microcrystalline, HBC, copper electroplating and heterojunction-perovskite tandem cells, which continuously improves the efficiency of solar cells and reduces product costs.

800W+

HJT+Perovskite+210mm wafer to realize module power up to 800W+



Capacity Expandation

2021

- Realized 500MW production capacity
- HJT cell average efficiency in mass production reach 24.5%.
- Start 2GW factory construction

2022

- 2GW project starts production.
- HJT cell average efficiency in mass production reach 24.9%.
- Realize cost reduction of HJT module.

2023

- Realize 2.7GW capacity
- Start 7.5GW+ construction
- HJT cell average efficiency in mass production reach 25.2%
- HJT laboratorial cell efficiency reach 26.5%
- Tandem cell efficiency reach 30%.
- **Manufacturing cost of HJT module equal to PERC**

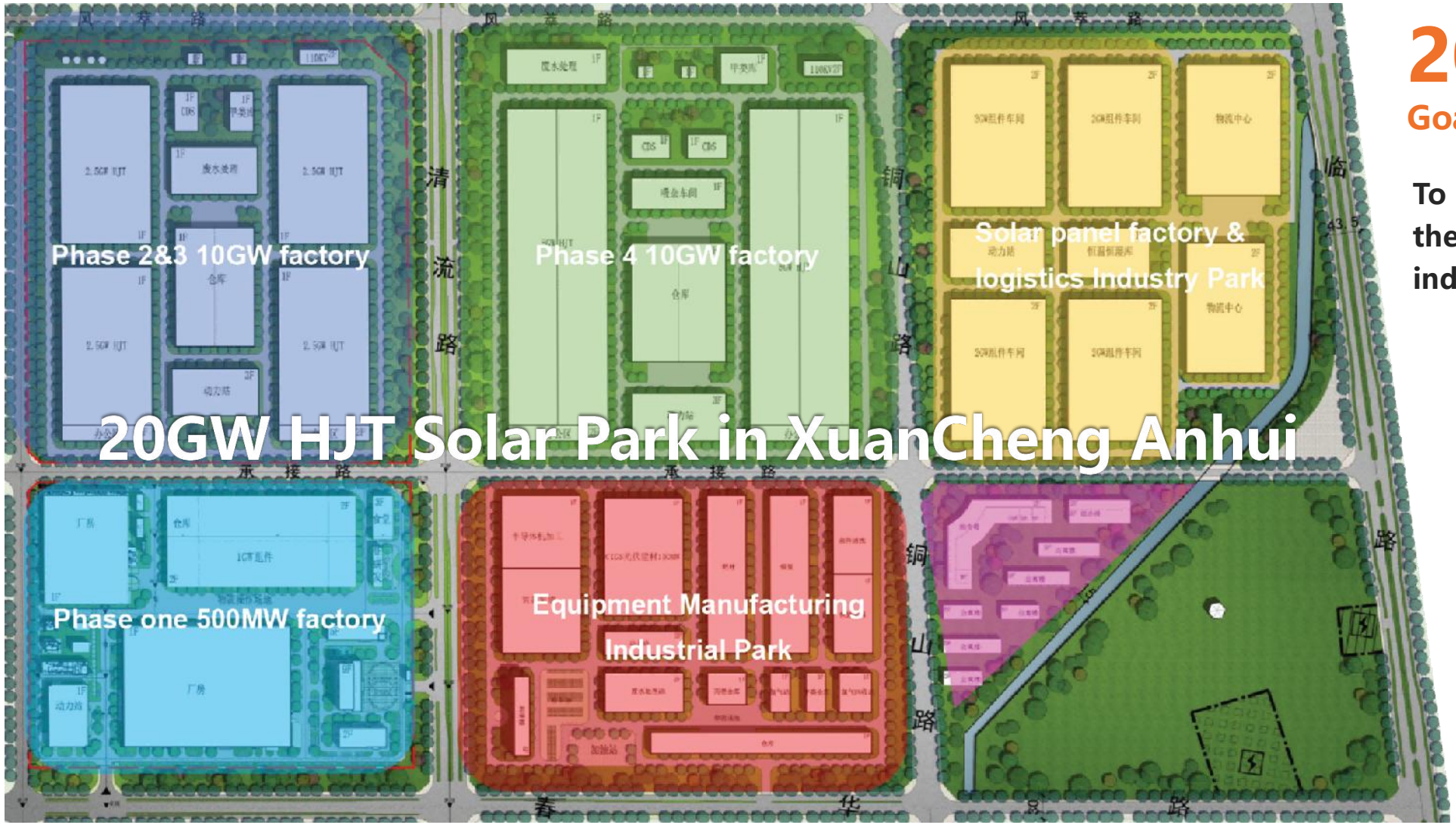
2024

- Realize 10GW production capacity
- HJT cell average efficiency in mass production reach 25.5%+
- Verify 210mm tandem cell technology
- Verify mass production equipment of Perovskite cell
- **IPO launching & financing for 10GW capacity expansion**

2025

- Start 10GW factory construction
- HJT cell average efficiency in mass production reach 25.5%-26%
- Tandem cell applies into MW level pipeline production, and average efficiency reach 28%-30%

20GW+
Production Capacity

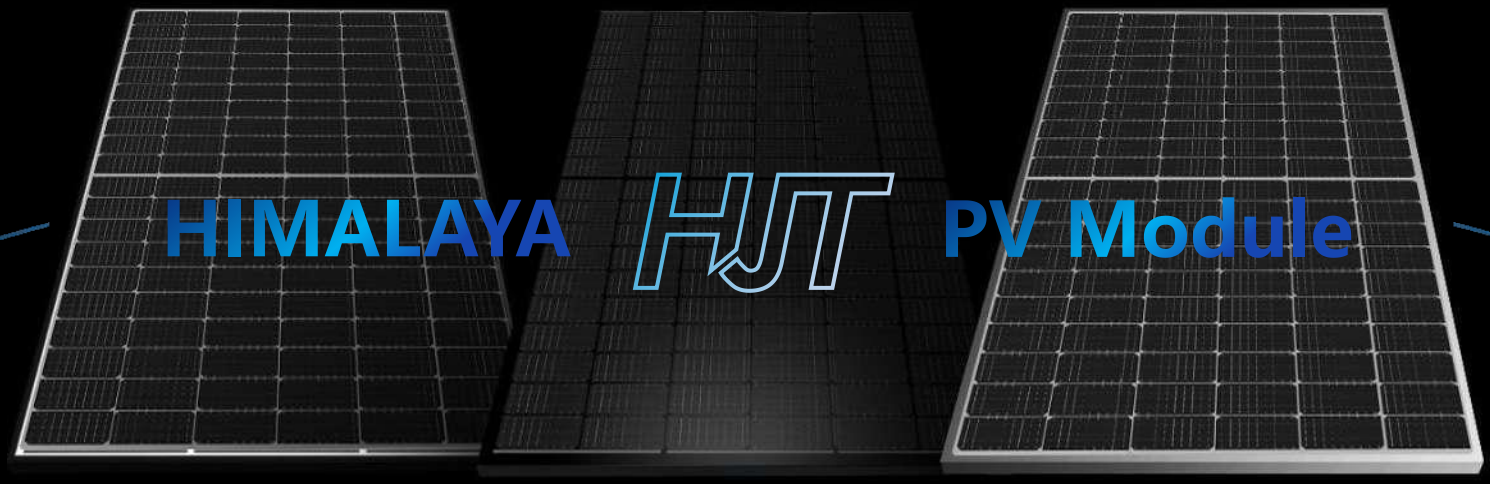


20GW+

Goal of production capacity

To build a TOP enterprise in the high-efficiency HJT solar industry

- Production area 1
- Production area 2
- Production area 3
- Module and Logistics park
- Equipment manufacturing and facility section
- Habitation facility section



HIMALAYA HJT PV Module

Himalaya Series
HJT Solar Module

Himalaya G12 Series

Bifacial double-glass HJT module

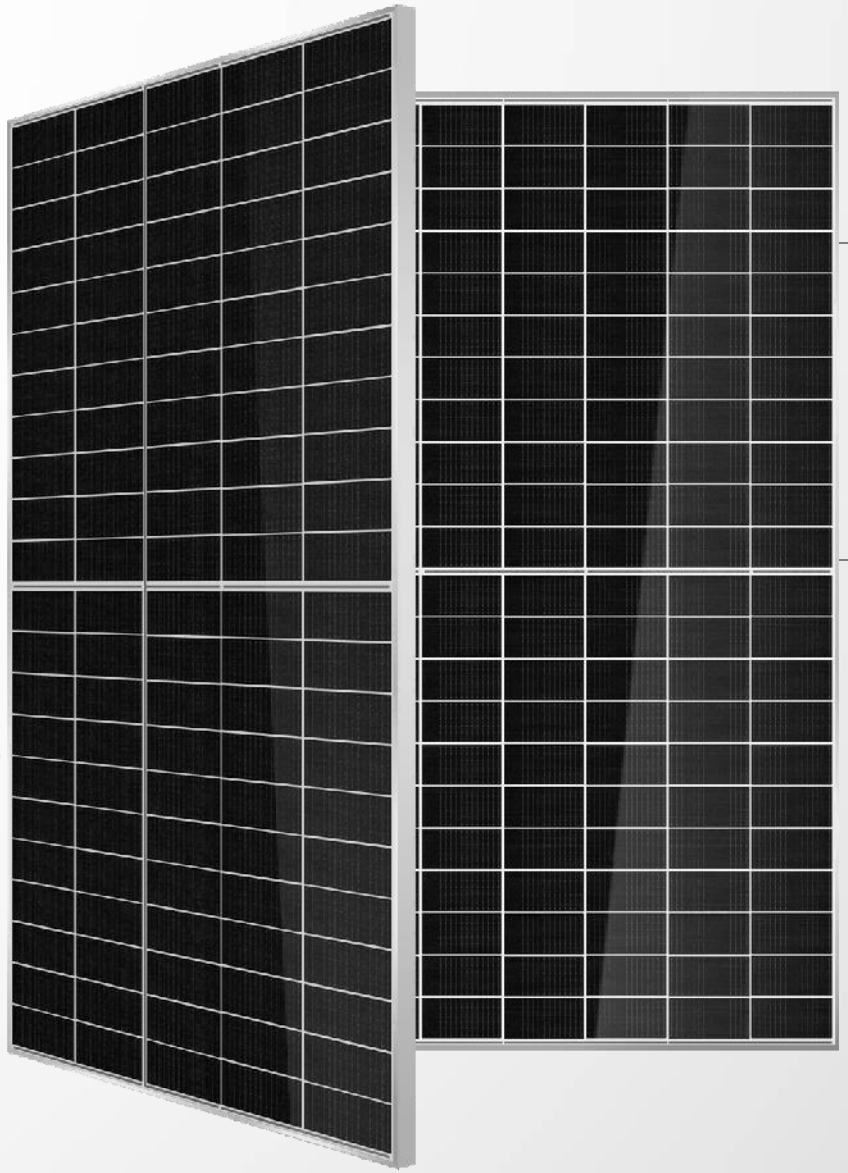
710w
Maximum Power Output

22.9%
Maximum Module Efficiency

- N-type 210mm solar cell
- Super multi-busbar technology
- Innovation non-destructive cutting technology
- >85% bifaciality
- 15-year product warranty, 30-year performance warranty
- Suitable for commercial and utility projects

15 Years
PRODUCT WARRANTY

30 Years
PERFORMANCE WARRANTY



Up to 710W — 132 Cells — 15BB

Maximum module efficiency up to **22.9%**
2384*1303*35mm
38.7KG

Up to 635W — 120 Cells — 15BB

Maximum module efficiency up to **22.4%**
2172*1303*35mm
35.3KG

HUASUN

Himalaya M6 Series

Bifacial double-glass HJT module

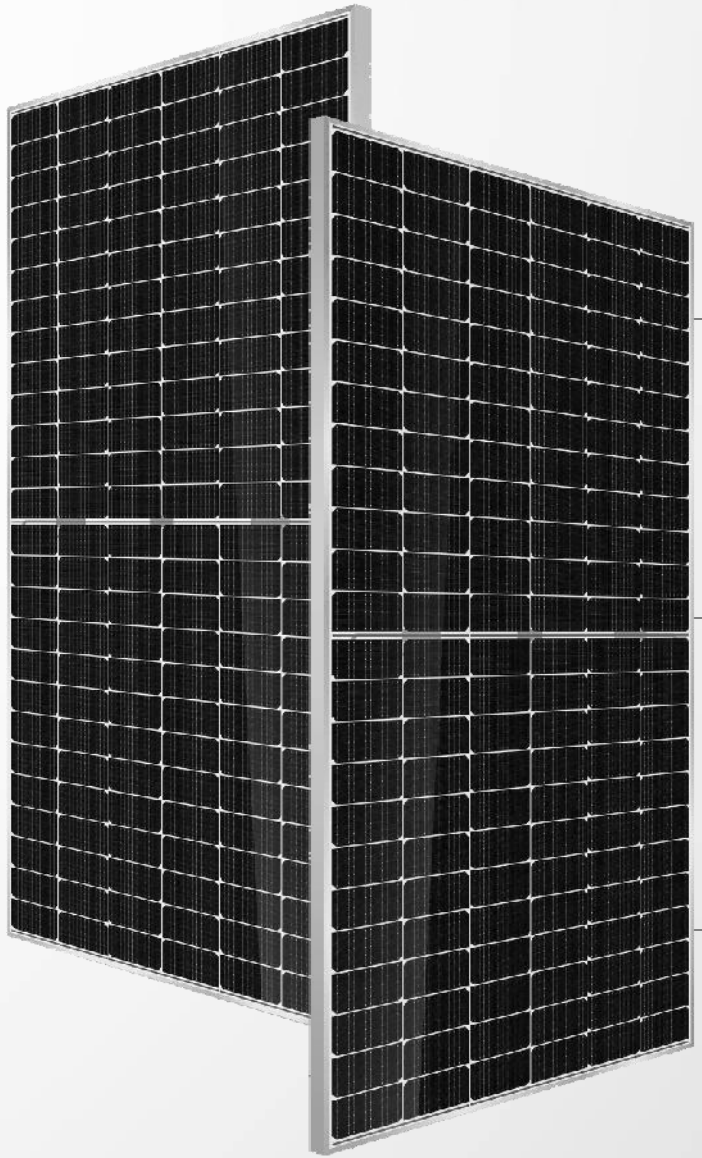
500w
Leading power Output

23.0%
Maximum Module Efficiency

- N-type 166mm solar cell
- Super multi-busbar technology
- Innovation non-destructive cutting technology
- >85% bifaciality
- 15-year product warranty, 30-year performance warranty
- Suitable for rooftop, commercial and utility projects

15 Years
PRODUCT WARRANTY

30 Years
PERFORMANCE WARRANTY



Up to 520W — 156 Cells

Maximum module efficiency up to **22.1%**
2263*1038*30mm
29.5 KG

Up to 500W — 144 Cells

Maximum module efficiency up to **23.0%**
2094* 1038*30mm
27.5 KG

Up to 400W — 120 Cells

Maximum module efficiency up to **22.0%**
1755* 1038*30mm
23.5KG

HUASUN

Himalaya M6 Series

Full Black Bifacial double-glass HJT module

- Aesthetic design in all black
- Class A fire rating, safety guarantee
- Ideal choice for rooftop system

Matte Frame in black

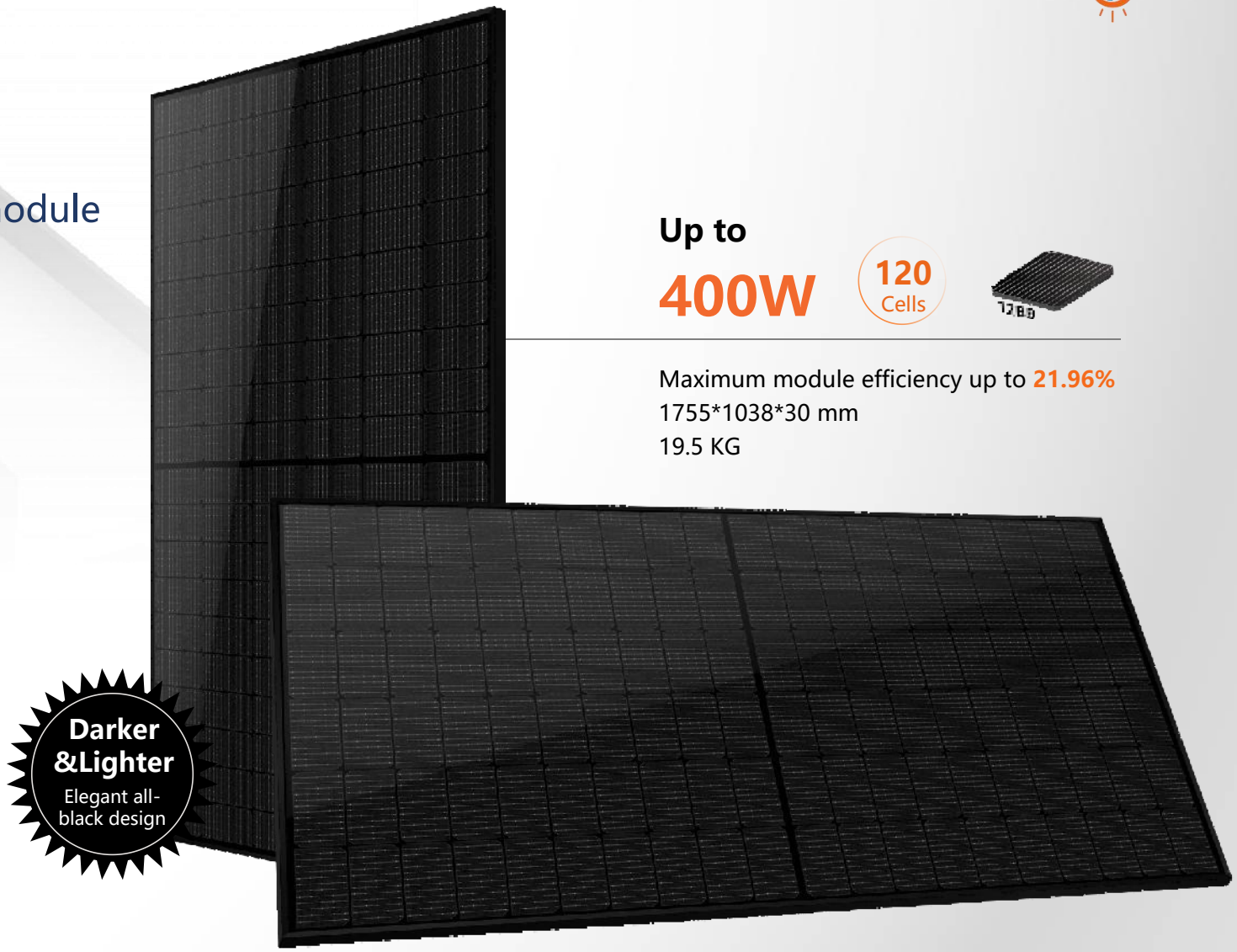
Glass with black grid line

HJT solar cell

Aesthetic design

15 Years
PRODUCT WARRANTY

30 Years
PERFORMANCE WARRANTY



Up to
400W

120 Cells

Maximum module efficiency up to **21.96%**
1755*1038*30 mm
19.5 KG

HJT

The choice of benefits to enpower the world

Huasun continuously explores the deep integration of advanced technology, intelligent manufacturing and clean energy, and actively promotes the practice of carbon neutrality in China and the world.

With the completion global projects built by its HJT modules, Huasun has contributed to lowering energy costs, reducing carbon dioxide emissions and further promoting the use of renewable energy.

Case Study

Bulgaria
350MW
Utility Project

The current biggest utility project built by HJT module in the world

Location: **Pazardzhik, Bulgaria**

Capacity: **350MW**

Annual power generation:

650,000,000 kW•h

Annual coal saving:

260,000 tons

Annual CO_2 emission reduction:

648,000 tons

* The project is under construction.

Case Study

Xuancheng, Anhui
23MW
Agrivoltaic Project

Location: **Xuancheng, Anhui province, China**

Capacity: **23MW**

Annual power generation: **24,640,000kW•h**

Annual coal saving: **9,858tons**

Annual CO_2 emission reduction: **24,571tons**

Case Study

Shouguang,Shandong
10MW
Floating Solar Project

Location: **Shouguang,**
Shandong province, China

Capacity: **10MW**

Annual power generation:
12,640,000kW•h

Annual coal saving:
5,054tons

Annual CO_2 emission reduction:
12,598tons

Case Study

Japan
6MW
Utility Project

Location: **Hamamatsu, Japan**

Capacity: **6MW**

Annual power generation:

8,719,800kW•h

Annual coal saving:

3,488tons

Annual CO_2 emission reduction:

8,694tons

Case Study

Xuancheng, Anhui
4MW
Commercial Rooftop

Location: **Xuancheng, Anhui province, China**

Capacity: **4MW**

Annual power generation: **4,260,000 kW•h**

Annual coal saving: **1,706tons**

Annual CO_2 emission reduction: **4,251tons**

Case Study

Xuancheng, Anhui
3.5MW
Commercial Rooftop

Location: **Xuancheng, Anhui province, China**

Capacity: **3.5MW**

Annual power generation: **3,730,000Kw•h**

Annual coal saving: **1,492tons**

Annual CO_2 emission reduction: **3,720tons**

Case Study

Tunisia
180KW
Residential Rooftop

Location: **Tunis, Tunisia**

Capacity: **180KW**

Annual power generation:
3,226,000Kw•h

Annual coal saving: **12,900kg**

Annual CO_2 emission reduction:
321,600kg

Case Study

BIH

17KW

Residential Rooftop

Location: **Sarajevo, BIH**

Capacity: **17KW**

Annual power generation:

21,600Kw•h

Annual coal saving: **8,600kg**

Annual CO_2 emission reduction:

21,500kg

Case Study

Germany

5KW

Residential Rooftop

Location: **Euskirchen, Germany**

Capacity: **5KW**

Annual power generation:

5,492kW•h

Annual coal saving: **2,200kg**

Annual CO_2 emission reduction:

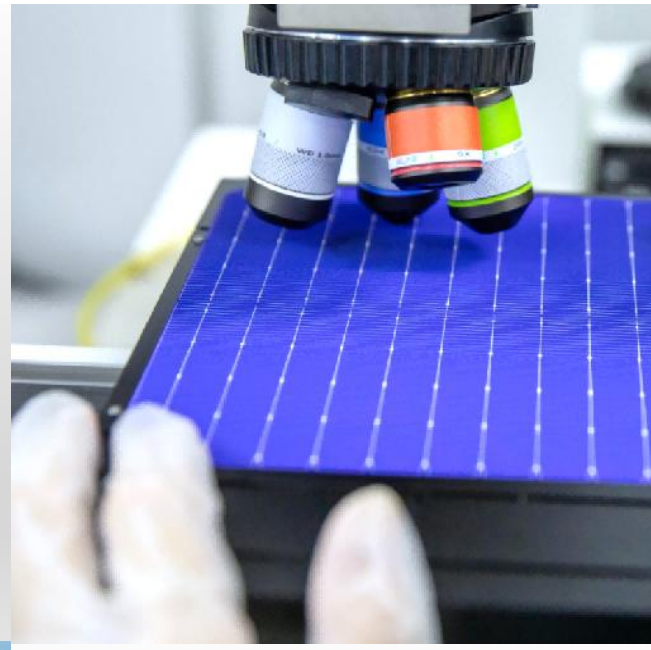
5,500kg

Vision

Become the world's leading technological company specializing in high-efficiency solar energy

Core values

Customer-centric
Quality-oriented
Keep striving
Adhere to technological innovation
Insist on lifelong learning



Mission

Committed to bringing superior solar clean energy into life, making mother earth greener and beautiful

Operation Philosophy

Integrity open-mind
ecology mutual benefit

Build a ZERO Carbon World

Intelligently produce clean energy
Together share the warm sunshine

HUASUN

We enpower the world with solar energy ,
to restore a green earth!
In such a tremendous energy project, we keep looking for new ways to improve the efficiency and performance of solar energy, to make life better.

Relying on the strong capability of technology innovation and development, Huasun has realized the large-scale production and application of HJT products, to provide higher yield return and added value to partners around the globe.

To lead the new photovoltaic era!

www.huasunsolar.com

HEADQUARTERS

No.99 Qingliu Road, Xuancheng Economic Development Zone, Xuancheng, Anhui, China

customerservice@huasunsolar.com

+86-563-3318095

SALES CENTER

14F, Kingmo center, #1698 Shuanglong Ave. Nanjing, Jiangsu, China

sales@huasunsolar.com

+86-25-86216170