



HJT

Leading high efficiency HJT photovoltaic
cell and module manufacturer

- Greener Earth, Better Life





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Company Introduction



Company Introduction



Guosheng Shian Technology Co., Ltd. (referred to as "Grand Sunergy Tech", Shanghai Stock Exchange Code: 603778) is a enterprise focusing on ecological governance with more than 30 years' experience. Grand Sunergy Tech has established a wide range of professional services including project planning, architecture, landscape, tourism, municipal services, and ecological/environmental protection.

With adherence to the mission of "Creating a Greener Earth and Better Life", Grand Sunergy Tech entered into the renewable energy by 2022. New energy segment referred to as "Grand Sunergy" primarily concentrates on the production of high-efficiency HJT cells and modules, as well as investment and operation in the upstream and downstream industrial chain. Grand Sunergy owns the industry's top professional R&D team and advanced technology routes. Currently, we have established five production bases in China, including HJT cells/Modules and Wafer. Four HJT module series have been released: the Eutropic Series (182), the Expedition Series (210R), the Chasing Series (210), and the Seapower Series designed for offshore photovoltaic applications.



Company Introduction



Grand Sunergy

- In order to improve Grand Sunergy competitiveness, Grand Sunergy is under construction to establish full industry supply chain from silicon materials, crystal pulling, ultra-thin N-type silicon wafers, high-efficiency heterojunction cells, large-formats modules to sodium ion energy storage. On the other hand, Grand Sunergy can also provide partners with project development, EPC and O&M services.
- Grand Sunergy seizes the new development opportunities of dual-carbon goals and continuously strengthens the "Product&Service Innovation" strategy, to create Gand Sunergy as the carrier of intelligent technology and innovative service.
- The company plans and constructs during the "14th Five-Year Plan" period

High efficiency HJT Cell

30GW

Large- formats and efficient modules

30GW

Grand Sunergy Corporate Culture

Mission

Better World, Better Life

Vision

To be the Leader in the New
Energy Industry



Company Culture

Core Value

Together as the One to win

Goal

To be a Family that can Make Every
Employee Happy
To be a Group that can Contribute to the
Social Development

Technology R & D



Grand Sunergy Expert Technical Team



Zhang Zhongwei

Chief Scientist and President
of the Research Institute

PhD of Microelectronics and Solid
State Electronics of East China Normal
University



Shen Wenzhong

Honorary President of
Research institute

PhD of Shanghai Institute of Technical
Physics Chinese Academy of Sciences



Zhang Wenbin

CTO and Executive President
of the Research Institute

PhD of Shanghai Institute of
Ceramics Chinese Academy
of Sciences



Liu Songmin

Vice President of
Research Institute

PhD of Nanjing University

Grand Sunergy Research Institute

Grand Sunergy established an individual Research Institute, and set up six different research directions, from new material to innovative applications. The joint research is conducting with Shanghai Jiao Tong University Solar Energy Research Institute and other leading research institutes, especially upon the perovskite crystalline silicon laminated cell technology.

Cell Research Team

- Focus on HJT cell efficiency, material and the path to lower cost and enhance efficiency

Module Research Team

- Focus on HJT module production technique and quality improvement

Perovskite Research Team

- Development of Perovskite / HJT cell lamination technology

Equipment Research Team

- Focus on the production equipment of HJT technology, R&D together with equipment manufacturer

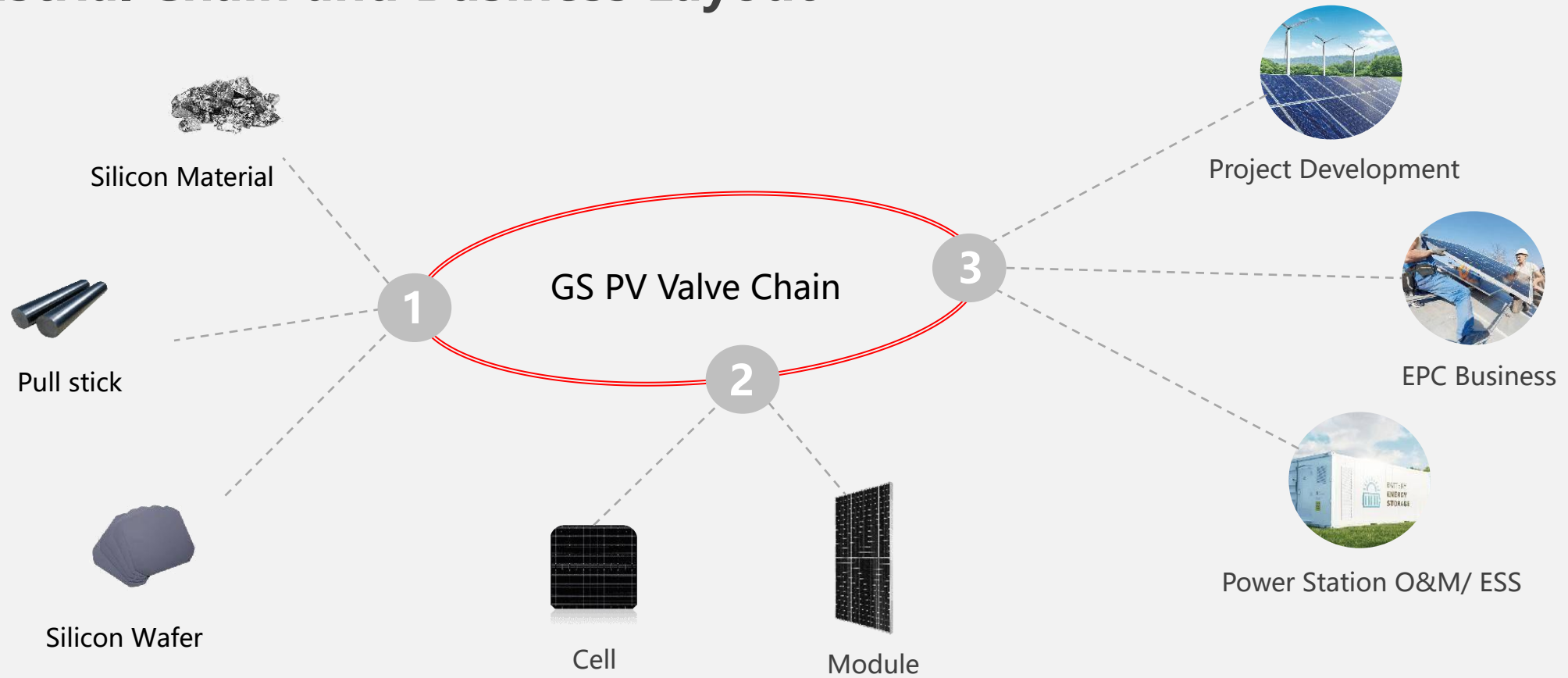
Material Research Team

- Focus on development and application of HJT new material and the cost reduction of material

Application Research Team

- Focus on module products, and develop new PV application products and scenarios

Industrial Chain and Business Layout



Grand Sunergy Energy Strategic Roadmap



2022

1GW Cell
1GW Module

2023

3GW Cell
3GW module

2024

10GW Cell
10GW Module

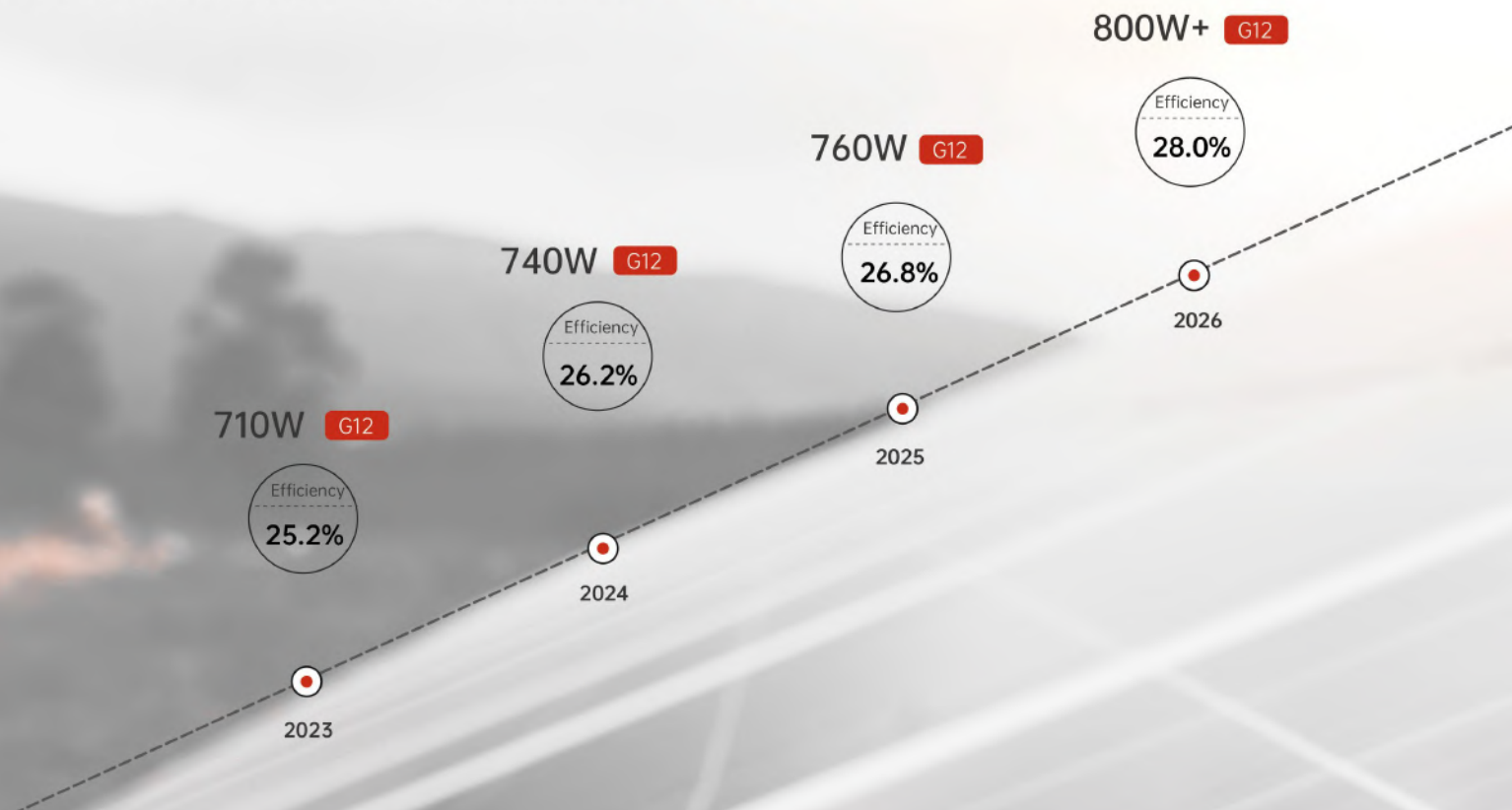
2025

20GW Cell
20GW Module

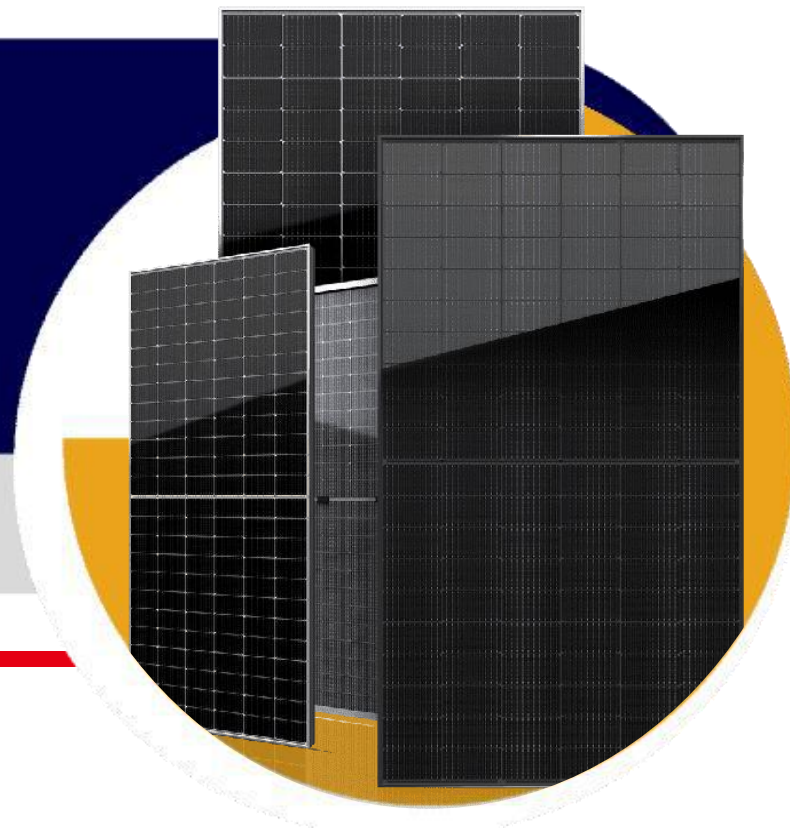
2026

30GW Cell
30GW Module

HJT + Perovskite , Support Module Power Achieves **800W+**



Products & Business



Bifaciality

Higher Bifaciality / 90%+ Bifaciality

HJT Bifaciality is about 10% higher compared to TOPCon.

The overall Bifaciality advantage results in a power generation increase of 0.5% to 1.0%.

Weak Light Performances

High Energy Yield

N-type substrates, with high minority carrier lifetimes, outperform conventional P-type silicon in low light, ensuring higher power output in low irradiation.

Temperature Coefficient

-0.24%/°C

TC: -0.24%/°C for HJT and -0.29%/°C for TOPCon, giving HJT an advantage of about 0.05%/°C.

At 30°C to 35°C, HJT can achieve up to 2.5% more power generation than TOPCon.

LCOE

Lower LCOE

A cutting-edge and most prominent technology to best reduce LCOE

NO PID NO LID

High Reliability

No LID caused by B-O effect, outstanding PID resistance by TCO film, to best guarantee long-period durability and yield

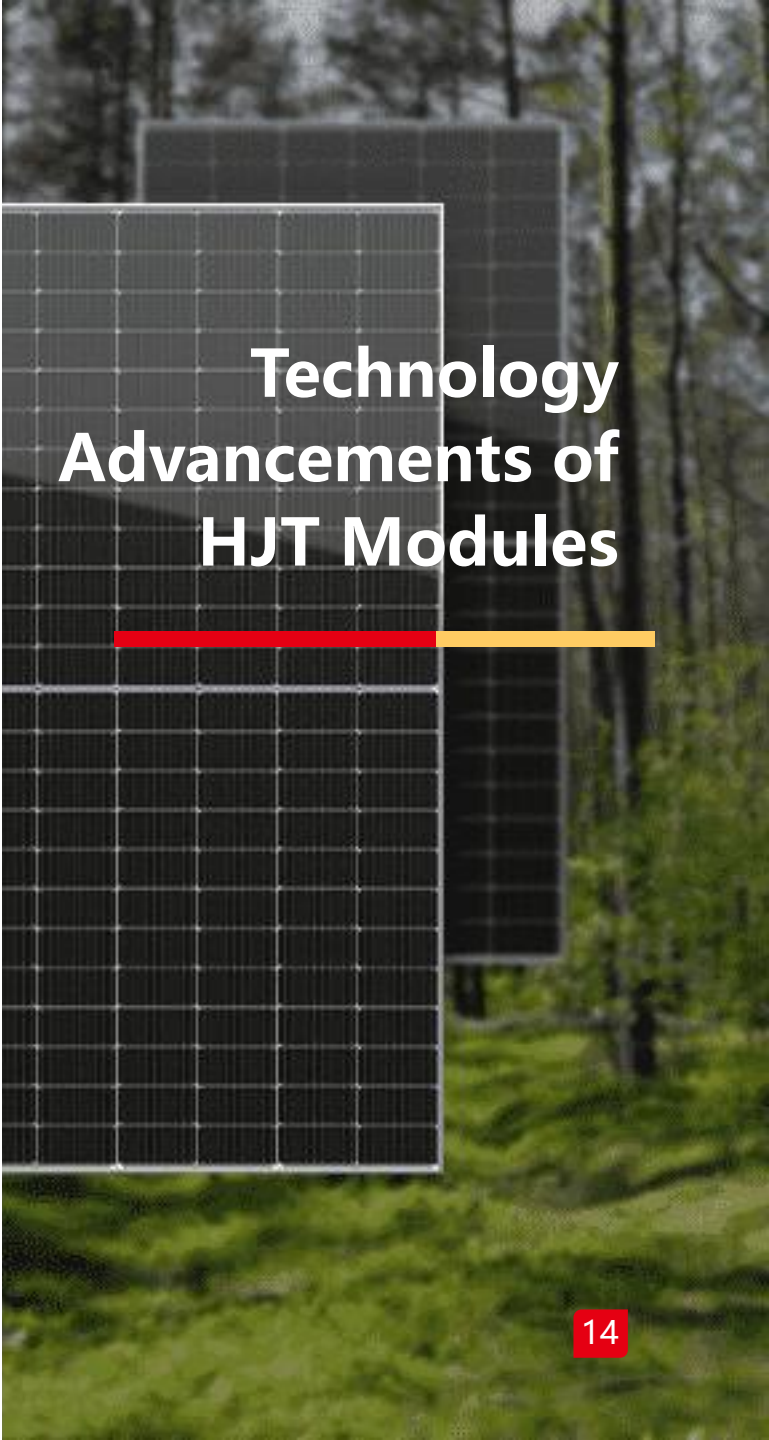
Low Degradation

Low Degradation Rate

HJT cells degrade 1% in the first year, with annual degradation <0.375% afterward, maintaining ≥88% power by year 30.

HJT generates about 2% more power per watt compared to TOPCon.

Technology Advancements of HJT Modules





HJT high-efficiency modules



HJT 210 Series

740W	30 Years	23.82%
Pmax	Warranty	Efficiency



HJT 210R Series

640W	30 Years	23.69%
Pmax	Warranty	Efficiency



No LID

(light-induced attenuation)

No LID, more power generation



No PID

Risk (electrical attenuation)

No PID risk, because N- type battery is used

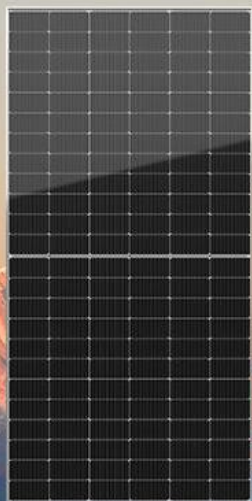


Better **low-light power generation performance**

Lower temperature coefficient corresponds to wider spectrum, Brings higher power output under low light conditions



HJT high-efficiency modules



HJT 182 Series

610W	30 Years	23.61%
Pmax	Warranty	Efficiency



HJT 182 Series (Full Black)

440W	30 Years	22.51%
Pmax	Warranty	Efficiency



No LID

(light-induced attenuation)

No LID, more power generation



No PID

Risk (electrical attenuation)

No PID risk, because N- type battery is used



Better **low-light power generation performance**

Lower temperature coefficient corresponds to wider spectrum, Brings higher power output under low light conditions

Grand Sunergy Quality Certification

Grand Sunergy PV products and facilities have passed authoritative certifications from a number of international standard certification bodies, and their high standards in product design, reliability and standardized production ensure that products and production comply with compulsory quality standards.



JP-AC



Grand Sunergy First-class Standard Testing Laboratory

Grand Sunergy Laboratory has established a comprehensive quality management system according to ISO/IEC 17025 (CNAS), and can carry out over 40 various test items, such as Thermal cycling test, Humidity freeze cycle test, Damp Heat test, Insulation test, Mechanical loading test, PID test, etc.

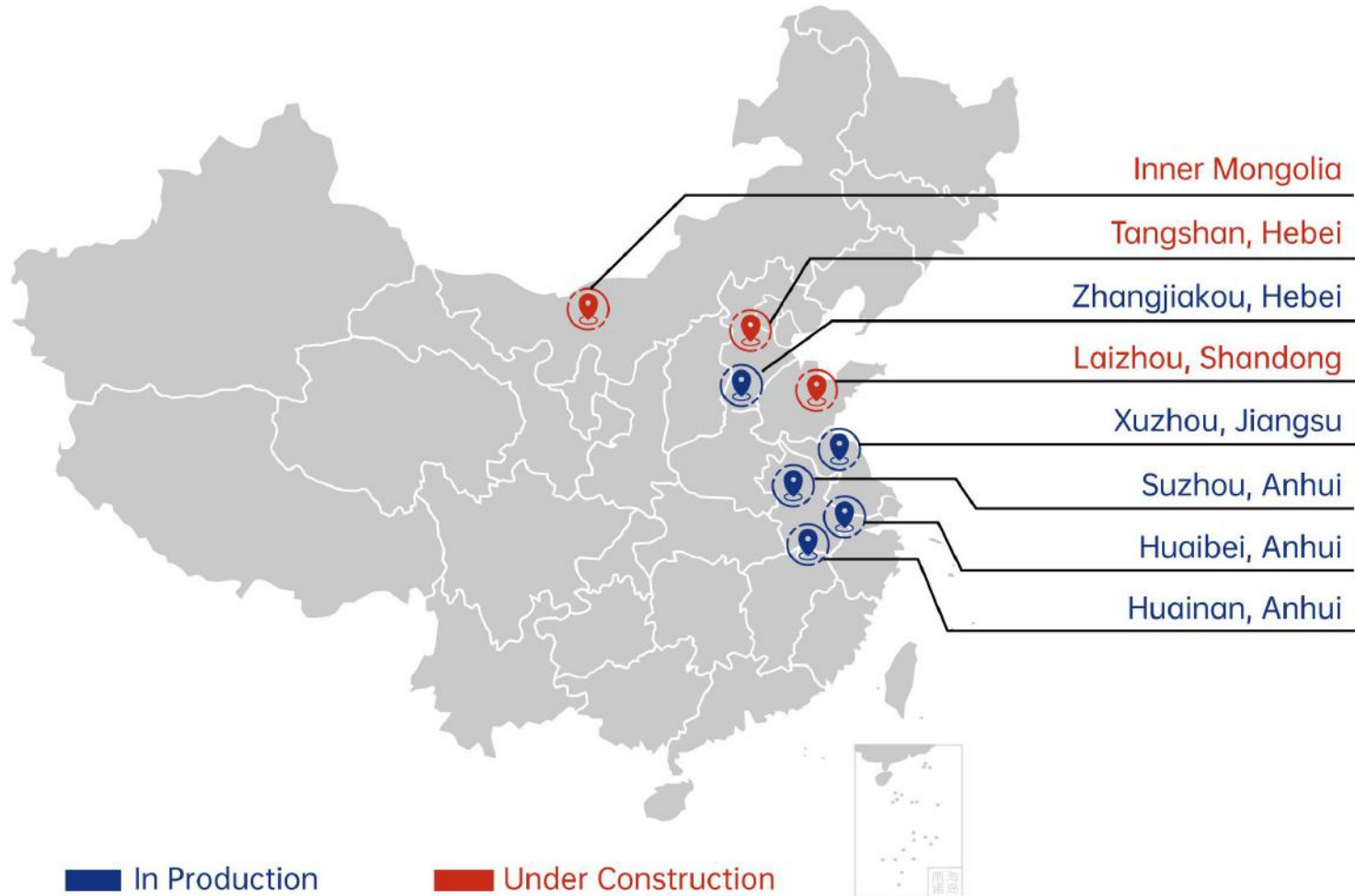
The products of Grand Sunergy have obtained multiple certifications, including ISO international quality management system certification, IEC International Electrotechnical Commission certification, certification from the General Administration of Quality Supervision, Inspection and Quarantine of China, and CE certification.



Grand Sunergy Intelligent Manufacturing Factory

The production line uses advanced automation equipment to strive for high production efficiency and stable production quality. It includes a fully automatic machine glass loading robot to improve loading efficiency and positioning accuracy; intelligent overlay welding and EL AI detection system to effectively identify lamination defects and ensure the accuracy and comprehensiveness of EL detection; intelligent double-layer three-cavity laminator , to ensure the lamination process is stable and reliable; the high-precision PCF component frame gluing system improves the accuracy of gluing; the fully automatic junction box lidding machine effectively detects the silicone curing effect and accurately seals; the component intelligent appearance AI detection system, fully Automatic recognition and detection of dimensional appearance, and intelligent binning system, etc.





Production Bases

At present, the company has built five bases for wafer, cell and module, and is accelerating the construction of other production bases with Crystall pulling factory included.





Global References



Global Reference



➤ Salt-PV Project





-  **Capacity:** 600 MW
-  **Location:** Laizhou, China
-  **Annual Generation Capacity:**
About 1003 million kWh
-  **Carbon Emissions:**
About 566 thousand tons



Global Reference



➤ Desert Project





-  **Capacity:** 500 MW
-  **Location:** Luopu, China
-  **Annual Generation Capacity:**
About 743 million kWh
-  **Carbon Emissions:**
About 607 thousand tons



Global Reference



➤ Offshore Project

-  **Capacity:** 400 MW
-  **Location:** Zhaoyuan, China
-  **Annual Generation Capacity:**
About 690 million kWh
-  **Carbon Emissions:**
About 532 thousand tons



Global Reference

➤ Utility Project

- ☐ **Capacity:** 146 MW
- 📍 **Location:** Jiayuguan, China
- ⚡ **Annual Generation Capacity:**
About 234 million kWh
- 🌳 **Carbon Emissions:**
About 190.2 thousand tons



Global Reference

➤ Utility Project





- ☐ **Capacity:** 100 MW
- 📍 **Location:** Suzhou, China
- ⚡ **Annual Generation Capacity:**
100 million kWh
- 🌳 **Carbon Emissions:**
81.4 thousand tons



Global Reference



➤ Floating Project

-  **Capacity:** 28 MW
-  **Location:** Huaibei, China
-  **Annual Generation Capacity:**
About 31.2 million kWh
-  **Carbon Emissions:**
About 25.8 thousand tons



Global Reference

➤ Expressway Project



📍 **Location:** Hebei, China



Global Reference







➤ C&I Project

-  **Capacity:** 8.995 MW
-  **Location:** Xuzhou, China
-  **Annual Generation Capacity:**
About 10.8 million kWh
-  **Carbon Emissions:**
About 8140 tons



Global Reference

➤ Utility Project

-  **Capacity:** 703.8 KW
-  **Location:** Thailand
-  **Annual Generation Capacity:**
About 703,800 kWh
-  **Carbon Emissions:**
About 572.89 tons



Global Reference

➤ C&I Project



- ☐ **Capacity:** 663 KW
- 📍 **Location:** Huaibei, China
- ⚡ **Annual Generation Capacity:**
663,000 kWh
- 👤 **Carbon Emissions:**
539.68 tons



Global Reference




➤ Residential Project

-  **Capacity:** 378 KW
-  **Location:** Spain
-  **Annual Generation Capacity:**
About 605,000 kWh
-  **Carbon Emissions:**
About 492.47 tons



Global Reference



➤ Residential Project

-  **Capacity:** 74 KW
-  **Location:** Poland
-  **Annual Generation Capacity:**
118,000 kWh
-  **Carbon Emissions:**
96.05 tons



Global Reference

➤ Residential Project

-  **Capacity:** 7.2 KW
-  **Location:** Belgium
-  **Annual Generation Capacity:**
About 11,500 kWh
-  **Carbon Emissions:**
About 9.36 tons





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Grand Sunergy

Address: Jiawang District Industrial Park, Xuzhou City

