



MINGYANG SOLAR

INNOVATE CLEAN ENERGY FOR ALL

HJT TECH, HIGHER EFFICIENCY

MINGYANG SOLAR CO., LTD
广东明阳光伏产业有限公司

7 MINGYANG SOLAR

WIND POWER INDUSTRY

As the world's leading clean energy industry group, MINGYANG's wind energy industry ranks among China's top three and the world's top six, while leading in offshore wind power worldwide.

On January 23, 2019, MINGYANG was successfully listed on the Main Board of Shanghai Stock Exchange (stock code: 601615).

INTELLIGENT ELECTRIC INDUSTRY

MINGYANG Electric's business encompasses the research, development, production, and sales of advanced power transmission, distribution, and control equipment in the fields of new energy and new infrastructure. Its products are globally exported to over 40 countries and regions including Europe and North America. As a renowned provider of intelligent high-end power and energy equipment systems MINGYANG Electric successfully listed on Shenzhen Stock Exchange on June 30th, 2023 (Stock code: 301291.SZ).

PHOTVOLTAIC INDUSTRY

MINGYANG focuses on developing high-efficiency PV technologies, including heterojunctions, perovskite solar cells, and cadmium telluride films. Aiming to establish a 5GW capacity for heterojunction PV and plan to build a new production line with over 10GW capacity. The certification efficiency of the perovskite solar cells exceed 25%. Additionally, we have successfully built a mass production line for cadmium telluride film technology, leading the way in green energy and solar power generation.

◆ HJT

Mastering the most advanced heterojunction and perovskite photovoltaic technologies, we have become a new energy technology company that has the largest scale of full-capacity production of high-efficiency heterojunction photovoltaics in China based on domestic sales.

 **10 BILLION YUAN** in construction

 Conversion efficiency **25%+**

 Solar Cell + PV Module factory

◆ BIPV building photovoltaic integration



Beijing Winter Olympics National Speed Skating Stadium: Ice ribbon

◆ Perovskite technology

MY Solar has insisted on high efficiency perovskite solar cell experiment center, with a complete equipment system for cell and module preparation and testing. Focusing on the trans-cell structure suitable for industrialization, it has made great progress in improving conversion efficiency, improving long-term stability, large-size film process, packaging and other aspects, and will build a 100MW perovskite component production line in 2024.

ENERGY STORAGE INDUSTRY

Mingyang possesses independent research and development as well as manufacturing capabilities for core products (BMS, PCS, EMS, PACK) and integrated systems. Additionally, we have the ability to conduct comprehensive testing of energy storage products and construct energy storage integrated systems, inverter systems, and energy management system industry chains that provide solutions for wind power and photovoltaic power stations.

HYDROGEN INDUSTRY

According to various application scenarios, different technical approaches have been developed for alkaline water electrolysis hydrogen production, PEM water electrolysis hydrogen production, and seawater direct electricity hydrolysis and hydrogen production. Leveraging the foundation of renewable energy development, MINGYANG aims to integrate wind power, photovoltaic systems, and hydrogen deeply while possessing the capability to design integrated solutions for wind and ammonia.



HJT Solar Cell Capacity
2GW + 8GW
Has invested Planning construction

HJT Solar Module capacity
3GW + 7GW
Has invested Planning construction



4
 Production Bases

2
 Headquarter R&D Center

MINGYANG Solar Co., LTD. (referred to as "MY Solar") was established in July 2022, is a wholly-owned subsidiary of MINGYANG Smart Energy Group Co., LTD. (Stock code :601615.SH, MYSE.L), the company gives full play to the advantages of MINGYANG's global leading new energy overall solution, Committed to the research and development and manufacturing of high-efficiency HJT cells and modules, through continuous innovation, to create a first-class domestic high-efficiency photovoltaic cell and module industrialization company.

MINGYANG SOLAR CO., LTD. (referred to as " MINGYANG SOLAR ") is a wholly-owned subsidiary of Mingyang Smart Energy, focusing on the R&D and manufacturing of high-efficiency N-type solar cells and modules. MINGYANG SOLAR is committed to benefit the industry with higher efficiency and lower cost through continuous technology innovation. Based on that, it's further aim is to lead the industry with next generation of HJT technologies and products.



3 INDUSTRY LAYOUT

- wind Turbine Production Bases
- Solar Production Bases/Headquarters/R&D Center

Inner Mongolia PV production base

Heterojunction PV module 2GW capacity

Henan PV Production Base
 -Under construction

Heterojunction PV cells 5GW+ modules 5GW capacity

Yancheng Base

2GW HJT Solar Cell Capacity

Shanghai Center

Zhongshan Headquarters/
 Photovoltaic Research Institute

Shaoguan Base

3GW HJT Solar Module Capacity

MINGYANG SOLAR sets up nationwide R&D innovation platforms and business layout get close to the market and clients.

20+

Wind Power Production Bases

4

Solar Production Bases

2

Headquarter R&D Center

4 HJT TECH, HIGHER EFFICIENCY

MINGYANG SOLAR always adhere to strive cost reduction and efficiency improvement by advanced technologies, continued to lead the technical innovation of high-efficiency N-type solar products, Mingyang high-efficiency Heterojunction (HJT) modules provide an industry-leading 30-year linear product warranty with more than 10% additional yield (Mingyang's mass-produced cell efficiency is up to 25.3%, and bifacial rate can reach up to 90%)

- The efficiency of MINGYANG HJT components surpasses 23.7%, exceeding the maximum efficiency limit of PERC components, resulting in higher power output and increased income.
- MINGYANG's HJT module has low power attenuation, with power attenuation $\leq 1.0\%$ in the first year and $\leq 0.35\%$ year by year. Provide 15 years products warranty and 30 years linear product warranty Excellent anti-PID performance guarantee.
- Symmetrical cell structure brings >90% bifacial rate, up to 5% power output than TOPCON.
- With the same installed capacity, less land is occupied and BOS costs are lower.



-0.255% /°C

Stable yield in extremely hot climate

Lower Temperature Coefficient



>26.5%

Use leading microcrystalline technology

HJT cell efficiency



30 years

linear product warranty

First Year Power Degradation $\leq 1.0\%$
Annual Degradation $\leq 0.35\%$



90%

High Bifacial Rate

Up to 90%
Provide extra benefit



Low silver consumption cell & module technology



Silver free cell & module technology



Ultra-thin cell & module technology



Low indium indium-free technology



Perovskite&Heterojunction tandem solar cells

5 SOLUTIONS & SCENARIOS

- Large-scale centralized power station
(covering gobi desert, mountainous areas, etc.)
- Photovoltaic complementary
(fishery and light complementary, agricultural and light complementary, wind complementary, forest complementary, etc.)
- Distributed rooftop PV
(industrial, commercial, household)
- Offshore floating PV

6 CERTIFICATION

MINGYANG PV series, cells and modules have passed the international and domestic quality and safety certification.



7 HIGH-EFFICIENCY HJT MODULES

High Efficiency HJT Double-glass MYMH-66HDR 2382*1134*30mm | 33.5kg



Power output: 615~635W
Modules efficiency: 22.8~23.5%



Silver-coated copper pastes & busbar-free technology
Ultra-thin cell & bifacial microcrystalline technology

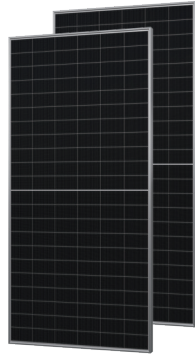


Optimal size extreme packing for lower shipping cost



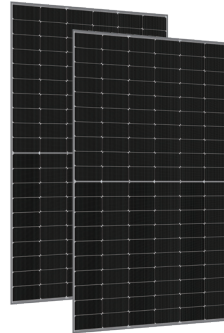
Up to 90% bifacial factor
Higher power generation returns

青龙 G12R
GREEN DRAGON



Distributed photovoltaic

白虎 G12
WHITE TIGER



Surface power station

High Efficiency HJT Double-glass MYMH-66HDG 2384*1303*33mm | 38.3kg



Power output: 710~730W
Modules efficiency: 22.9~23.5%



Adopt 0BB design combined with double-sided microcrystalline technology
High light absorption, the cell efficiency is higher



Large size solar cells
Low LCOE cost, Higher yield



Up to 90% bifacial factor
Higher power generation returns

High Efficiency HJT Double-glass MYMH-72HD 2278*1134*30mm | 32.4kg



Power output: 580~600W
Modules efficiency: 22.5~23.2%



Silver-coated copper pastes & busbar-free technology
Ultra-thin cell & bifacial microcrystalline technology

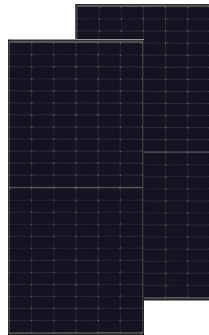


Composite frame higher mechanical strength
high water resistance corrosion resistance wave impact



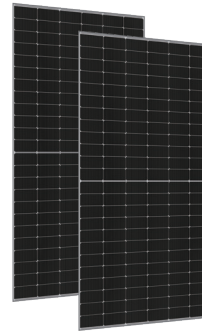
Borderless reduces dust accumulation
natural rainwater self-cleaning

玄武 M10
The Basalt



Offshore photovoltaic

朱雀 M10
Suzaku



High Efficiency

High Efficiency HJT Double-glass MYMH-72HD 2278*1134*30mm | 32kg



Power output: 575~595W
Modules efficiency: 22.3~23.0%



Ultra-thin cell & bifacial microcrystalline technology



Optimized design for current transmission
Reduce internal resistance loss and improve efficiency



Up to 90% bifacial factor
Higher power generation returns

Light component MYMH-60HSL 1941*1158*3.3mm | 7.7kg



Power output: 475~495W
Modules efficiency: 21.1~22.0%



Flexible bendable lightweight components
reduce weight by 70%

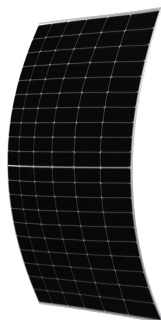


High strength anti-impact layer to protect the cell, self-cleaning, dust is difficult to adhere



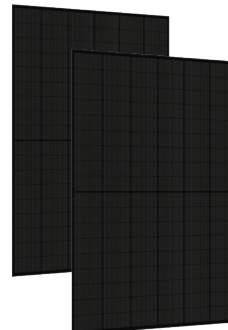
Product life up to 10 years

朱雀 M10
Suzaku



Light component

朱雀 M10
Suzaku



Black aesthetics

High Efficiency HJT Double-glass MYMH-54HDB 1722*1134*30mm | 21kg



Power output: 425~445W
Modules efficiency: 21.8~22.8%



Ultra-thin cell & bifacial microcrystalline technology



Optimized design for current transmission
Reduce internal resistance loss and improve efficiency



Up to 90% bifacial factor
Higher power generation returns



MINGYANG

地蕴天成 · 能动无限

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