

Brief Introduction of Astronergy

High Quality, High Performance, High Efficiency



ASTRONERGY

April 2024





CONTENT

01	Our Company
02	N-Type Technology
03	Our Products
04	News

ABOUT CHINT GROUP & ASTRONERGY



ASTRONERGY



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About CHINT Group:

- Founded in 1984 and a listed company since 2010;
- A global leading smart energy solutions provider;
- Three major segments: Green Energy, Intelligent Electric & Smart Low-carbon ;
- Business cross over 140+ countries with 50,000+ employees worldwide;

About ASTRONERGY:

- Founded in 2006 and it's under CHINT Group;
- An intelligent PV cells & modules manufacturer;
- Tier 1 PV module maker by BloombergNEF;
- Top 6 shipment worldwide;
- Top performer honored by PVEL for 7 times;

HONORS



ASTRENERGY

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

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

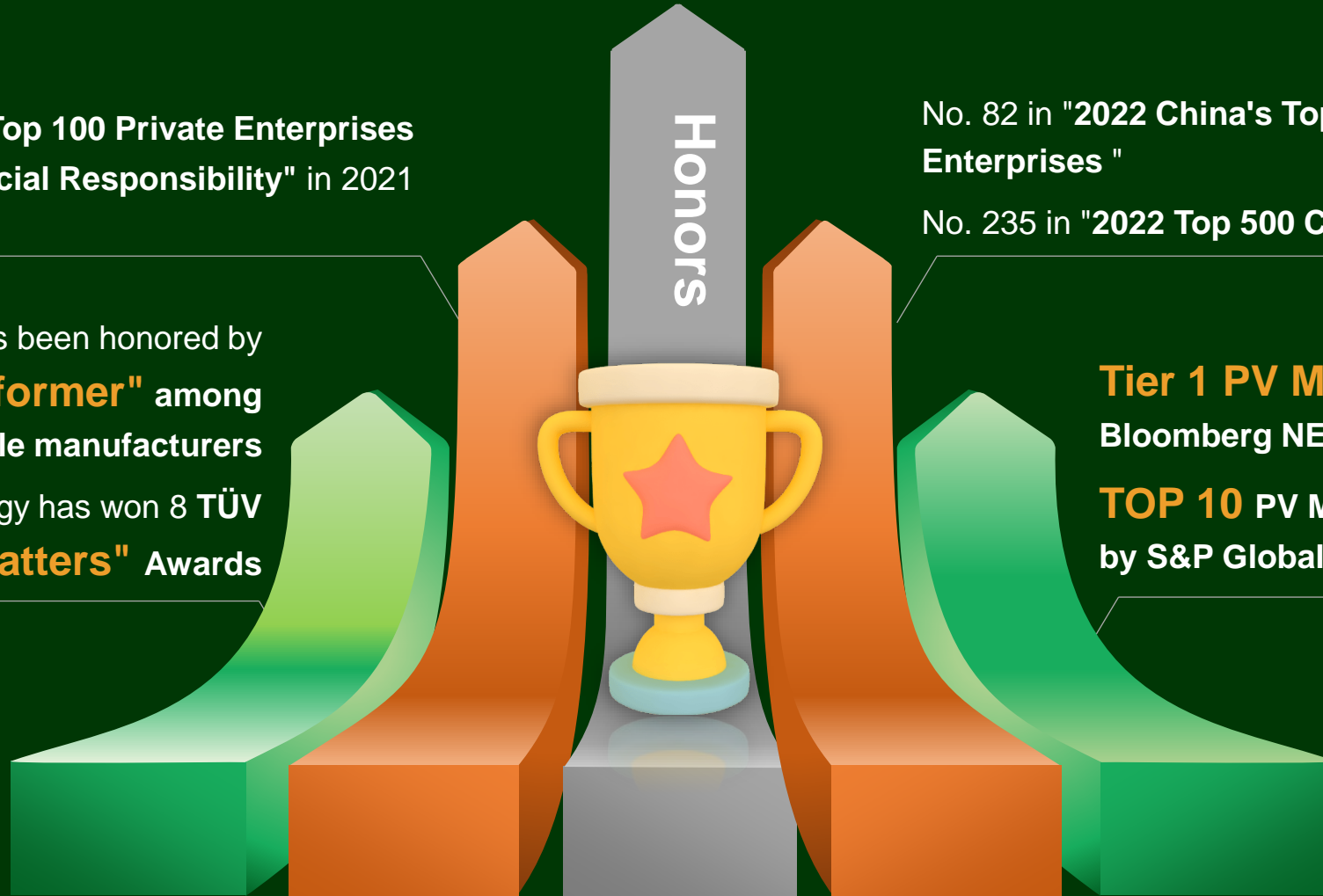
No. 235 in "2022 Top 500 Chinese Enterprises"

For 7 years, Astronergy has been honored by PVEL as **"TOP Performer"** among module manufacturers

For 4 times, Astronergy has won 8 TÜV Rheinland **"All Quality Matters"** Awards

Tier 1 PV Module Maker listed by Bloomberg NEF

TOP 10 PV Modules Suppliers released by S&P Global

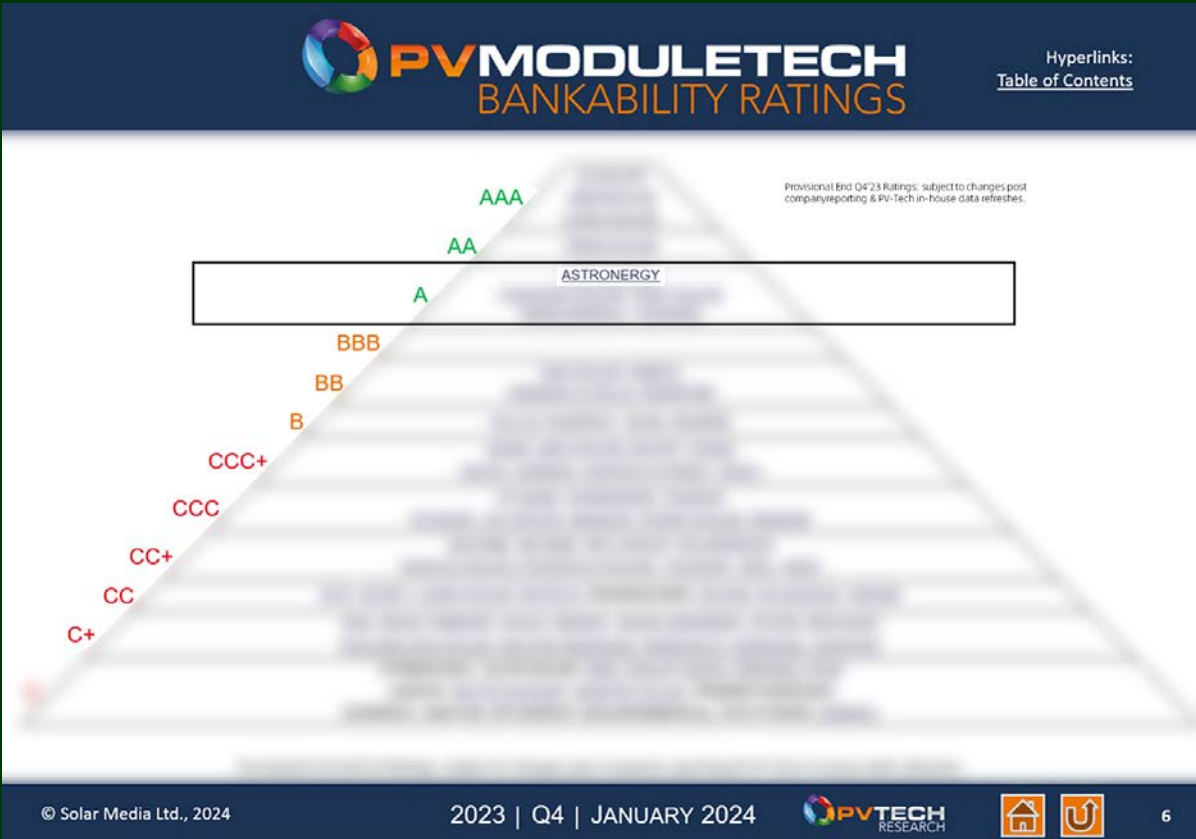


BANKABILITY



ASTRENERGY

Due to its stable financial situation, reliable product quality, and outstanding brand value, Astronergy bankability rating continues to rise. According to the Bankability Ratings released by **PV ModuleTech**, Astronergy has been in the upper for multiple consecutive quarters; In the annual "PV Module and Inverter Bankability" released by **Bloomberg New Energy Finance (BNEF)**, Astronergy bankability rating has risen from seventh place on the 2022 list to **sixth place on the 2023 list**.



PV ModuleTech 2023 Bankability Ratings



BNEF 2022&2023 Bankability Survey TOP10

Year of 2023

Year of 2022

KEY FIGURES



ASTRONERGY



21.54 Billion USD
2023 CHINT Group Revenue



50000+
Employees Worldwide



140+
Countries and Regions
Where Businesses
Cover



3.02 Billion USD
PV Modules Revenue in 2022



TOP 6*
2023 PV Modules
Shipments among All
Suppliers Worldwide



55 GW
2023 PV Modules
Production Capacity
Worldwide



31 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

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

GLOBAL PRESENCE



ASTRONERGY

80 GW+

Total Global Shipments

140+

Countries



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

Overseas Presence



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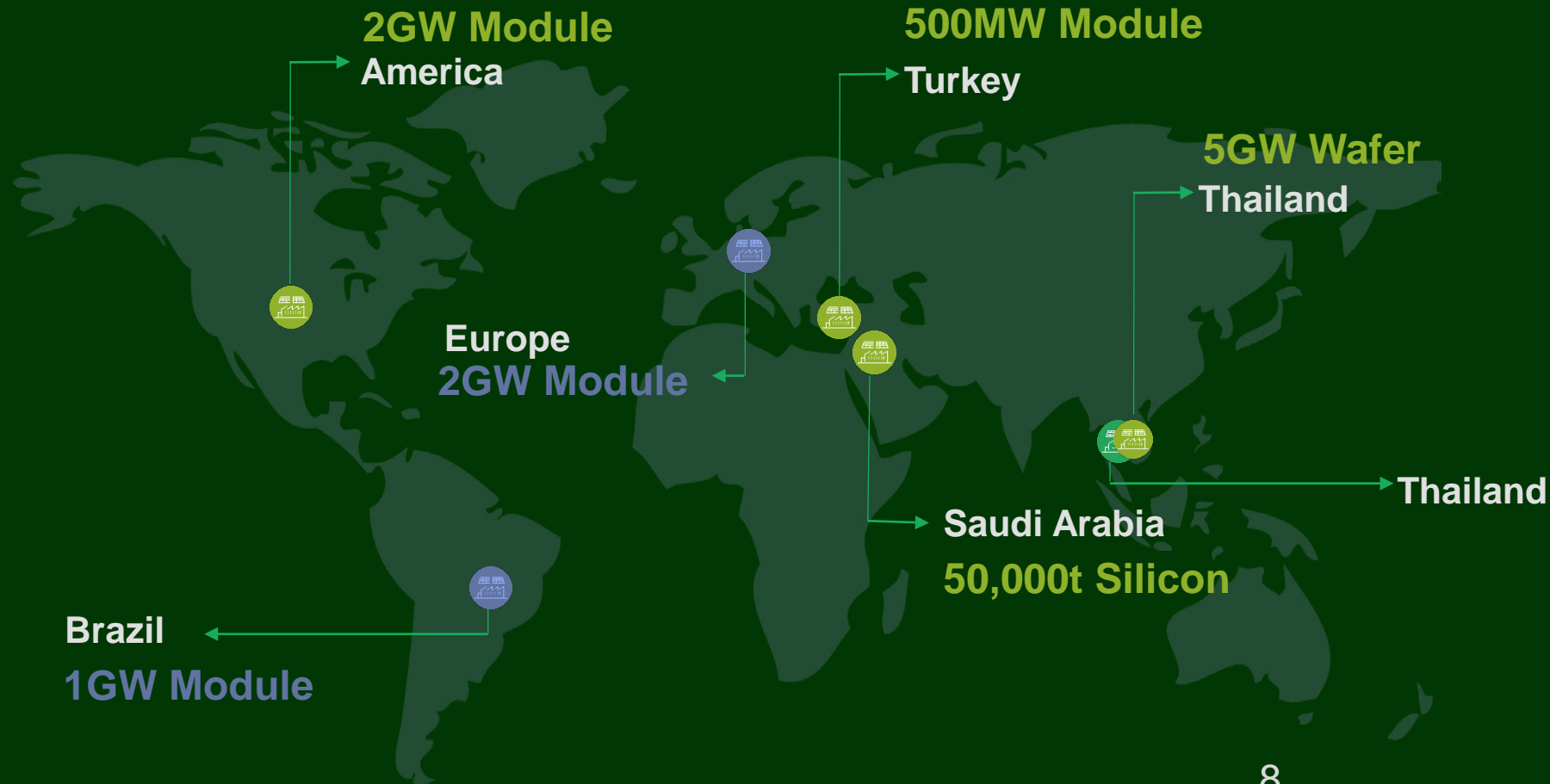
Global Manufacturing Bases
(mass production)



Global Manufacturing Bases
(Preparing for construction)



Global Manufacturing Bases
(under evaluation)



3GW Module
3GW Cell



Manufacturing Base
in Thailand



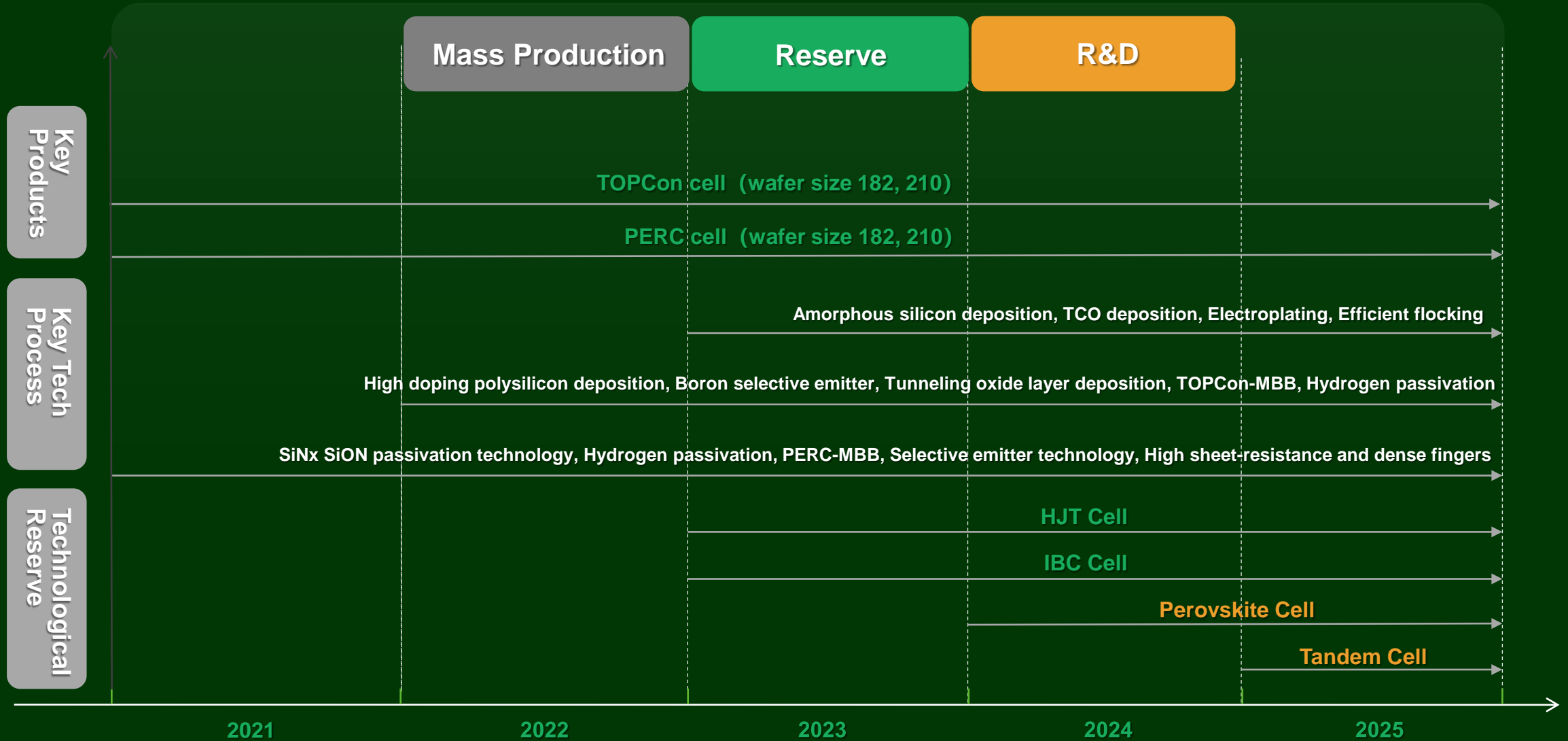
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01	Our Company
02	N-type technology
03	Our Products
04	News

R&D ROADMAP



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TECHNOLOGY CHOICE BY MAIN MANUFACTURERS



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xBC

AIKO 爱旭

LONGI

TOPCon



CanadianSolar

JinKO Solar

JA SOLAR
晶澳太阳能

LONGI

risen
东方日升

Trinasolar
天合光能

通威太阳能
TW SOLAR

HJT

AKCOME
爱康光电

HUASUN
华晟新能源

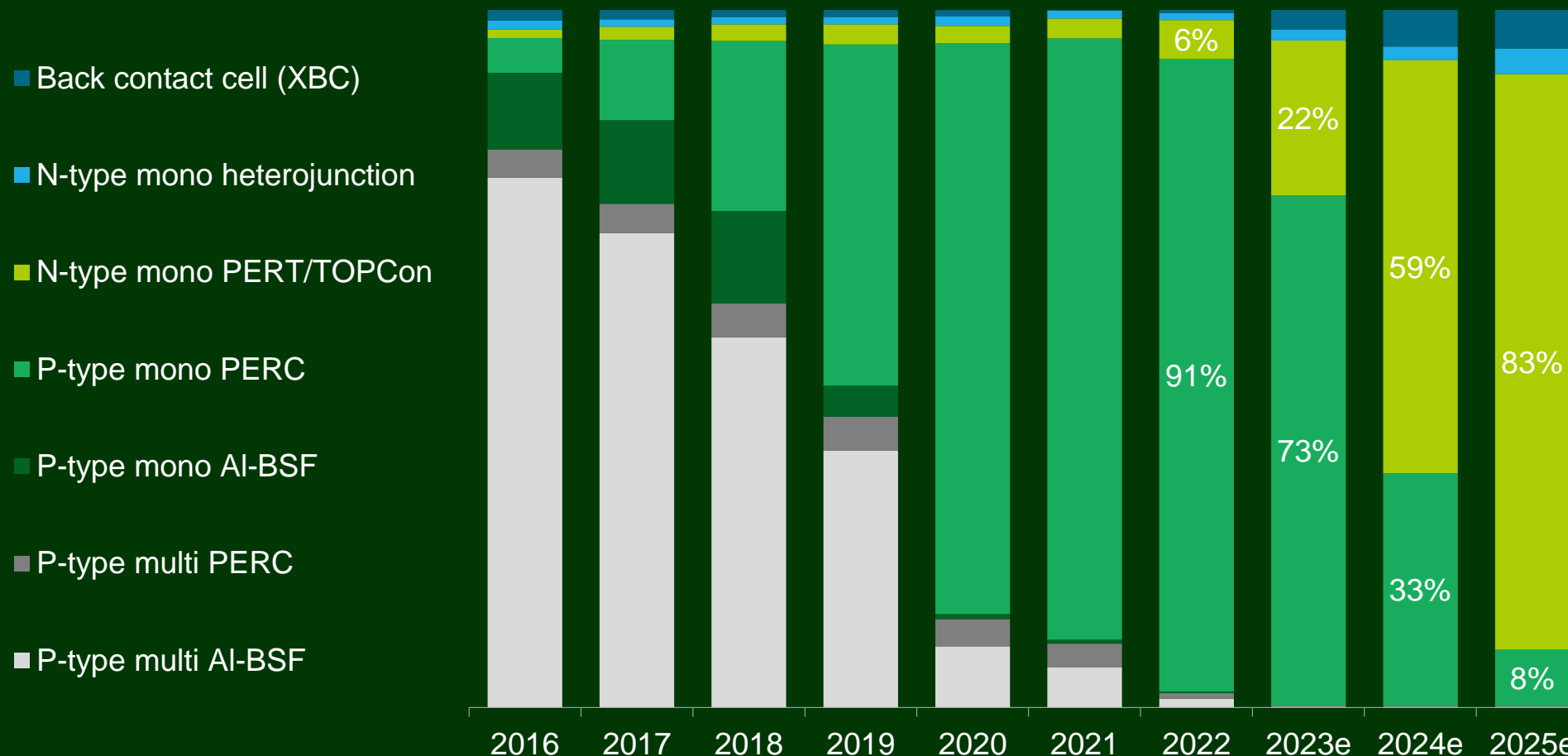
risen
东方日升

Cell Technology Forecast



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Market share of different crystalline silicon solar cells



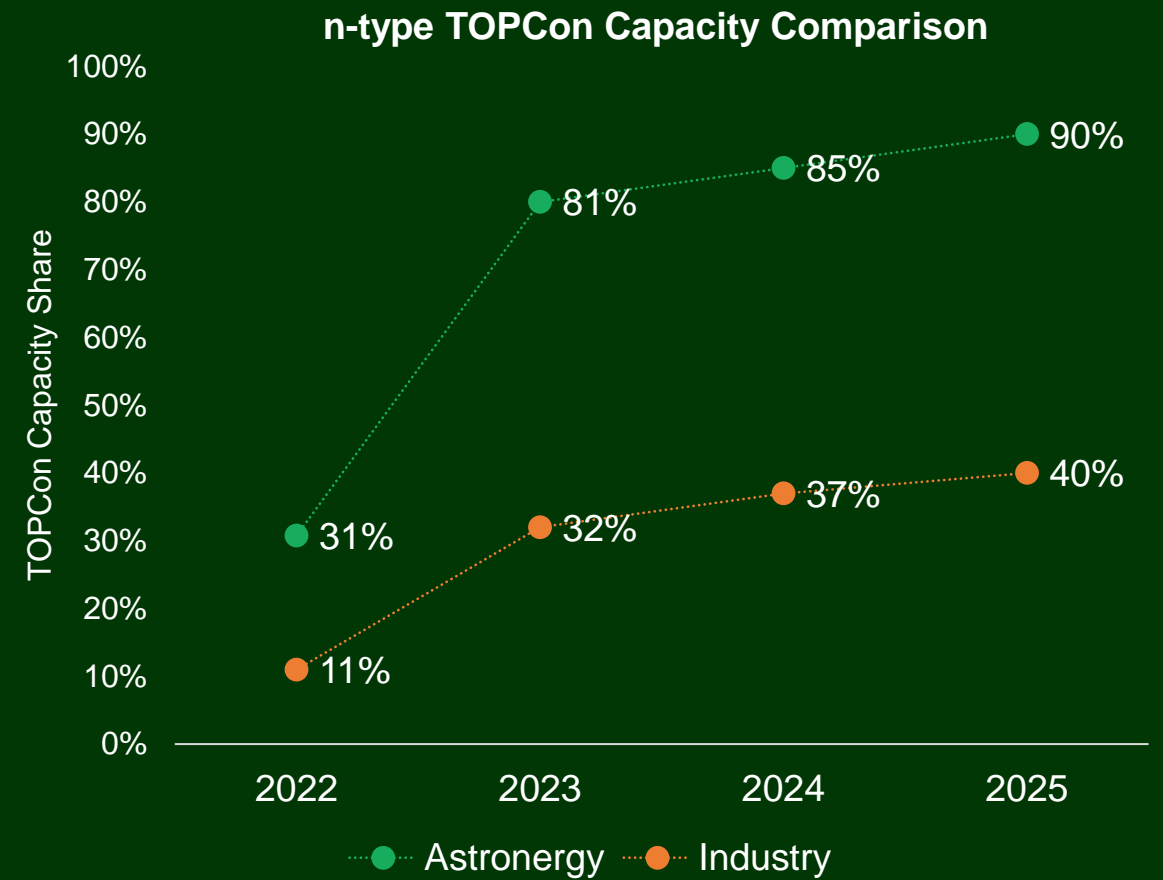
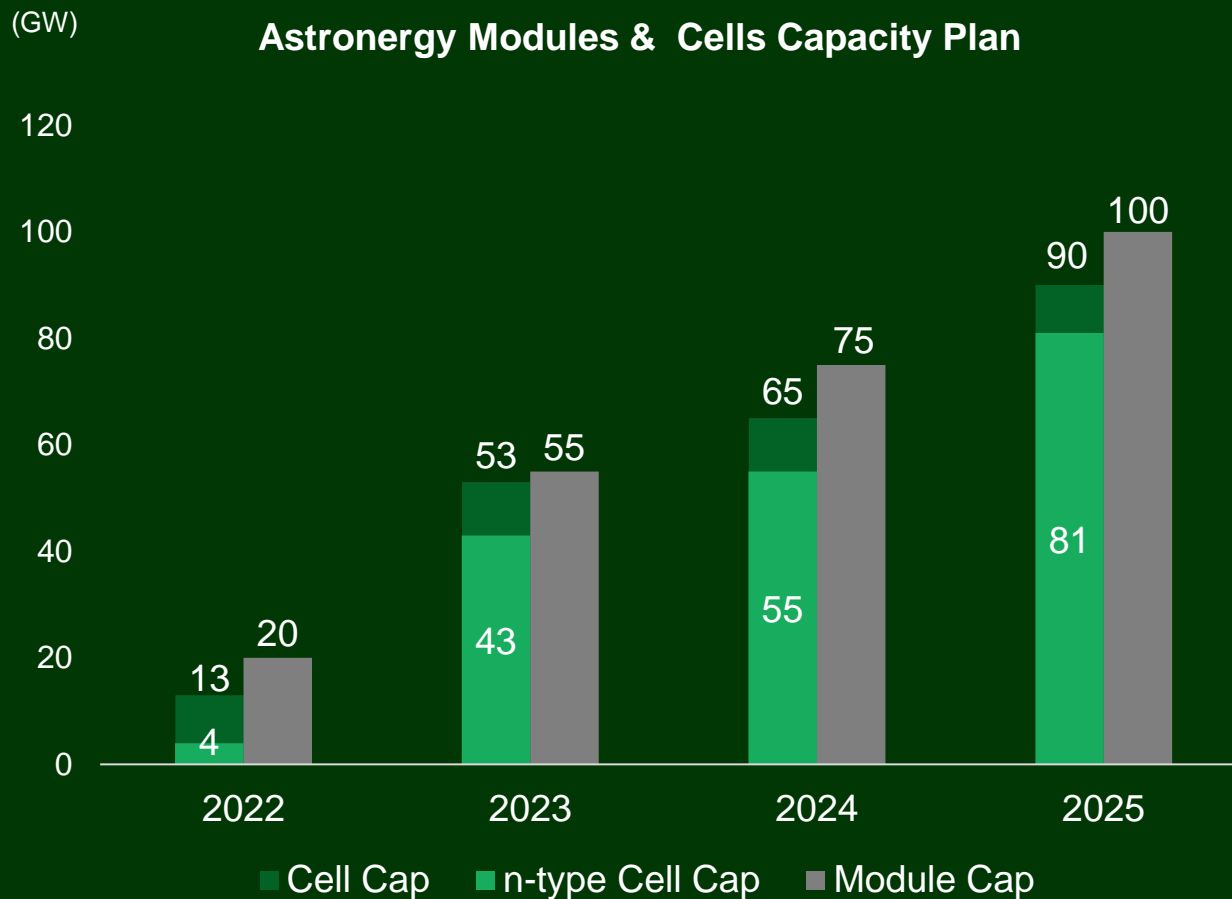
CAPACITY PLANNING



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Astronergy's TOPCon cell production capacity will increase to **55GW** in 2024.

In 2025, the **TOPCon capacity share of Astronergy will be $\geq 90\%$** vs. **industry $\leq 40\%$** .





CONTENT

01 **Our Company**

02 **N-Type Technology**




03 **Our Products**

04 **News**

MODULE PRODUCTS ITERATION & INNOVATION



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<p>4BB Polycrystalline PERC Black Silicon Technology</p>	<p>5BB High Efficiency Monocrystalline 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 Power High Efficiency High Bifaciality Better Low-irradiation Performance Better Temperature Coefficient Low Degradation</p>	
<p>ASTRO 1</p>	<p>ASTRO 2</p>	<p>ASTRO 3</p>	<p>ASTRO 4</p>	<p>ASTRO 5</p>	<p>ASTRO 6</p>	<p>ASTRO N</p>	
<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>545~560W 21.7%</p> 	<p>650~670W 21.6%</p> 	<p>615~640W 22.9% (78-Cell)</p> 	<p>595~620W 22.95% (66-Cell)</p> 

MAIN PRODUCTS



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ASTRO N7



- n-type **TOPCon 4.0** PV cell
- Light redirecting film (for double-glass series)
- SMBB tech
- Higher power
- Higher efficiency
- Higher reliability
- Higher power generation per watt
- Lower BOS & Lower LCOE

ASTRO N7s



- n-type **TOPCon 4.0** PV cell
- RSD device (Optional)
- ZBB-TF tech
- Higher power
- Higher efficiency
- Higher reliability
- Higher power generation per watt

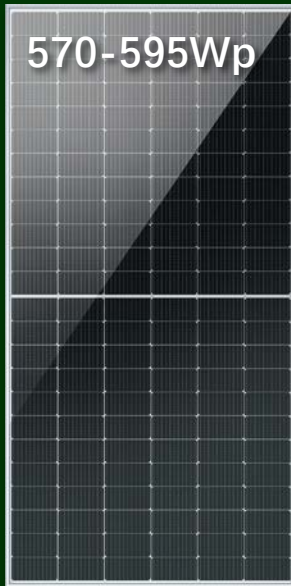


MAIN PRODUCTS

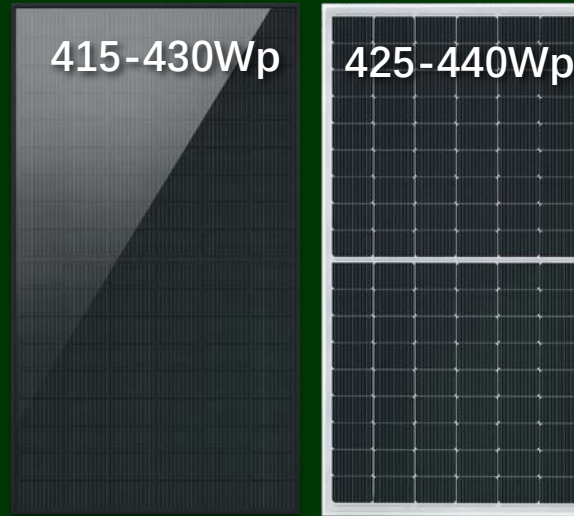


ASTRONERGY

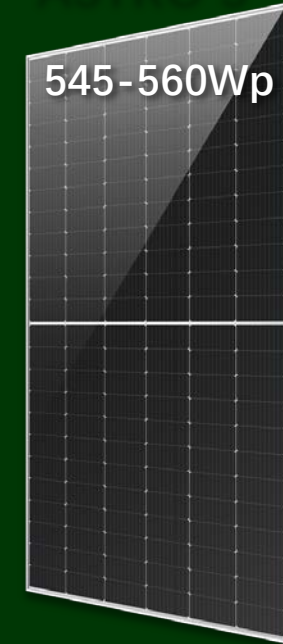
ASTRO N5



ASTRO N5s



ASTRO 5



- n-type **TOPCon** cell

- The series of products could meet various PV application scenarios of utility-scale, C&I distributed utilizations, residential rooftops, etc.

- High-efficiency **PERC+**

- Suitable for utility-scale power stations and distributed power stations



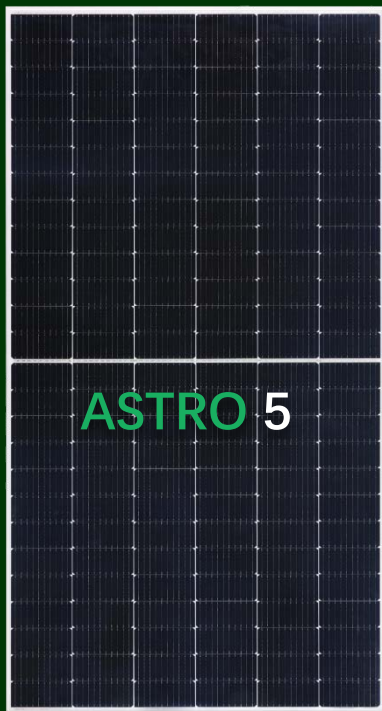
To create a sustainable and net-zero carbon world with solar power

ASTRO N – High Efficiency



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P-TYPE PERC



Outer dimensions (L x W x H):
2278 x 1134 x 35 mm

Cell type: P-type mono-crystalline

POWER RANGE:
545~560Wp

MAX MODULE EFFICIENCY:
21.7%

N-TYPE TOPCON



Outer dimensions (L x W x H):
2278 x 1134 x 30 mm

Cell type: N-type mono-crystalline

POWER RANGE:
570~595Wp

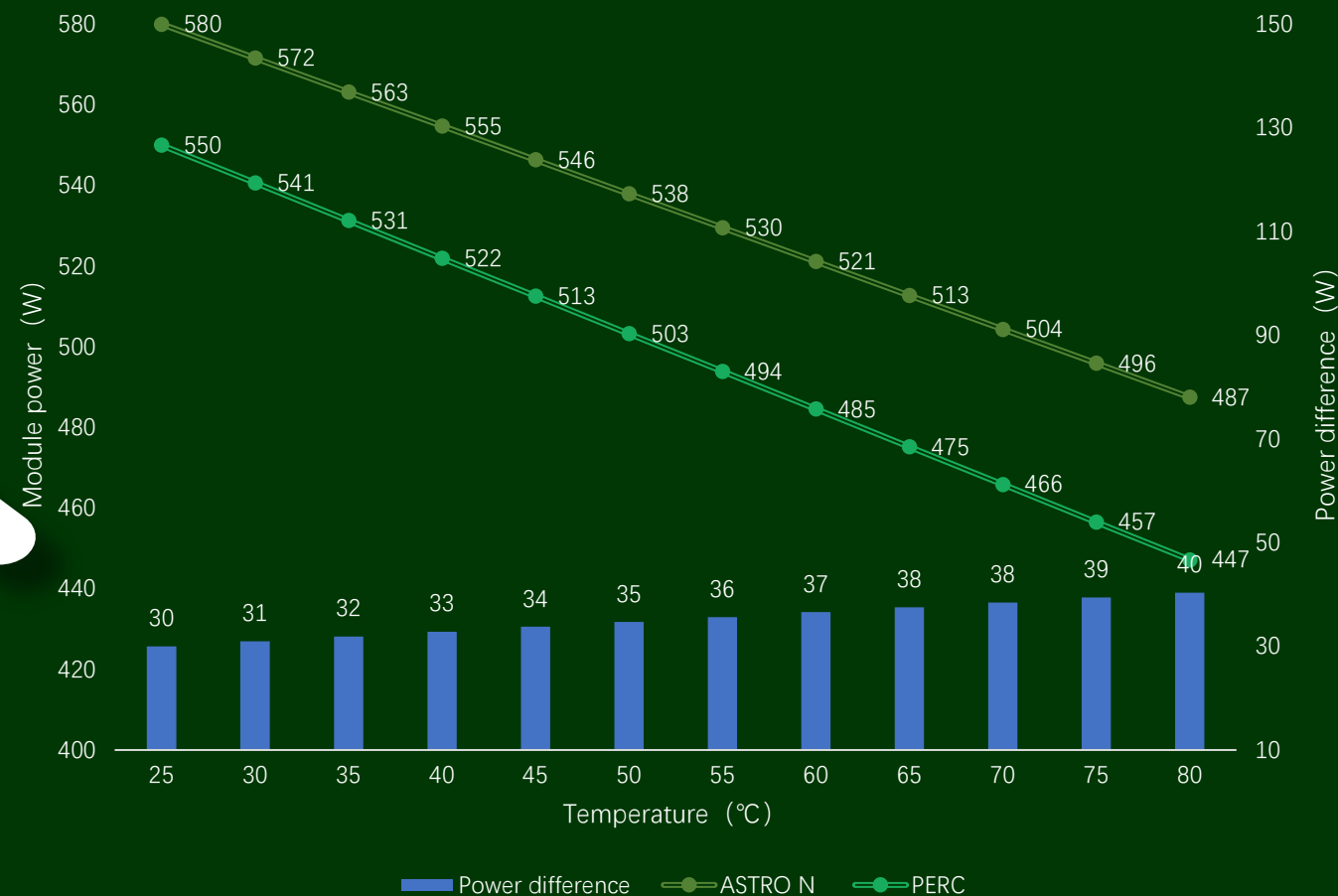
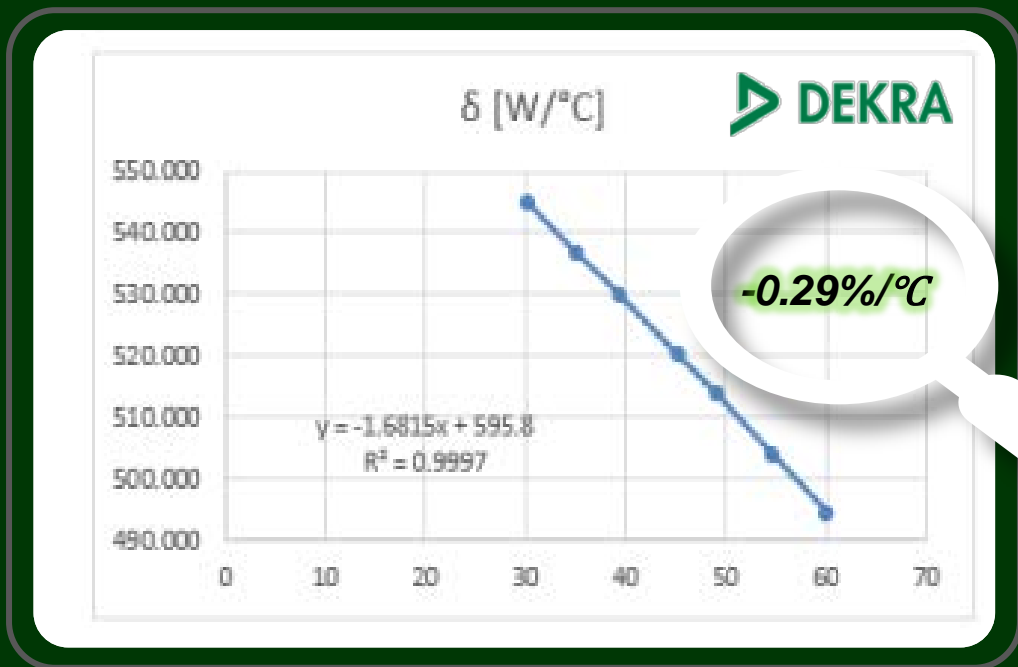
MAX MODULE EFFICIENCY:
23.0%

ASTRO N modules can utilize more front irradiance.

ASTRO N – Better Temp. Coefficient



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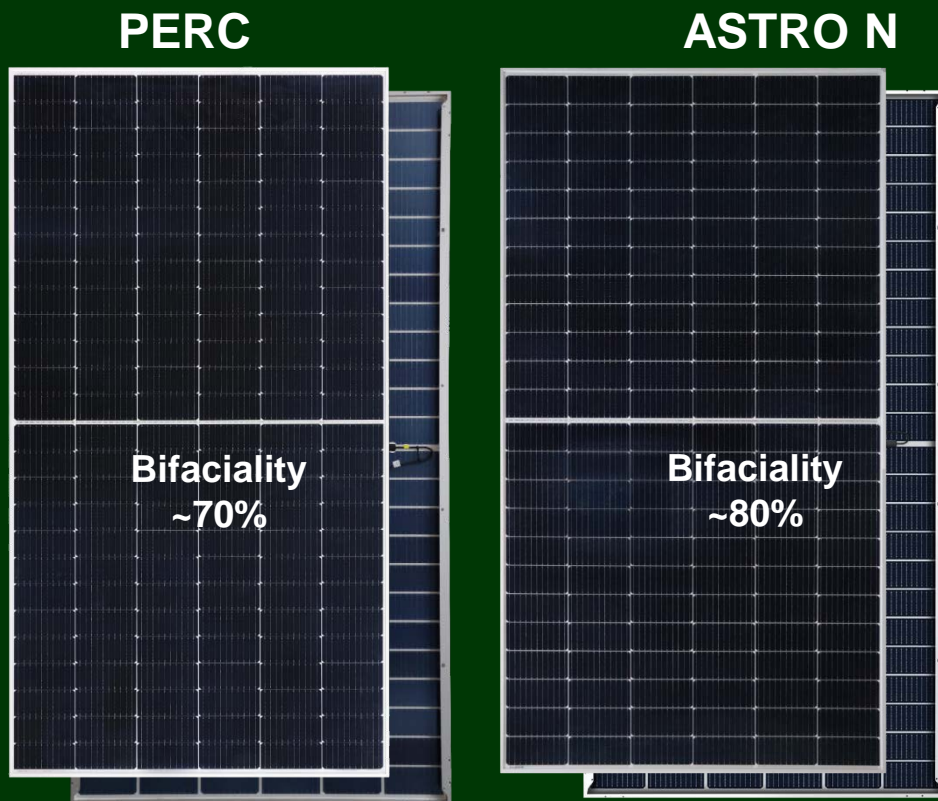


Better temp. coefficient: **-0.29%/°C**, better performance at high temperature

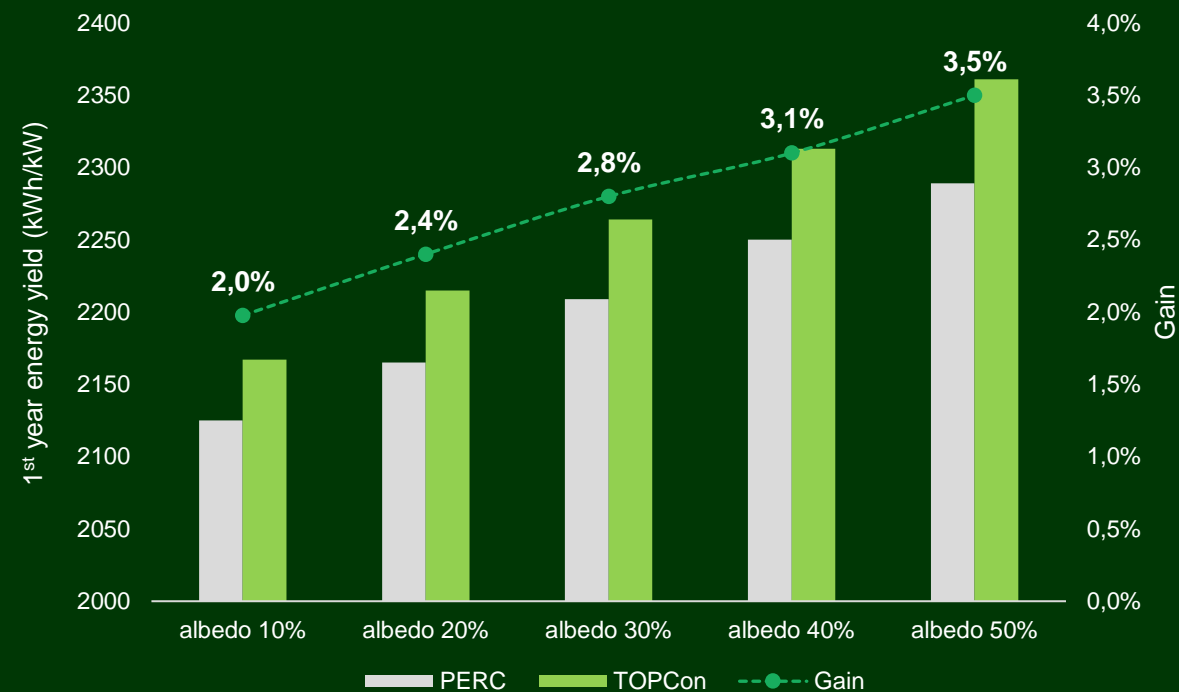
ASTRO N – High Bifaciality



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1st year energy yield at various albedo



Based on PVsyst simulation results at Abu Dhabi

Mounting system: 1P HSAT

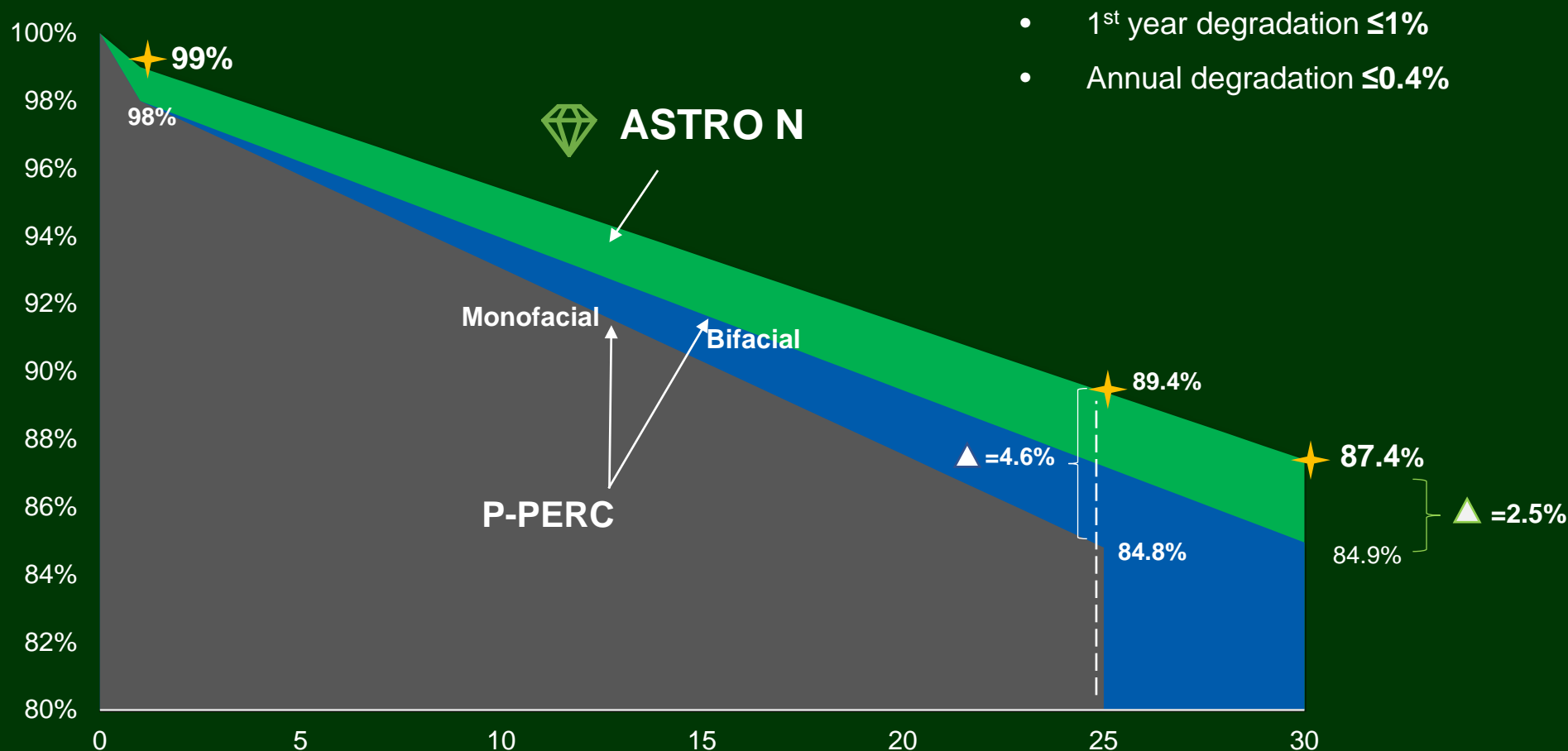
Module height above the ground: 1.5m

ASTRO N modules can utilize more rear irradiance.

Warranty – ASTRO N series



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- 1st year degradation $\leq 1\%$
- Annual degradation $\leq 0.4\%$

30

Power warranty

15/25

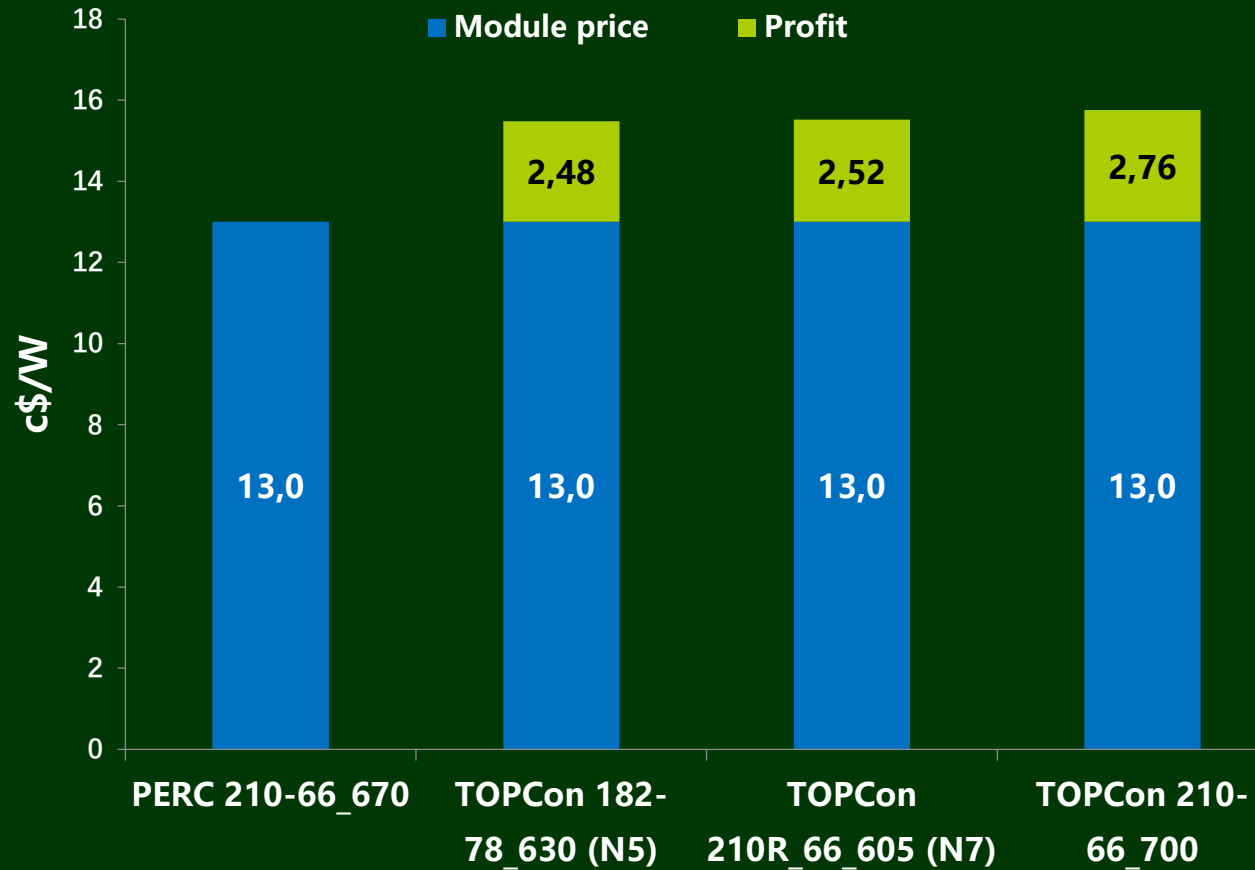
Workmanship warranty

Module price profit comparison



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Module price profit comparison



based on Poland scenario



CONTENT

01	Astronergy
02	N-type technology
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EXTREM NUMBER OF TIER1 COMPANIES DROPPED OF THE LIST



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Number of Tier 1 Companies

23Q3

47

23Q4

46

24Q1

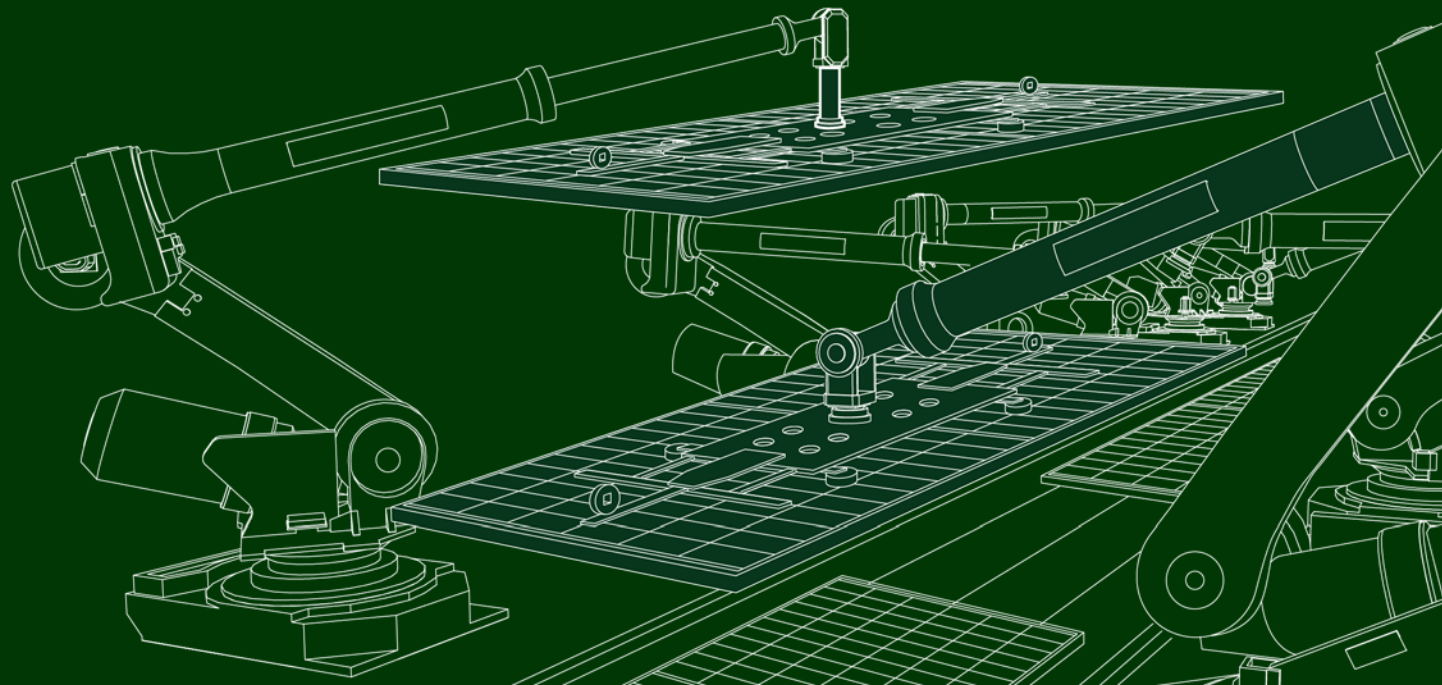
26



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**Thank You for
your attention!**



www.astronergy.com



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