



ASTRONERGY

Brief Introduction of Astronergy

High Quality, High Performance, High Efficiency

May 2023





01 Our Positioning

02 Our Advantages

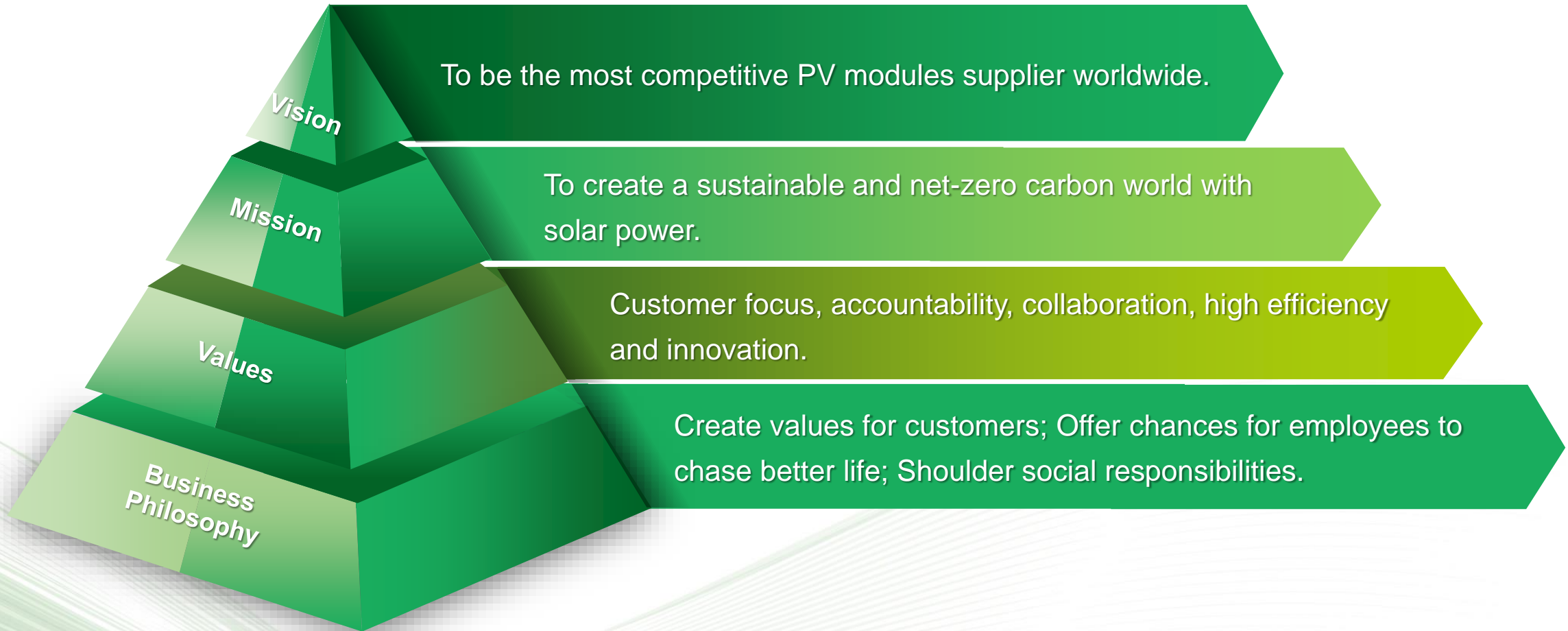
03 Our Products

04 Social Responsibility

OUR POSITIONING



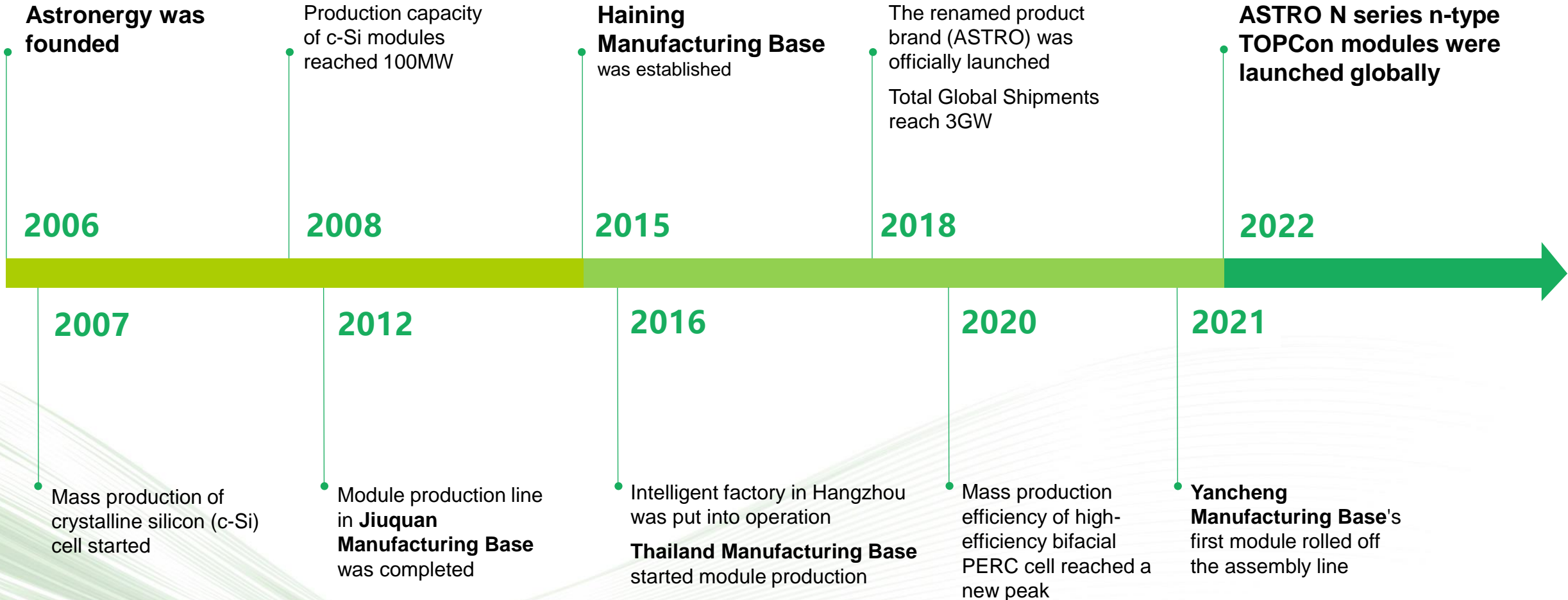
ASTRONERGY



MILESTONES



ASTRONERGY





About CHINT Group

Founded in 1984, CHINT Group is a leading global provider of smart energy solutions. It is actively deploying industrial sectors including smart electrics, green energy, industrial control and automation, smart home and incubator, forming an integrated whole industry chain of “power generation, storage, transmission, transformation, distribution, sales and consumption”.

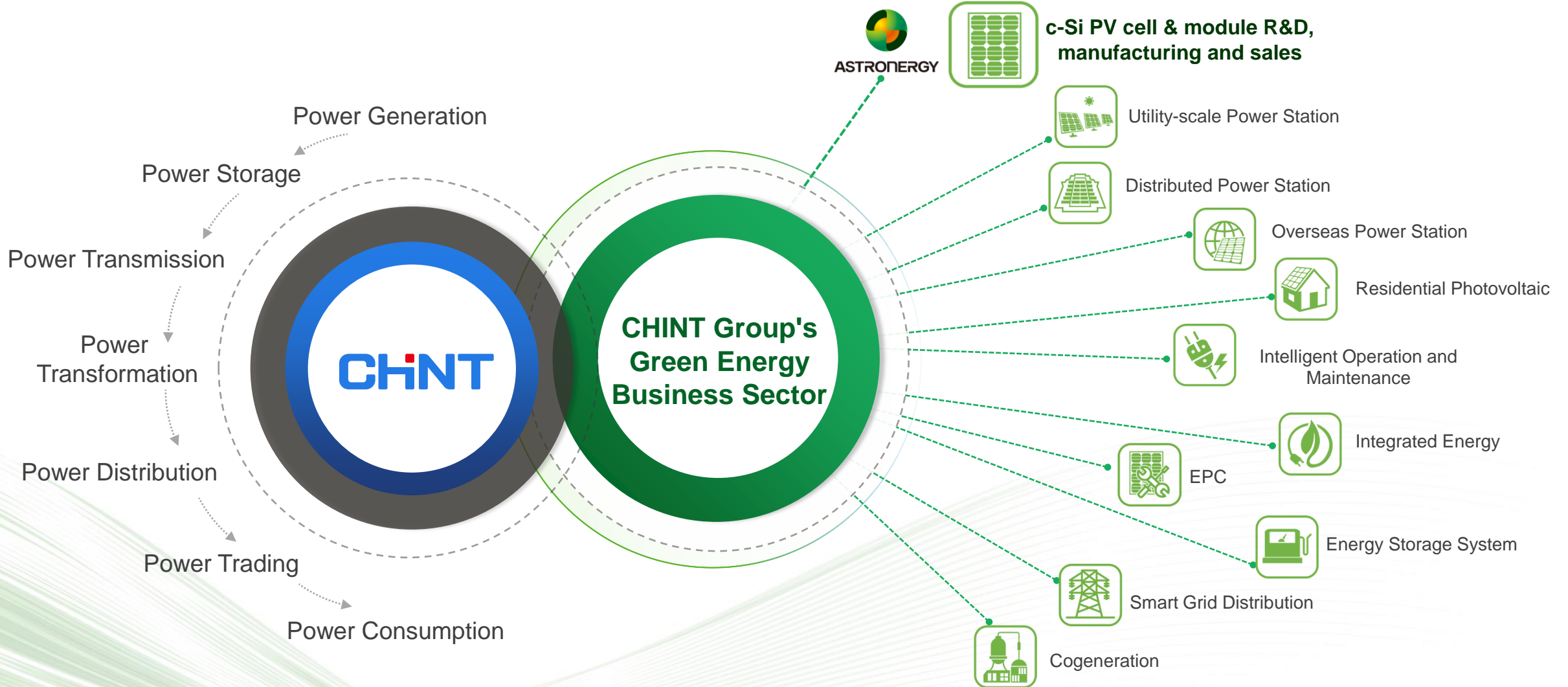
About Astronergy

Focusing on PV cells and modules, Astronergy is an intelligent manufacturing company under CHINT Group, with its photovoltaic business started from 2006. Astronergy is committed to the R&D, production and sales of high quality, high performance and high efficiency crystalline silicon solar cells and modules, and has been a pioneer in n-type TOPCon PV modules.

THE ENTIRE INDUSTRY CHAIN



ASTRONERGY



To create a sustainable and net-zero carbon world with solar power



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HONORS



ASTRONERGY

No. 1 in "China's Top 100 Private Enterprises with Social Responsibility" in 2021

No. 82 in "2022 China's Top 500 Private Enterprises "

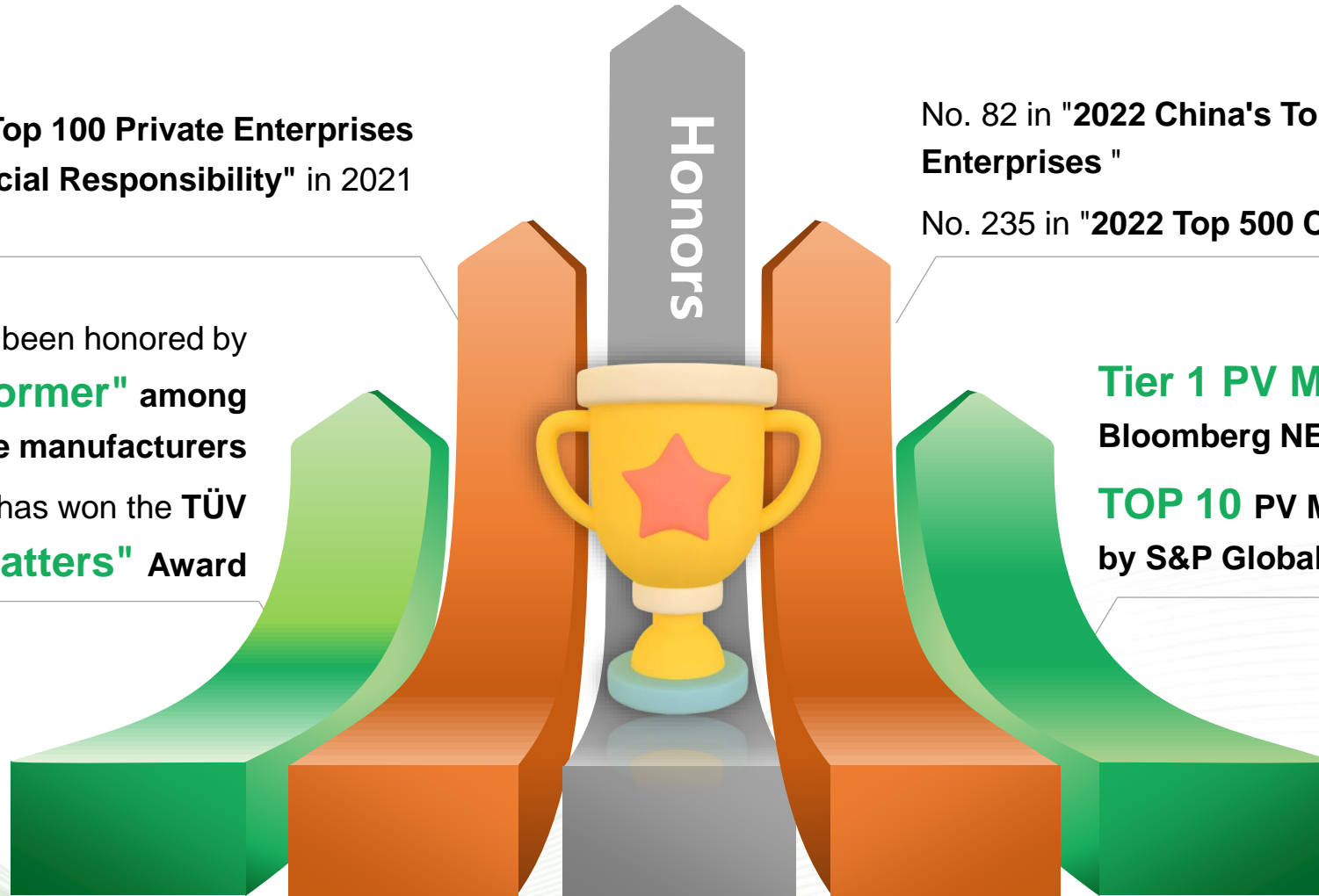
No. 235 in "2022 Top 500 Chinese Enterprises"

For 6 years, Astronergy has been honored by PVEL as **"TOP Performer"** among module manufacturers

For 3 times, Astronergy has won the TÜV Rheinland **"All Quality Matters"** Award

Tier 1 PV Module Maker listed by Bloomberg NEF

TOP 10 PV Modules Suppliers released by S&P Global



KEY FIGURES



ASTRONERGY

18.34 Billion USD
2022 CHINT Group Revenue

40,000+
Employees Worldwide

140+
Countries and Regions Where
Businesses Cover

3.02 Billion USD
PV Modules Revenue in 2022

TOP 7
2022 PV Modules Shipments among
All Suppliers Worldwide

20 GW
2022 PV Modules Production
Capacity Worldwide

11 GW
Cumulative Capacity of PV Power
Stations Owned by CHINT Group

8.3 Million Tons
CO₂ Emissions Reduced per Year

8.3 Billion kWh
Green Electricity Provided for the
Whole Society per Year

GLOBAL PRESENCE



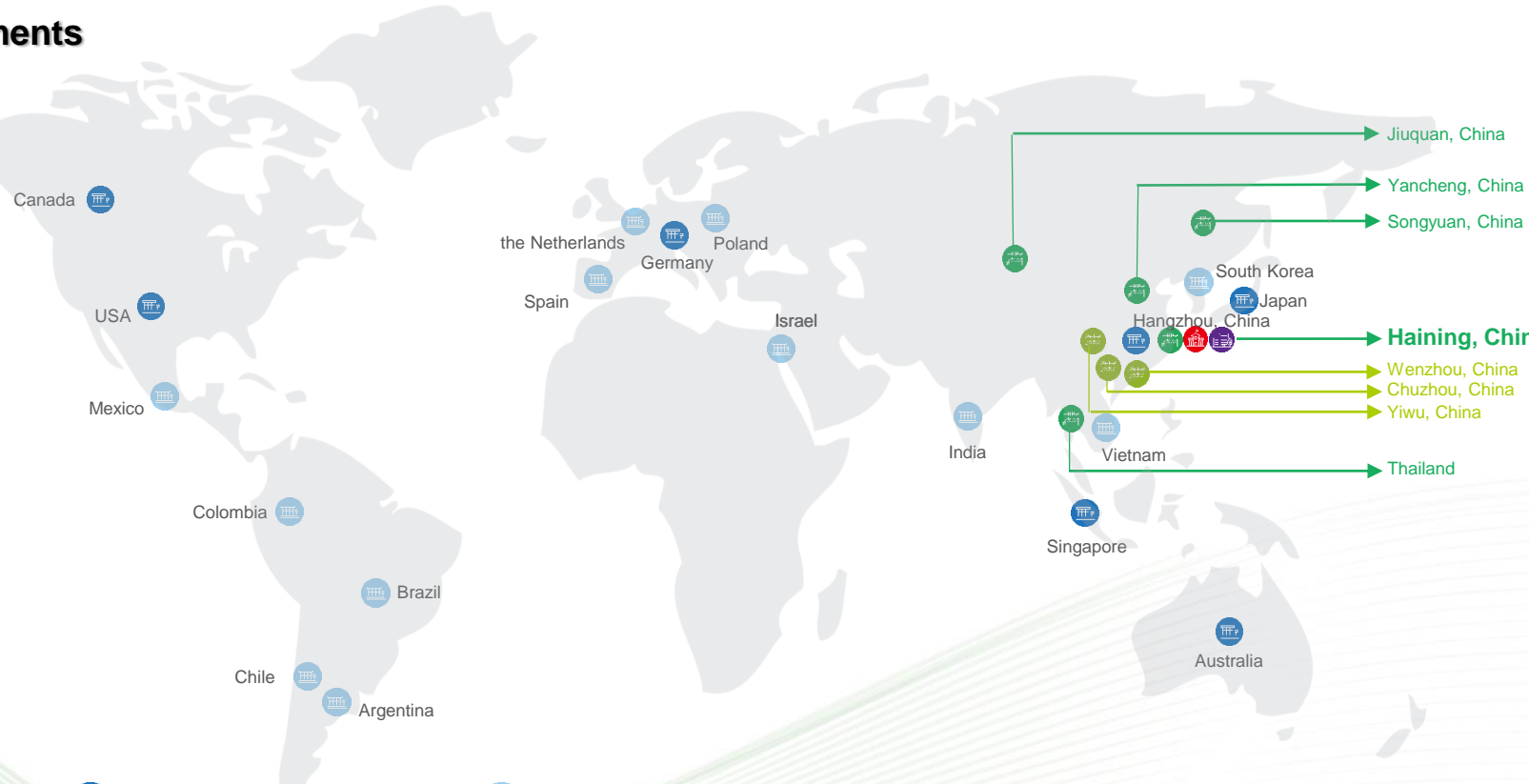
ASTRONERGY

45 GW+

Total Global Shipments

140+

Countries



Global Headquarters



Global Sales Offices



Global Sales Channels



Global R&D Center



Global Manufacturing Bases
(mass production)



Global Manufacturing Bases
(under construction)



Haining, HQ
R&D, MFG Center



Manufacturing Base
In Yancheng



Manufacturing Base
In Jiuquan



Manufacturing Base
in Thailand

To create a sustainable and net-zero carbon world with solar power

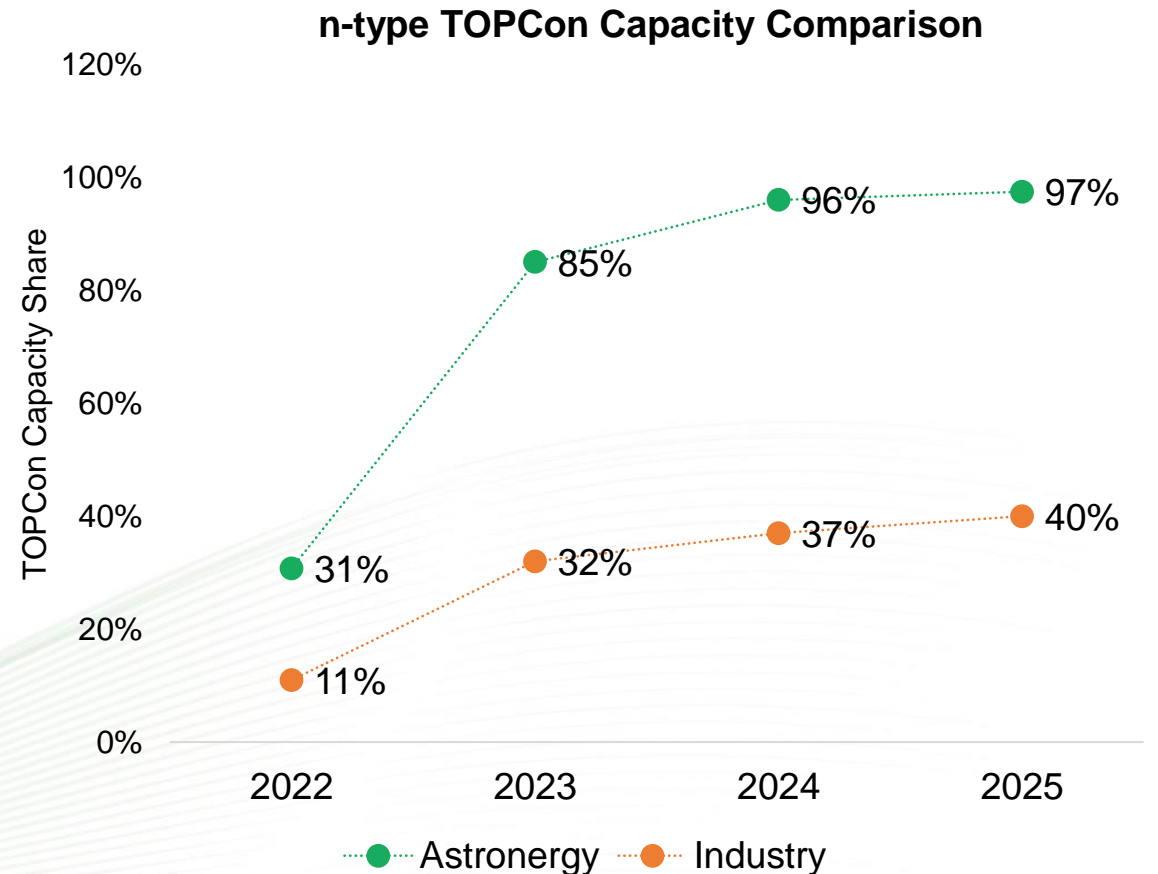
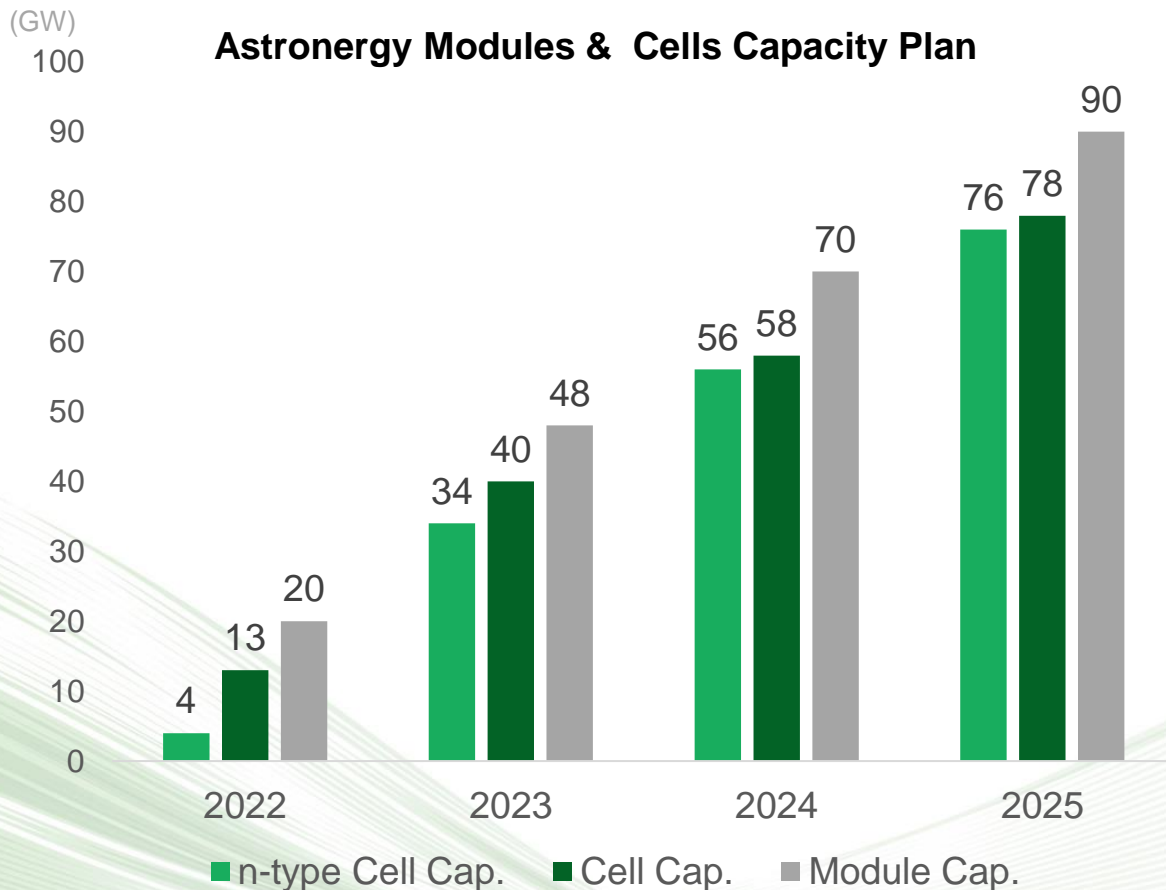
CAPACITY PLANNING



ASTRONERGY

Astronergy's TOPCon cell production capacity will increase to **34GW** in 2023.

In 2025, the TOPCon capacity share of Astronergy will be **≥ 97%** vs. industry **≤ 40%**.



GLOBAL PARTNERS



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To create a sustainable and net-zero carbon world with solar power

FINANCIAL SUPPORT



ASTRONERGY

Actively involved in the financial investment sector, the company has established investment and financing companies such as Zhejiang Civil Investment Bank, Wenzhou Civil and Commercial Bank, Zheshang Insurance, and CHINT Finance, and has been investing in new energy, electrical and many other fields.

We have established comprehensive cooperation with major domestic and foreign financial institutions such as China Credit Insurance, China Development Bank, Export Bank, ICBC, IFC, Standard Bank, Shinhan Bank, SCB, CITI, etc., with **financing ratio and financing cost leading in the industry.**

BloombergNEF



中国进出口银行
THE EXPORT-IMPORT BANK OF CHINA



中国信保



ICBC
中国工商银行



国家开发银行
The State Development Bank of China

UniCredit

BBVA

UmweltBank

Sicher. Rentabel. Direkt.

Deutsche Leasing

Sparkasse



VR BANK
NURNBERG

ZUIG
investment
浙江民营企业联合投资股份有限公司

浙商保险
ZHESHANG INSURANCE

LIGA BANK

DKB
Deutsche Kreditbank AG



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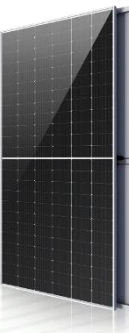
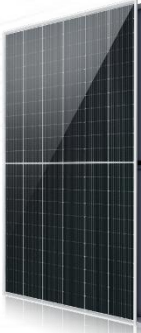
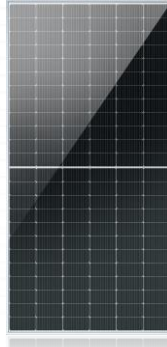
MODULE PRODUCTS ITERATION & INNOVATION



ASTRONERGY

<p>4BB Polycrystalline PERC Black Silicon Technology</p>	<p>5BB High Efficiency Monocrystal PERC Technology</p>	<p>G1 158.75 PERC SE Half-cut</p>	<p>M6 166 22.5%+PERC MBB Half-cut</p>	<p>M10 182 23%+PERC+MBB Half-cut Non-destructive Cutting</p>	<p>G12 210 23.2%+PERC+MBB Half-cut Non-destructive Cutting High-Density Encapsulation Design</p>	<p>n-TOPCon 182 High Efficiency High Bifaciality Better Low-irradiation Performance, Low Temperature Coefficient, Low Degradation</p>
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ASTRO 1 ASTRO 2 ASTRO 3 ASTRO 4 ASTRO 5 ASTRO 6 ASTRO N

<p>325~350W 17.8%</p> 	<p>375~390W 19.3%</p> 	<p>405~425W 20.7%</p> 	<p>440~460W 21.1%</p> 	<p>540~555W 21.5%</p> 	<p>650~670W 21.6%</p> 	<p>580W / 630W 22.5%</p> 
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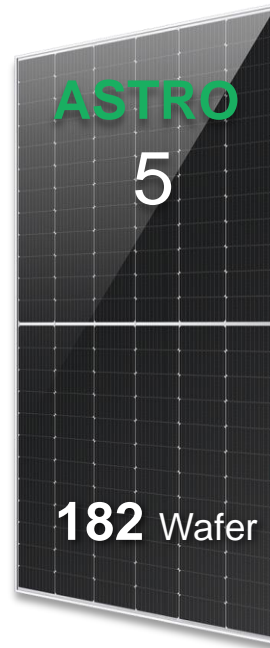
MAIN PRODUCTS



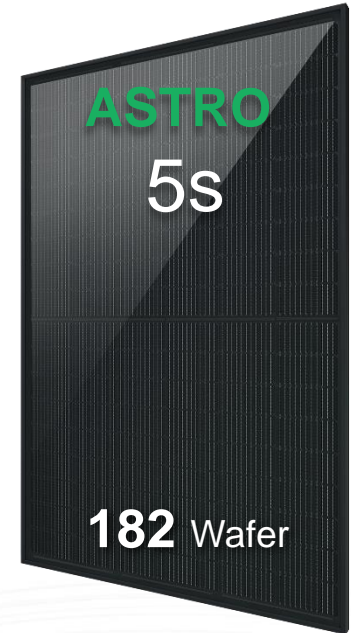
ASTRONERGY



- n-type **TOPCon** cell
- The series includes two products to meet variable PV application scenarios



- High-efficiency **PERC+**
- Suitable for utility-scale power stations and distributed power stations



- High-efficiency **PERC+**
- Featuring “light, efficient, quality and aesthetic”, especially for residential PV rooftops



To create a sustainable and net-zero carbon world with solar power

INTELLIGENT MANUFACTURING



ASTRONERGY

The Thinking Factories

- Supported by Big Data
- AI Quality Inspection
- The 1st to Achieve AI Automatic Detection of EL Defects
- Automatic Monitoring of the Entire Process
- Fully Automated Production
- Automatic Batching by Unmanned Vehicles
- Localization of Production Equipment

Top Level of Intelligent Manufacturing

2016: Sino-German Intelligent Manufacturing Demonstration Base

2020: Intelligent Photovoltaic Pilot Demonstration Enterprise

The World's First PV "Internet + Transparent Factory"



Scribing Machine



Automatic Glass Laminating Machine



Intelligent Assembly Line



Automatic Feeding and Bar Code Sticking Machine



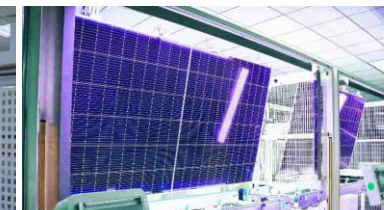
Series Welding Machine



Banding Machine



Laminating Machine



90 Degree Flip Inspection



Group Box All-in-one Machine



Process Control

MES (Manufacturing Execution System)

- Collects, feedback and verifies statistics for the control of manufacturing abnormality.



SPC (Statistical Process Control)

- Monitors key quality control points, ensure process stability, timely alarm and avoid unqualified.



Quality Control App

- Digital documents for statistic reserve and timely control.



AI Quality Detection

- Intercepts and reports defects in production process to improve products quality.

INTELLIGENT AI DETECTION



ASTRONERGY

Key Process Detection

Semi-finished Product Detection

Finished Product Detection

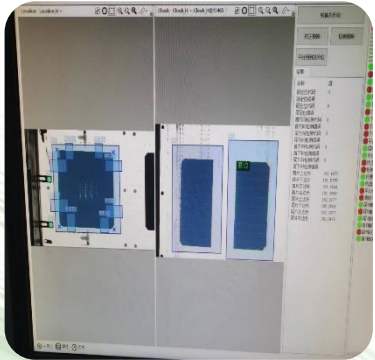
CCD Detection

Serial AI Detection

Pre-lamination EL & VI Detection

Post-lamination Detection

Post-lamination EL Detection & Final Detection



HIGH RELIABILITY & HIGH QUALITY



ASTRONERGY

25-30 Years Power Warranty

Systemized Quality Control Measures

Rigorous Testing Procedures

Certificates with ISO9001, ISO14001 and OHSAS18001...

World-class suppliers and partners



With strong testing capabilities, Astronergy has obtained the qualifications of **CNAS Laboratory, CSA Witness Laboratory, TÜV Rheinland Witness Laboratory, Intertek "Satellite Program" Laboratory** and other qualifications, and conducts **more than 30 rigorous tests internally for PV modules.**

LEADING TECHNOLOGY LEADS TO HIGH PERFORMANCE



ASTRONERGY

1st

Tier 1

Mono-PERC cell efficiency is **23.4%**, leading in PV industry

The average efficiency of **n-type TOPCon cells** reaches **25.6%**, and the highest efficiency is **26.12%**, ranking **in the 1st tier**



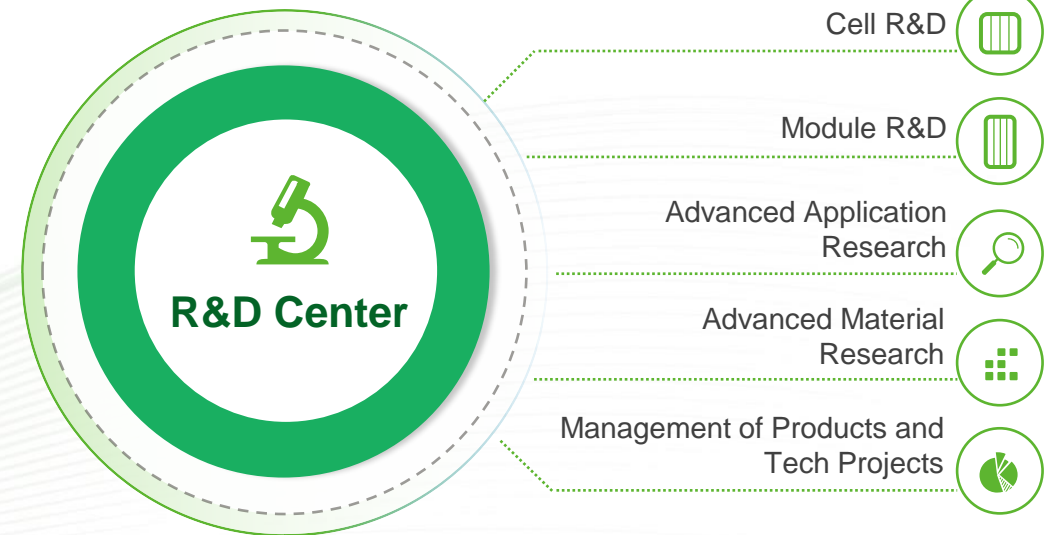
20 %

The number of R&D personnel **with intermediate titles and above** at the national level accounts **for over 20%**



295

295 Patents: **221** Utility Model Patents
69 Invention Patents
5 Appearance Design Patents



GLOBAL R&D COOPERATION



ASTRONERGY

Established R&D centers in North America, Europe, Asia Pacific, North Africa and other countries, and explored the “Industry-University-Research” integration model with Tsinghua University, CUHK (Shenzhen), New South Wales, etc. and universities and research institutions in the United States and Europe, integrating global innovation resources to promote R&D innovation, **exploring high efficiency and high reliability PV modules technology.**

Hangzhou Dianzi University

High-efficiency Monocrystalline PERC Cell Technology

Shanghai Jiao Tong University

New Tunnel Passivated High-efficiency Solar Cell & Module Technology

Zhejiang University

Key Technologies of Low-cost and High-efficiency Solar Cells

UNSW SYDNEY

Hydrogen Passivation Project

Zhejiang University of Technology

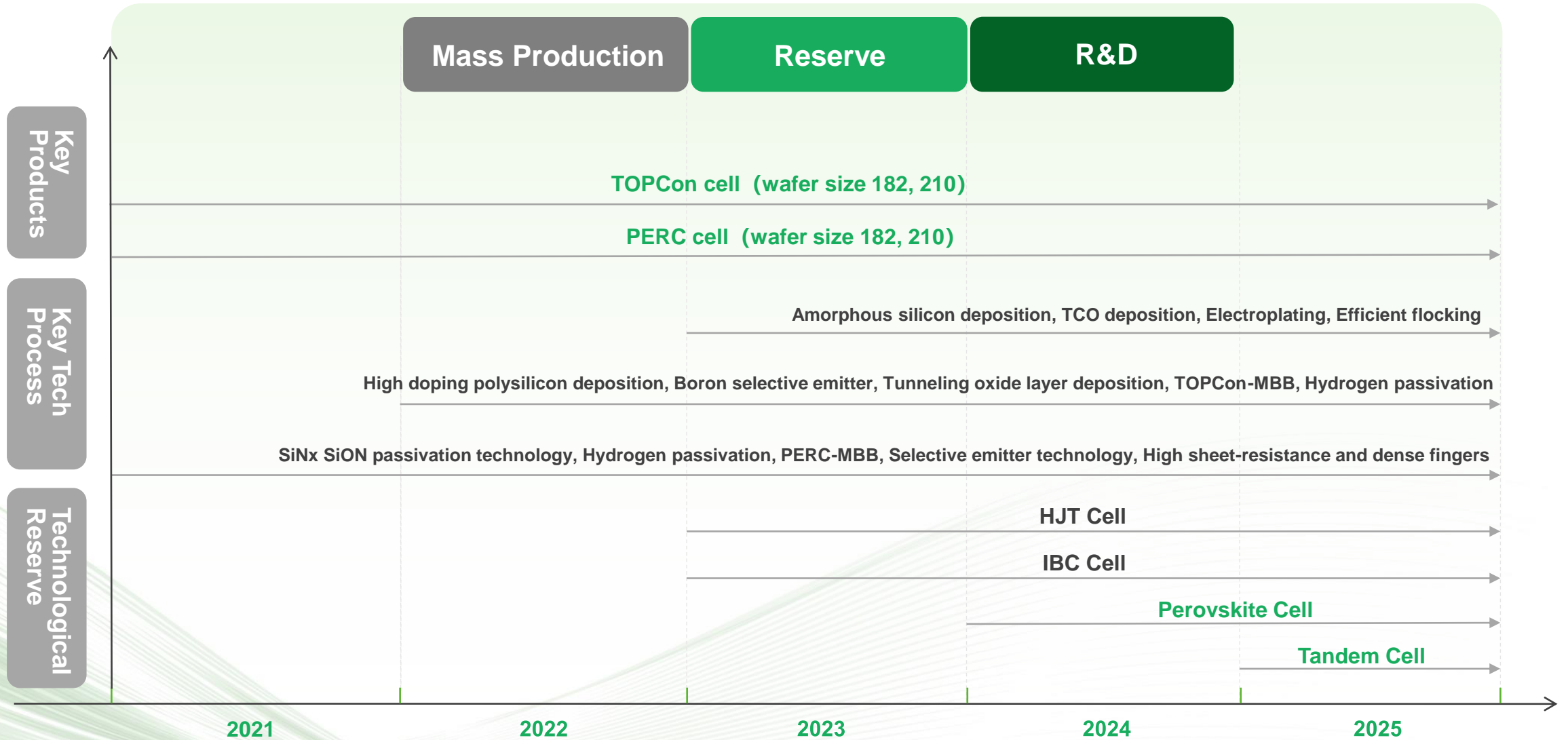
n-type Passivated Contact High-efficiency Bifacial Crystalline Silicon Solar Cells



R&D ROADMAP



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APPLIED CASES



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Utility-scale Power Stations

- Benban Solar Park Project in Egypt, 165MW
- Agriculture-Solar Hybrid PV Power Station in Wenzhou, 150MW
- Forest-Solar Hybrid Power Station in Jiangshan Quzhou, 200MW
- Utility-scale Project in Zhangjiakou, Hebei Province, 70MW
- Goonumbla Project in Australia, 89MW
- Barreiras Project in Brazil, 50MW
- Insua Power Station in Portugal, 48.5MW
- Utility-scale Project in Yongchang, Gansu Province, 200MW
- Utility-scale Project in Qiongjie, Tibet, 10MW
- Top Runner Project in Baicheng, Jilin Province, 100MW

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Midden-Groningen Solar Park, one of The Largest Power Stations in the Netherlands
103MW | The Netherlands



China's First Sand-Solar Hybrid Power Station
310MW | Kubuqi, Inner Mongolia, China



The Largest Fishing-Solar Hybrid Project in Asia
550MW | Wenzhou, Zhejiang Province, China



Claresholm Solar Farm, one of the Largest Solar Power Plant in Canada
132MW | Southern Alberta, Canada

APPLIED CASES



ASTRONERGY

Distributed PV Rooftop

C&I PV Rooftop

- Logistics Warehouses Rooftop Solar Projects in Serbia, 10MW
- Hikvision Rooftop Project in Hangzhou, Zhejiang Province, 10MW
- Jintian Copper BIPV Power Station in Ningbo, Zhejiang Province, 30MW
- C&U Group Rooftop Project in Wenzhou, Zhejiang Province, 23MW
- Roof Project in Changxing Economic Zone, Huzhou, Zhejiang Province, 20MW
- Geely Automobile PV Rooftop Project in Linhai, Zhejiang Province, 10.3MW

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Residential PV Rooftop

- Residential Project in Kecheng District, Quzhou, Zhejiang Province, 30MW

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Roof Photovoltaic Power Station of Hangzhou East Railway Station
10MW | Hangzhou, Zhejiang Province, China



Hangzhou Civic Center Podium Roof Photovoltaic Power Station
1.2MW | Hangzhou, Zhejiang Province, China



Hervey Bay Rooftop
16 kW | Australia



Project "Million Rooftops for Zhixi"
4MW | Quzhou, Zhejiang Province, China

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CORPORATE SOCIAL RESPONSIBILITY



ASTRONERGY

United Nations Global Compact

10,000 companies + 4,000 non-businesses

Company Information

Company: CHINT GLOBAL/ Zhejiang Chint Electrics Co.
 Type: Company
 Country: China
 Sector: Electronic & Electrical Equipment
 Ownership: Publicly Listed
 Engagement Tier: Participant
 Global Compact Status: Active
 Participant Since: 24 May 2021
 Letter of Commitment

Principles and Global Goals Addressed in their most recent CoP

Next Communication on Progress (CoP) due on: 2022-05-30

Communication On Progress

PUBLISHED ON	TITLE	LEVEL
2021-05-30	Communication on Progress	Learner

Note: Responsibility for the content of participants' public communication related to the Ten Principles of the UN Global Compact and their implementation lies with participants themselves and not with the UN Global Compact.



Green energy solutions provider CHINT joins United Nations Global Compact

2021-06-21 15:10:18 source: CHINT

Zhejiang Chint Electrics Co. Ltd., a Zhejiang-based leading global provider of smart green energy solutions has recently joined the United Nations Global Compact (UNGC).

Launched In 2000, the UNGC is the largest corporate sustainability initiative in the world, with more than 9,500 companies and 3,000 non-business signatories based in over 160 countries, and more than 70 local networks. It is a call to companies everywhere to align their operations and strategies with ten universally accepted principles in the areas of human rights, labor, environment, and anti-corruption, and to take action in support of UN issues embodied in its sustainable development goals (SDGs).

Joined the United Nations Global Compact (UNGC)

Appear on the official website of the United Nations, which endorses the CHINT brand and brings the following benefits:

- Share experience and learn from each other with consensus companies and organizations.
- Expand CHINT's resources for **overseas public welfare activities**.
- Obtain the most **authoritative sustainable development policy** information and connection.
- Establish **partnerships with United Nations agencies**, including the International Labor Organization, the office of the United Nations High Commissioner for human rights, the United Nations Environment Program and the United Nations Development Program.
- Improve the **ECO VADIS** corporate social responsibility score of **10 +**, so as to maximize business opportunities.

CORPORATE SOCIAL RESPONSIBILITY



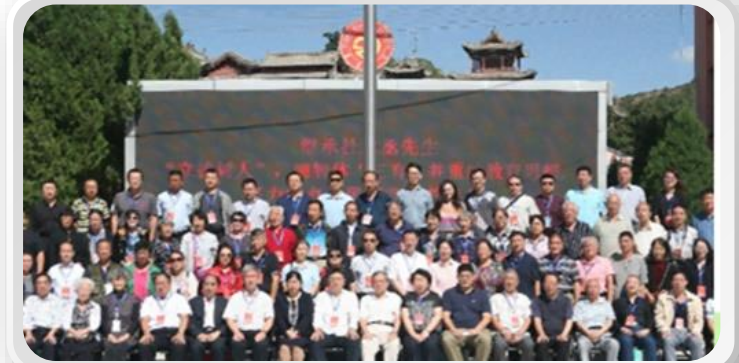
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Charity Activities in China

- CHINT Group has always been devoted to building an **extraordinary CSR management system** and improving social responsibility performance throughout all aspects of business operation.
- CHINT Group has **donated more than 54 million dollars** to social welfare such as precise poverty alleviation, school donation, epidemic relief, industry promotion and ecological protection.



Promote photovoltaic projects in the countryside to increase farmers' family income and protect environment.



Provide scholarship of 20 million dollars so far for educational institutions to help students in need and reward excellent students



Set up innovation award of more than 1 million dollars to encourage talents and promote development of the electric-power industry



Donated 1.5 million dollars of emergency supplies to the rescue operations in Henan flood



Collaborate with China Society for Promotion of the Guangcai Program and actively participate in targeted poverty alleviation

CORPORATE SOCIAL RESPONSIBILITY



ASTRONERGY

Overseas Charity Activities



Donated over 1,000 boxes of food and necessary living materials to more than 1,000 families in need in 40 underdeveloped areas in Egypt in April 2021.



"CHINT, Let Love Shine" continues to bring clean energy experiences to schools, hospitals and welfare institution around the world



CHINT associated with Foundation Frenó Al Icus, launching the "Pedal against stroke" virtual low-carbon challenge to draw attention to the problem of stroke and improve people's awareness and vigilance.



Global relay to fight the pandemic together. Donated overseas more than 200k masks ,10k protective clothes and 50 respirators.



Helped Rebuild Homes in the Earthquake Areas of Turkey by providing urgently needed materials



Launched an initiative to combat the devastation that caused by the storm Philomena: that is, donated 5 % of the amount of CHINT surge protections sold online to the tree recovery.



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High Quality, High Performance, High Efficiency

www.astronergy.com

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