An aerial photograph of a vast solar farm during sunset. The sun is low on the horizon, casting a warm orange glow over the landscape. The solar panels are arranged in neat, parallel rows that stretch across the field. In the background, there are rolling hills and a small town. A large teal geometric shape, consisting of two overlapping triangles, is overlaid on the bottom right corner of the image.

A Global Leading Solar Products and Integrated Solution Provider

PHONO

Innovative Reliable Sustainable



CONTENTS

01

ABOUT US

SINOMACH Group, SUMEC Group,
PHONO

02

WHAT WE DO

World Leading Solar Products and
Integrated Solution Provider

03

WHY PHONO

Innovative, Reliable and Sustainable

04

PROJECT REFERENCE

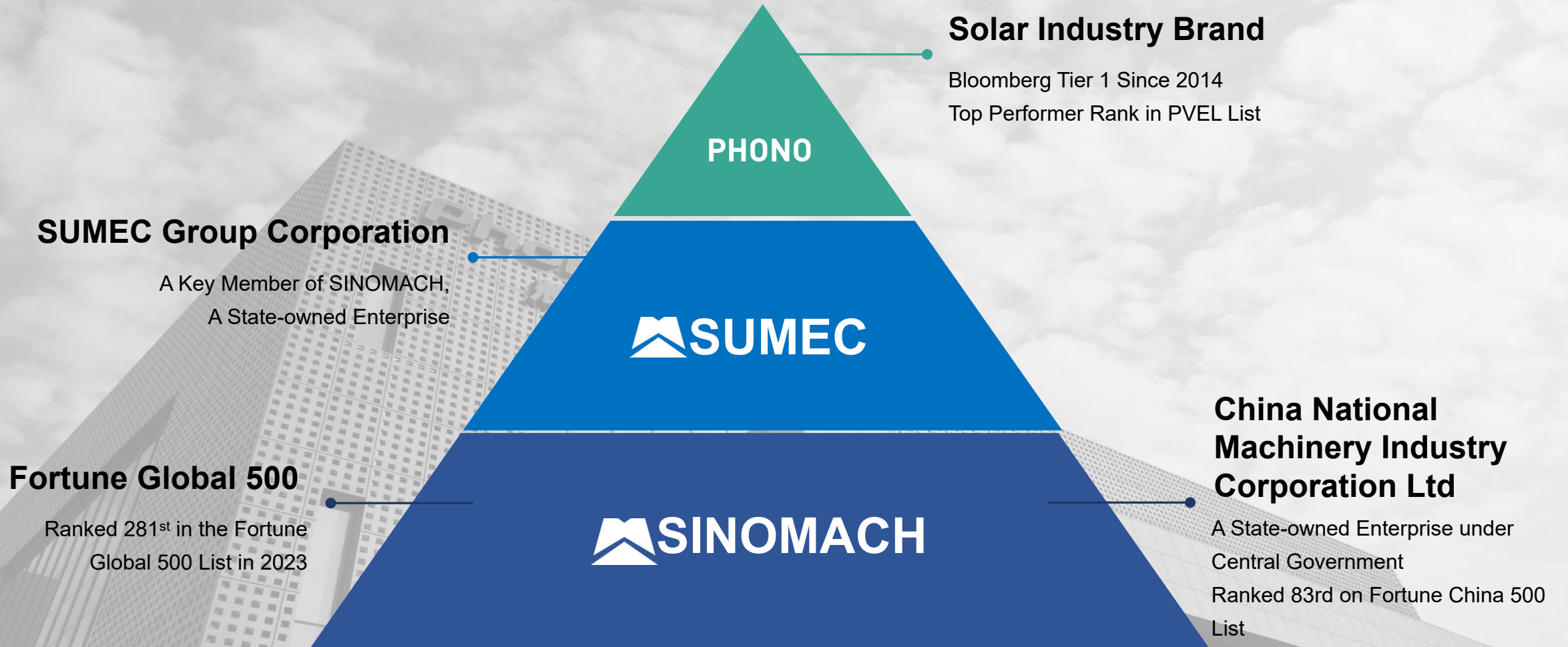
Worldwide Proven Projects Reference Including
Residential, Commercial and Utility

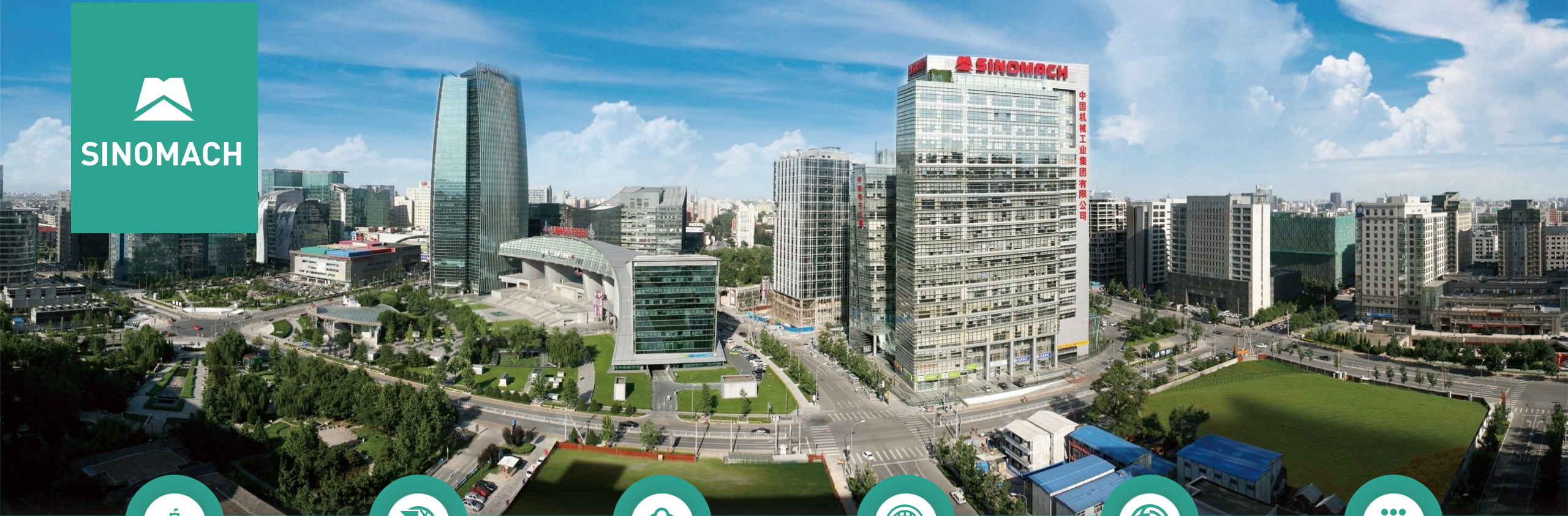
01 ABOUT US

PHONO is a global leading solar products and integrated solution provider. It is affiliated to SUMEC Group which is the subsidiary of SINOMACH Group, one of the Global Fortune Top 500 companies



History & Backing





State-Owned

Backbone Enterprise
Under The Direct Control
of the Central Government

500

Rank No. 326
Fortune Global 500

29+13

29 Wholly
Owned Subsidiaries
13 Listed
Subcompanies

ENR 40

Rank No.40
**Top 250 Largest
International
Contractors**

300+

Overseas Service
Subsidiaries and
Agencies

120000+

Global Employees



1978

Established in 1978,
47 Years History



\$16.3 Billion

Primary Business Revenue
in 2024



No. 97

Rank No.97 on
Fortune China Top 500
Listed Companies



AAA

Credit Rating
Strong capital strength



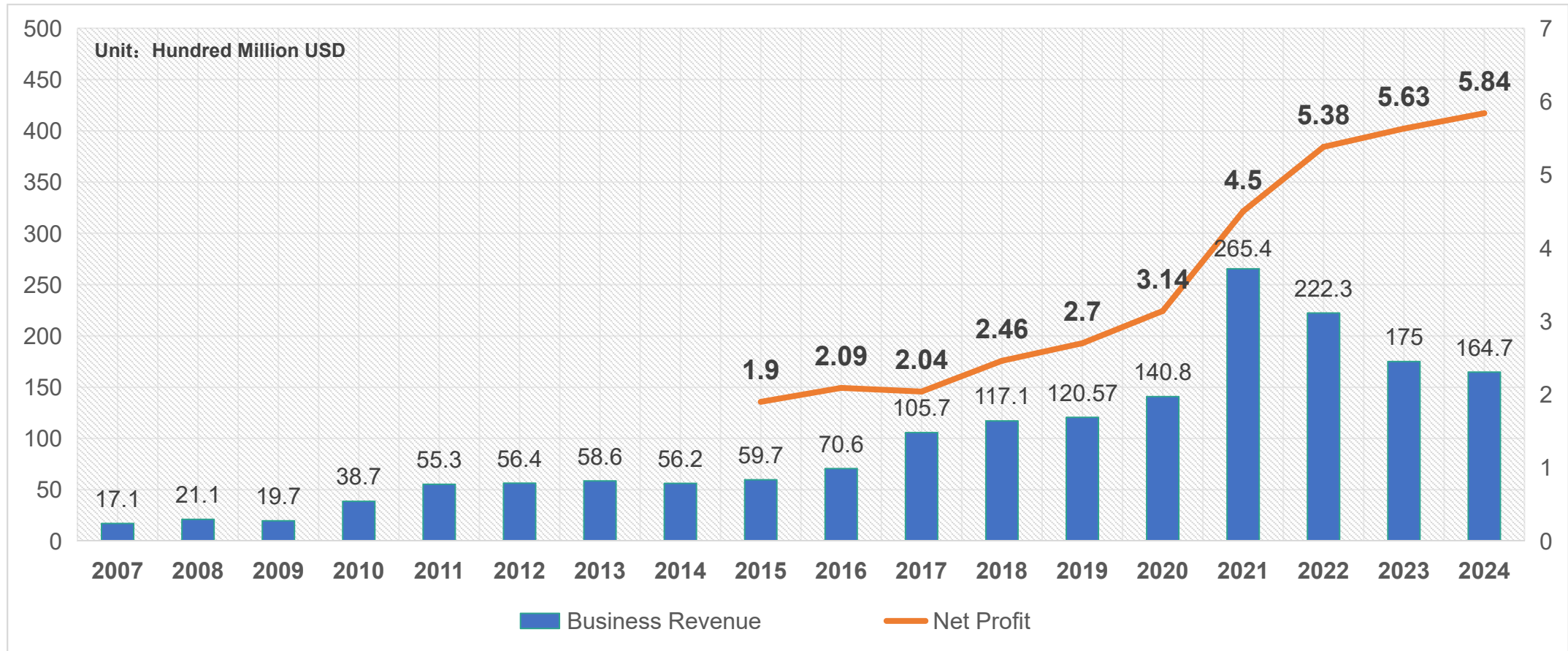
16000+

Over 16000 Global
Employees

Stable Operation

Under the guidance of SINOMACH, SUMEC Group has adhered to the concept of high-quality development, actively response and hard work to achieve steady development. In 2024, the primary business revenue was nearly 16.5 billion USD dollars.

Primary Business Revenue



Diversified Industry

With 47 years of development, the reform and opening-up of China, and the process of global economic integration, SUMEC has 12 subsidiaries, business scope covers power tools, power generating equipment, automobile wheel hub, high-speed rail parts, textile products, energy engineering, shipbuilding, bulk commodity etc.



Power Tool



Power Generation Equipment



Garments



Household Textile



Bulk Commodity



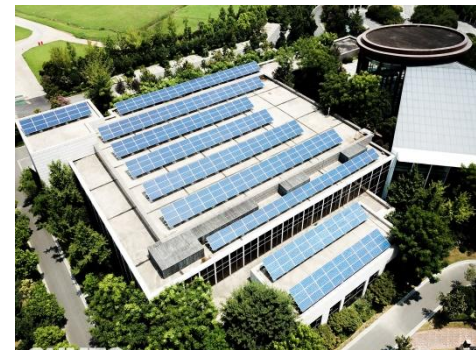
Electronic Equipment Import



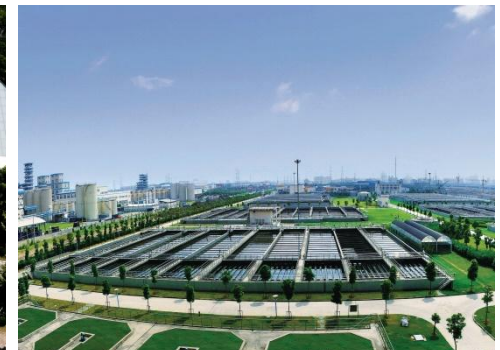
Rail Transit Parts



Maritime Engineering



Clean Energy



Engineering Contracting

PHONO



Innovative

- ❑ Technical Innovation
- ❑ Product Innovation
- ❑ Service Innovation



Reliable

- ❑ Reliable Product
- ❑ Reliable Team
- ❑ Reliable Platform



Sustainable

- ❑ Sustainable Partnership
- ❑ Sustainable Green Development
- ❑ Sustainable Social Impact

PHONO



PHONO is Continuously Ranked as
“TOP PERFORMER”
in DNV-GL PV Module Reliability Test



Best Solar Panel Brands



PHONO

Global Leading Solar Products and Integrated Solution Provider

PHONO is a state-level high-tech enterprise, focusing on research and development, manufacturing of photovoltaic solar modules, which has developed into a leading global solar products and integrated solution provider.



Established



Module Capacity

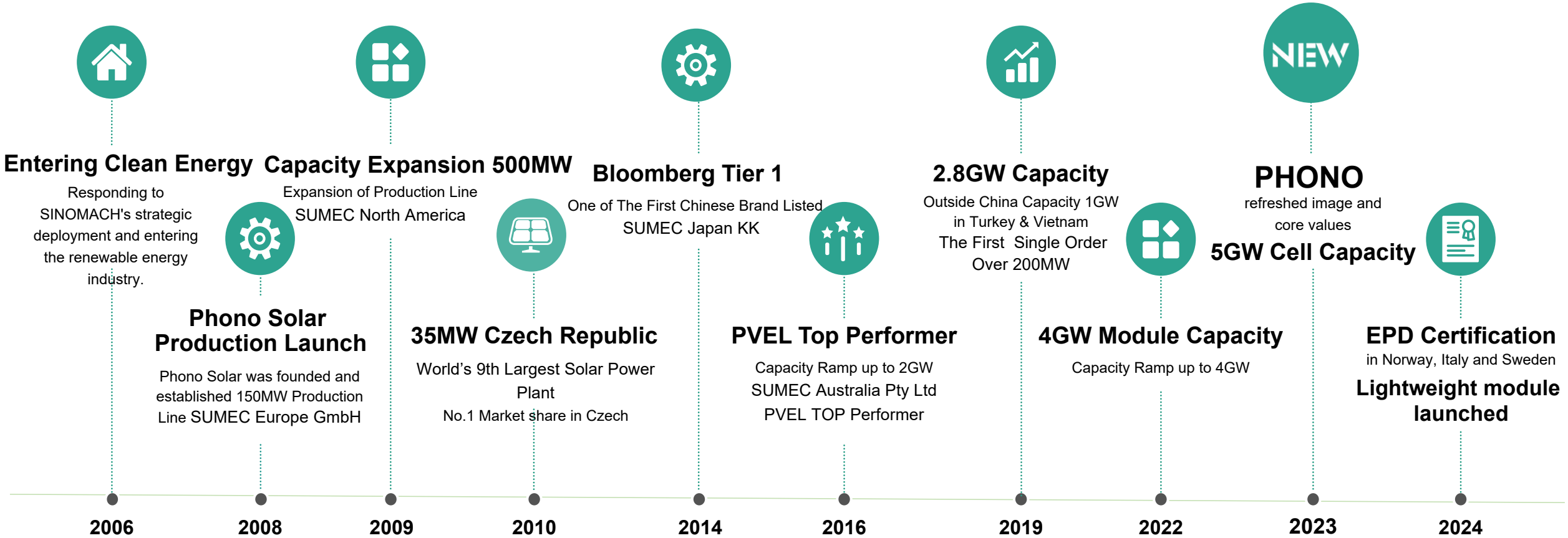


Cell Capacity



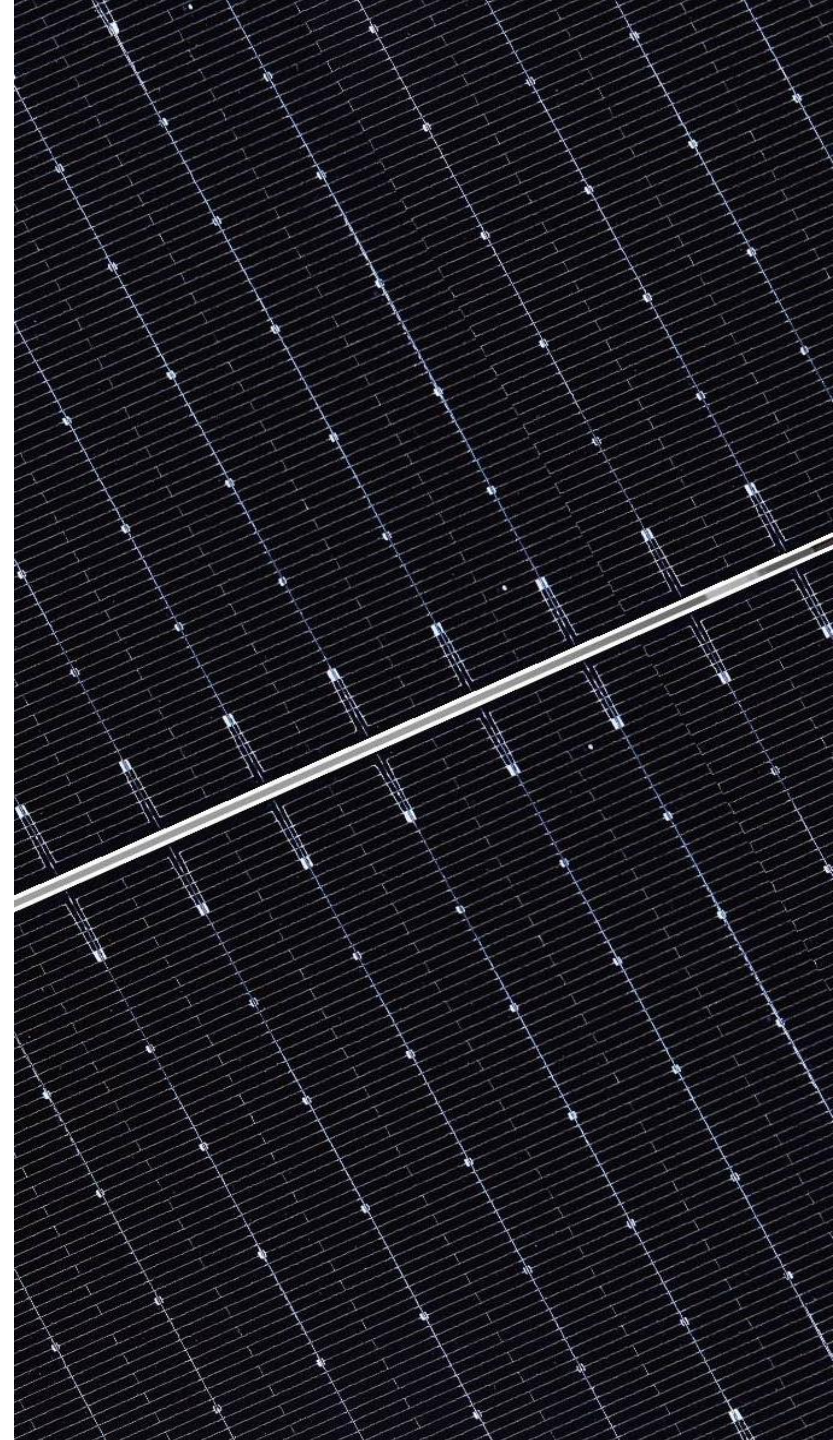
Global Shipment

Milestones

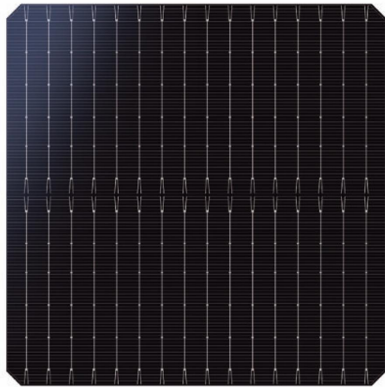


02 WHAT WE DO

As a global leading solar products and integrated solution provider, PHONO provides high efficiency solar products for residential, commercial and utility systems; Solar Factory Turnkey Solution and PV Carport.

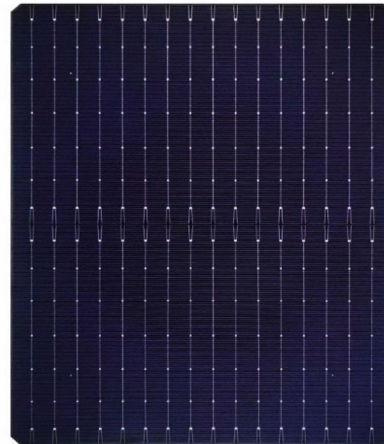


High Efficiency Solar Cells



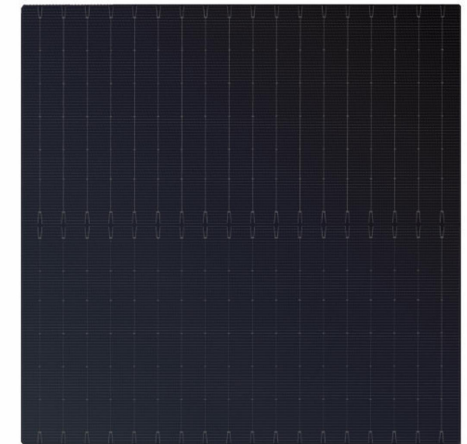
Monocrystalline 16BB-182
TOPCon Bifacial Solar Cell

Dimension: 182*182mm
Cell Thickness: 130 μ m



Monocrystalline 182*X Rectangle
TOPCon Bifacial Solar Cell

Dimension: 182*Xmm
Cell Thickness: 130 μ m



Monocrystalline 18BB-210
TOPCon Bifacial Solar Cell

Dimension: 210*210mm
Cell Thickness: 130 μ m

High-Efficiency Solar Cell

We have

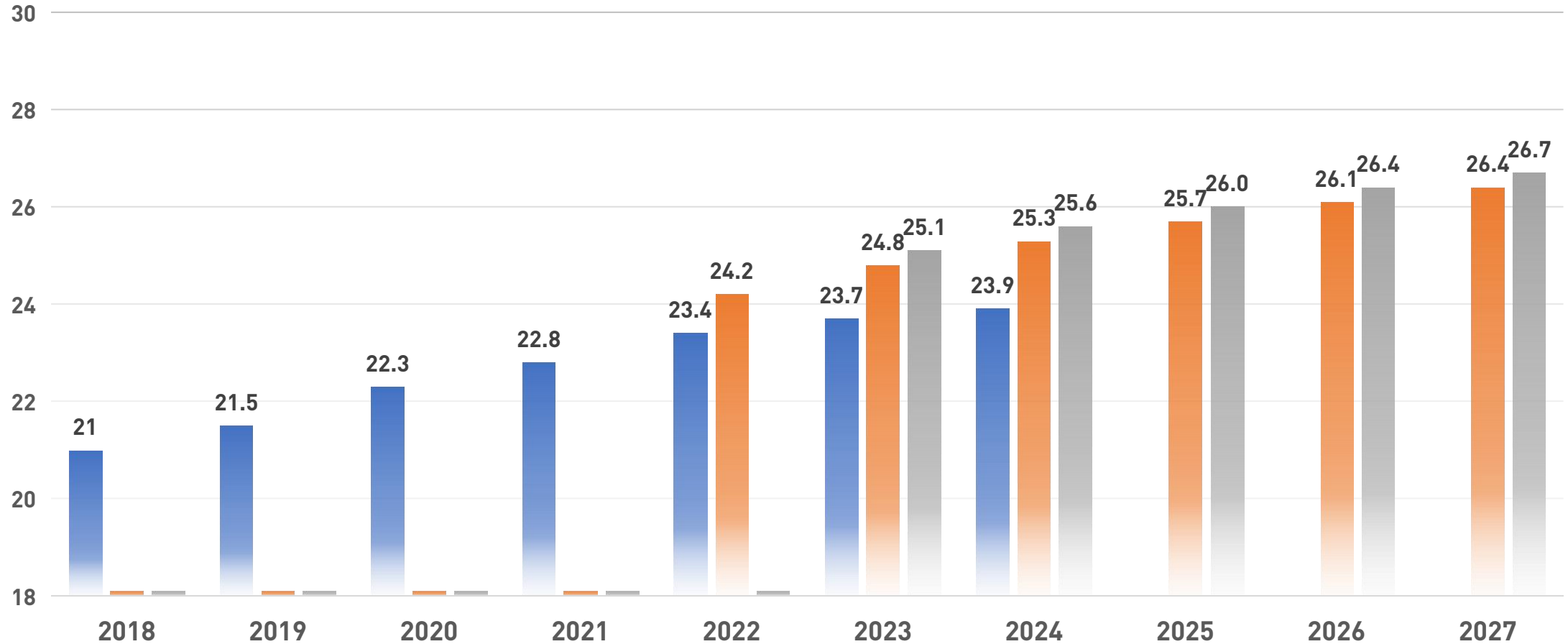
Phase I solar cell manufacturing base, 5GW of high efficiency TOPCon solar cell production capacity in Chuzhou, Anhui Province. The total scale of the project is 10 GW. We dedicate ourselves to R&D and technological innovation to deliver more clean, reliable, high-efficiency, and affordable products to our global partners.



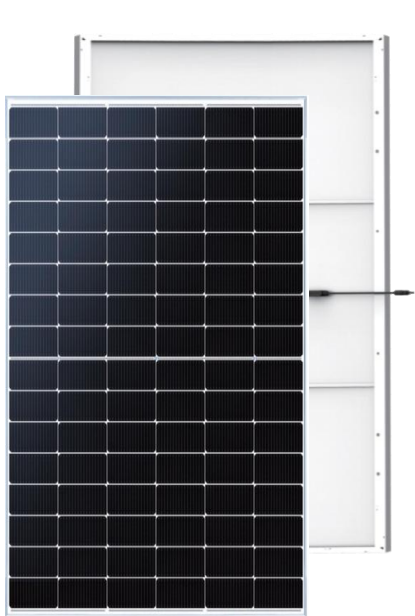
Roadmap of Cell

Efficiency: %

■ PERC p-type ■ TOPCon cells n-type ■ HJT cells n-type

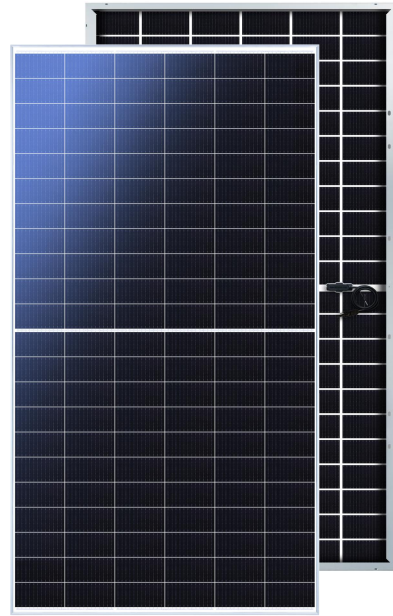


Solar Products



Meteor Series

Lightweight Module



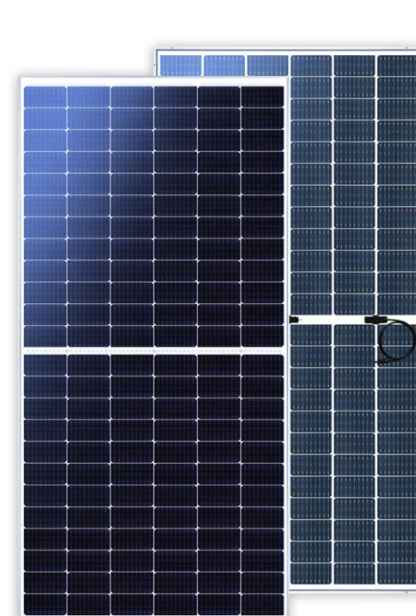
Helios Series

HJT



Draco Series

N-TOPCon



Bifacial TwinPlus Series

Half Cell Mono Perc
Dual Glass Technology

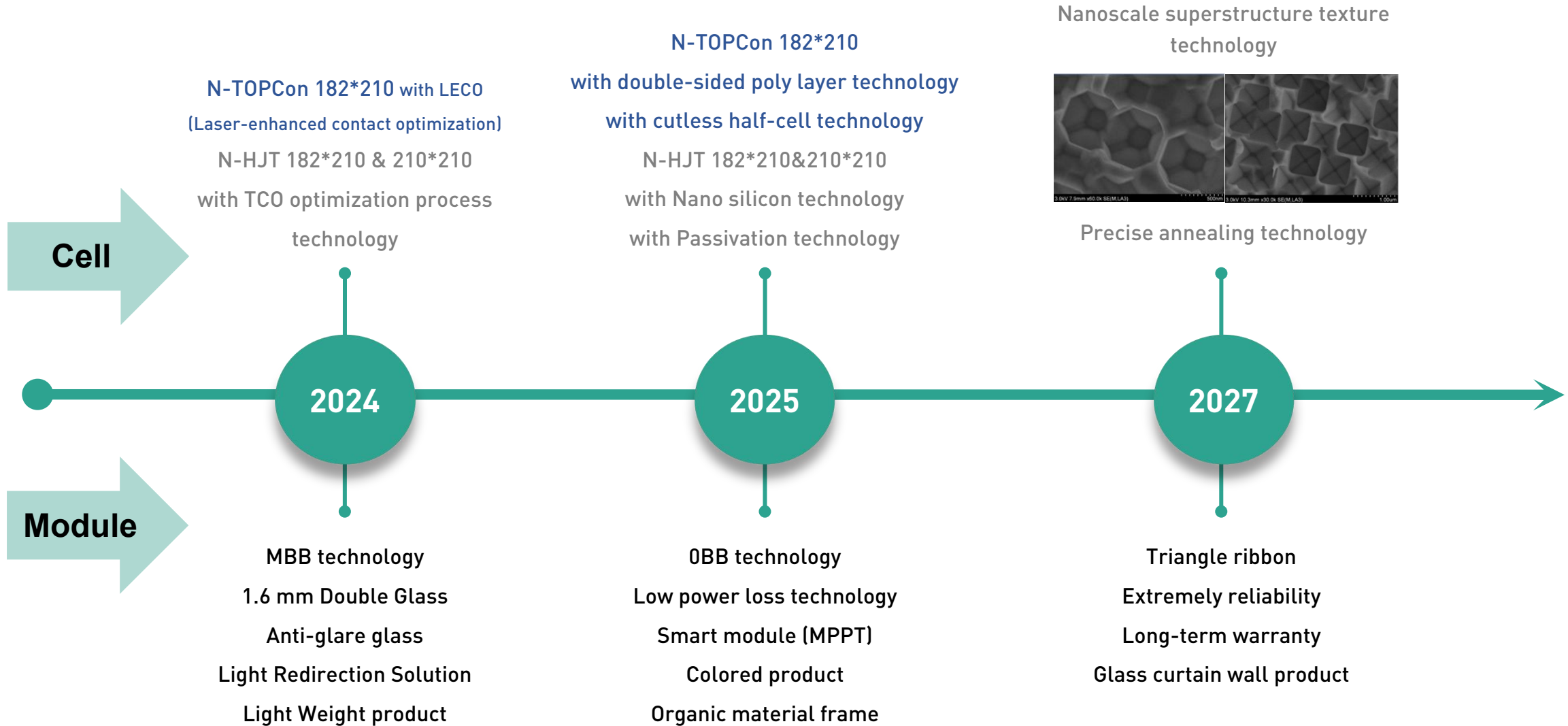


TwinPlus Series

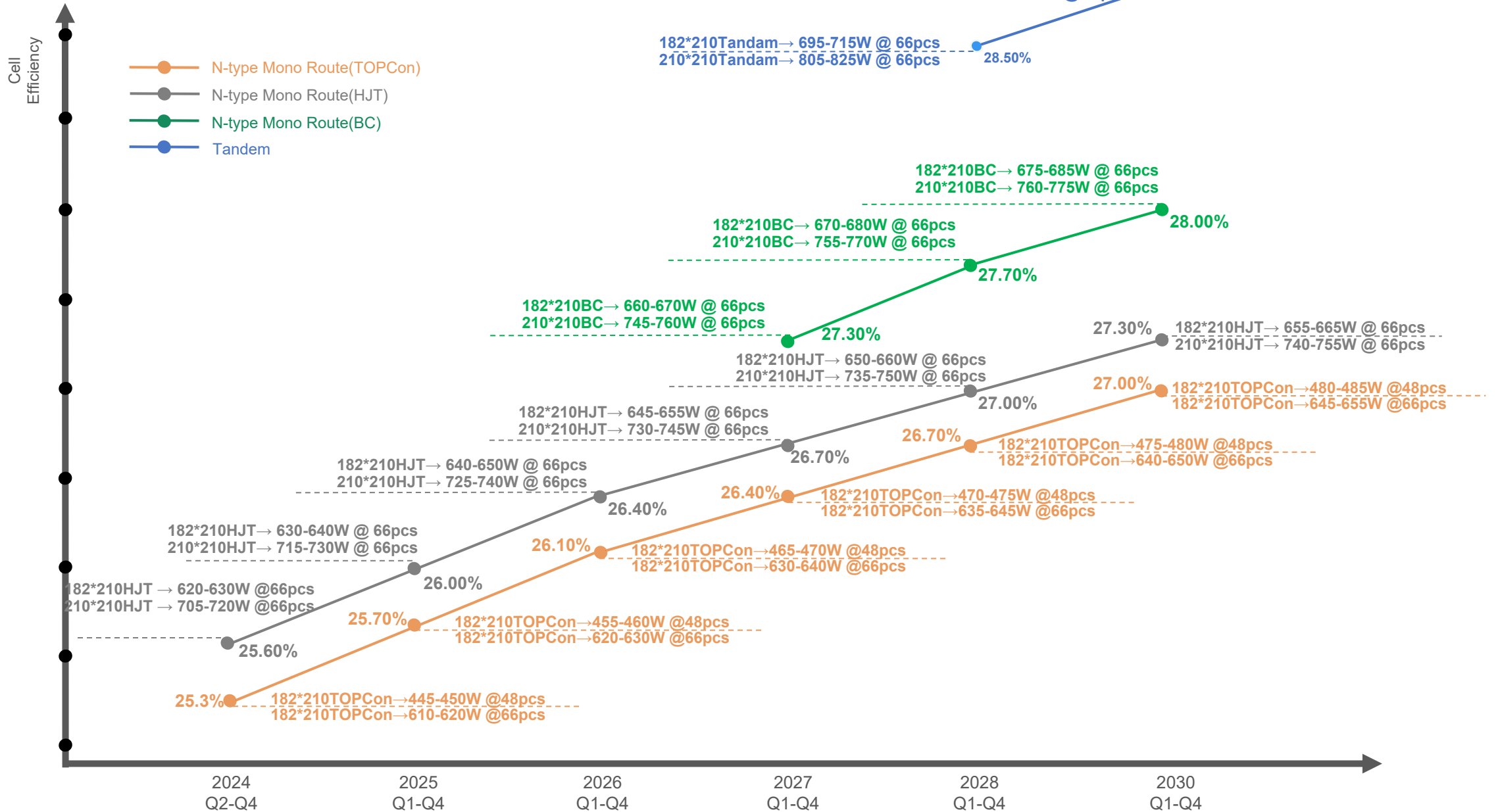
Half Cell Mono Perc

High Efficiency Solar Modules

Roadmap of Technology



Research and Development



Evaluation Carbone Simplifiée (ECS)

Progress Updates

Already obtained ECS Certificates for

- PERC Monofacial (182mm*182mm, 72-cell)
- PSxxxM6H-24/TH (535W - 555W)

Expected to obtain ECS Certificates for

- TOPCon 585W (182mm*182mm, 72-cell)
- TOPCon 630W (182mm*182mm, 78-cell)

Application underway

- TOPCon (210*182mm, rectangular wafer)

TEST - CERTIFICATION PHOTOVOLTAÏQUE

Evaluation Carbone simplifiée

ECS PPE2 N°072-2023_001

Page 1/2

Titulaire du certificat : Phono Solar Technology Co., Ltd. **Site(s) de production module :** Phono Solar Technology Co., Ltd. **Site(s) de production cellules :** Phono Solar Technology Co., Ltd. **Site(s) de production wafers :** Wuxi Zhongshun Applied Materials Co., Ltd.

Phono Solar Technology Co., Ltd. No.1 Xinhua Road, Nanjing hi-tech Zone, Pukou District, Nanjing 210061 Jiangsu province, Chine No.1 Xinhua Road, Nanjing hi-tech Zone, Pukou District, Nanjing 210061 Jiangsu province, Chine Donggong Avenue of Yixing Economic and Technological Development Zone Wuxi, Jiangsu, Chine

Identification du site : 05P1 Identification du site : 04P1 Identification du site : 02Z1

Produits concernés (modules de la production courante) :

Modules Monocristallins : PSxxxM6H-24/TH (535W à 555W) - Monofacial 144 1/2 cellules M10 PERC

Méthodologie :

Cahiers des charges des appels d'offres PPE2 portant sur la réalisation et l'exploitation d'installations de production d'électricité à partir :
 - de l'énergie solaire « Centrales au sol » [CDC modifié du 14/04/2023] : [valable à partir de la 3ème période](#)
 - de l'énergie solaire « Centrales sur bâtiments, serres agricoles, hangars, ombrières et ombrières agricoles de puissance supérieure à 500 kW » [CDC modifié du 14/04/2023] : [valable à partir de la 3ème période](#)
 - d'énergie solaire photovoltaïque, hydroélectrique ou éolienne situées en métropole continentale, "AO Neutre" [CDC modifié du 02/08/2023] : [valable à partir de la 3ème période](#)
 - d'énergies renouvelables en autoconsommation et situées en métropole continentale « AD PPE2 Autoconsommation » [CDC modifié du 13/09/2023] : [valable à partir de la 3ème période](#)
 - de l'énergie solaire et situées dans les zones non interconnectées « AD PPE2 ZNI » [CDC du 22/08/2023]

Arrêté du 6 octobre 2021 (S21) modifié par :
 - l'arrêté du 8 février 2023 fixant les conditions d'achat de l'électricité produite par les installations implantées sur bâtiment, hangar ou ombrière utilisant l'énergie solaire photovoltaïque, d'une puissance crête installée strictement supérieure à 200kWc jusqu'à 500 kilowatts : [valable uniquement pour des installations ayant fait l'objet d'une demande complète de raccordement déposée à compter du 3er avril 2023.](#)
 - l'arrêté du 4 juillet 2023 fixant les conditions d'achat de l'électricité produite par les installations implantées sur bâtiment, hangar ou ombrière utilisant l'énergie solaire photovoltaïque, d'une puissance crête installée inférieure ou égale à 500 kilowatts telles que visées au 3° de l'article D. 314-15 du code de l'énergie et situées en métropole continentale : [valable pour des installations ayant fait l'objet d'une demande complète de raccordement déposée à compter du 3er mai 2023.](#)

Pour les installations dont la demande complète de raccordement est antérieure au 3er mai 2023, ce sont les dispositions de l'arrêté du 6 octobre 2021 dans sa version antérieure qui s'appliquent (méthodologie ECS CRE4).

Inventaire de la composition des modules : [Origine des sites de production](#)

Ref. Modules	PSxxxM6H-24/TH	Ref. Modules	Coefficients répartition / Sites fabrication / Pays fabrication
Technologie	Monocristallins	PSxxxM6H-24/TH	
M10 (µg)	0,01	M10 (µg)	100 % CHINE
Polysilicium (kg)	0,01	Polysilicium	100 % CHINE - CHINE
Lingots (kg)	0,01	Ingots	100 % HONGKONG - CHINE
Préformes (kg)	0,01	Préformes	100 % HONGKONG - CHINE
Préformes (m²)	2,38	Préformes	100 % CHINE - CHINE
Cellules (m²)	1,38	Cellules	100 % NANJING - CHINE
Modules (m²)	2,54	Modules	100 % NANJING - CHINE
Versé (kg)	22,14	Versé et Trempé	100 % ANHUI - CHINE
Trempé (kg)	22,14		
Encapsulant (kg)	1,97	Encapsulant	100 % HONGKONG - CHINE
Face arrière (kg)	1,00	Face arrière	100 % SUZHOU - CHINE

CERTISOLIS TC atteste de l'origine et de la réalité de l'approvisionnement des composants déclarés pour les produits visés ci-dessus et que les données ont été vérifiées au cours d'un audit documentaire.

Page 1/2

CERTISOLIS TC - SAS au capital de 80 000 € - RCS Chambéry : 517 720 470 - N° Siret : 517 720 47000015
 Siège social : Savoie Technolac - BP 364 - 39 allée du Lac de Côte - 73372 LE BOURGET-DU-LAC Cédex
 Filiale du groupe CSTB et du LNE

Environmental Product Declaration



PHONO's high-efficiency module products have achieved EPD-Italy, EPD-Norway and International EPD® System (Environmental Product Declaration) through strict auditing and have been registered in the Norwegian EPD system.

It indicates PHONO has been further recognized by international environmental standards, marking PHONO's new step towards product eco-friendliness, sustainability, and continuous contributions to the global carbon neutrality goal.



CERTIFICATE

Nr. 50 100 17739

This is to certify that

Phono Solar Technology Co., Ltd.

LOCATED IN:

**NO. 1 XINGHUO ROAD, NANJING HI-TECH ZONE,
CN - 210032 NANJING CITY, JIANGSU PROVINCE**

HAS BEEN FOUND TO CONFORM WITH AN APPROPRIATE AND EFFECTIVE MANAGEMENT SYSTEM THAT MEETS THE REQUIREMENTS OF SOCIAL ACCOUNTABILITY MANAGEMENT SYSTEM STANDARD:

SA8000:2014

THE SCOPE OF CERTIFICATION DESCRIBED BY THIS CERTIFICATE RELATES TO THE EMPOWERMENT AND PROTECTION OF ALL PERSONNEL WHO PROVIDE PRODUCTS OR SERVICES FOR THAT ORGANIZATION AT THE ABOVE ADDRESS INCLUDING PERSONNEL EMPLOYED BY THE ORGANIZATION ITSELF (OPTIONAL) - AND THIS SUPPLIERS, SUB-CONTRACTORS, SUB-SUPPLIERS AND HOME WORKERS) FOR THE FOLLOWING ACTIVITIES:

Production, sales and related management activities of crystalline silicon solar modules. The main production processes of the organization included: Soldering, Lay-up, EL Inspection, Lamination, Framing, Junction Box, IV Test and Packing

Social Accountability International and other stakeholders in the SA8000 process only recognize SA8000 certificates issued by qualified CBs granted accreditation by SAAS and do not recognize the validity of SA8000 certificates issued by unaccredited organizations or organizations accredited by any entity other than SAAS. To verify the presence of this certificate please visit www.saai.org/certification



For the Certification Body
TUV Italia S.r.l.

Validity

From: 2024-08-01

To: 2027-07-31

The Audit was Performed and Supervised by:

Sidney Zhang

SA8000 Lead Auditor

Issuing Date

2024-08-01

Francesco Scariata
Francesco Scariata
Business Assurance Managing Director

NOTE: LACK OF FULFILLMENT OF THE CONDITIONS SPECIFIED IN THE APPROPRIATE CERTIFICATION AGREEMENT MAY RENDER THIS CERTIFICATE... THIS CERTIFICATE IS ISSUED BY SAAS ACCREDITED BODY TUV ITALIA S.R.L. (TUV SUD GROUP) VIALE FULVIO TESTI, 280/16 - 20126 MILANO (MI) - IT

PHONO has successfully passed the SA8000 social responsibility management system audit and obtained the **SA8000:2014 Social Responsibility Certification**.

The SA8000 Standard is based on internationally recognized standards of decent work, including the Universal Declaration of Human Rights, ILO conventions, covering the standard elements of child labor, forced labor, health and safety, discrimination, working hours, remuneration, etc.



**Female Employees
constitute 67% of
Total Workforce**



**Social Welfare
Project**



**Employee
Welfare and Care**



**Volunteer
Service**

Meteor 460w

Where Lightness
Meets Brilliance

- Meteoric Efficiency
- Featherlike Grace
- Stellar Performance



Low Bearing Roof



Curved Roof



Moving Vehicle Roof



Other buildings

Lightweight Module Features

- ✓ Aesthetic appearance design
- ✓ Extremely light
- ✓ Easy to install, and no damage to the existing installed roof
- ✓ Products can be customized according to customer installation conditions
- ✓ Extremely low surface light reflection, no light pollution and glare problems

A Sustainable Strategy for a Green Future

- Dual Glass Modules Meet the Requirements of the German Building Permit
- Parking Friendly
- Outstanding Power Generation Returns
- Easy and Safe Installation
- Structural Waterproof

*Green Travel,
Green Living!*



PV Carport All-In-One Solution

PV Modules

+

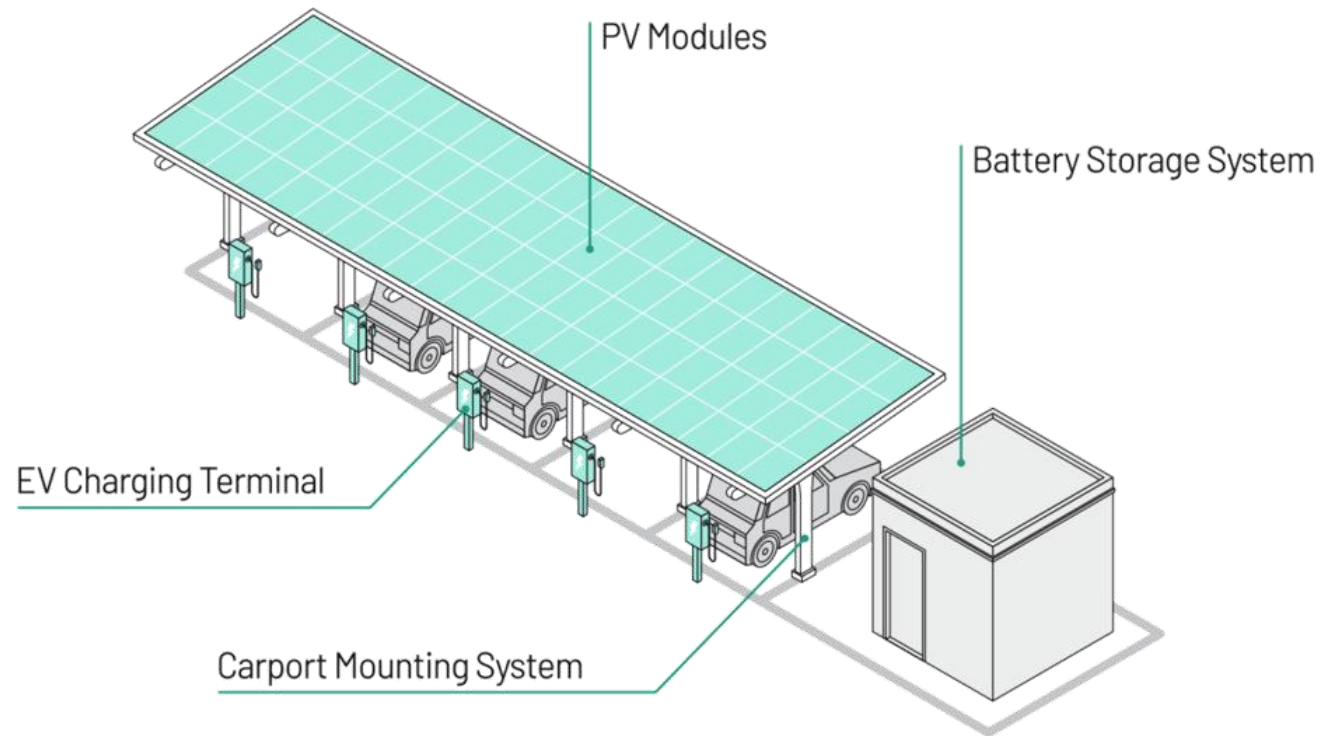
Carport Mounting System

+

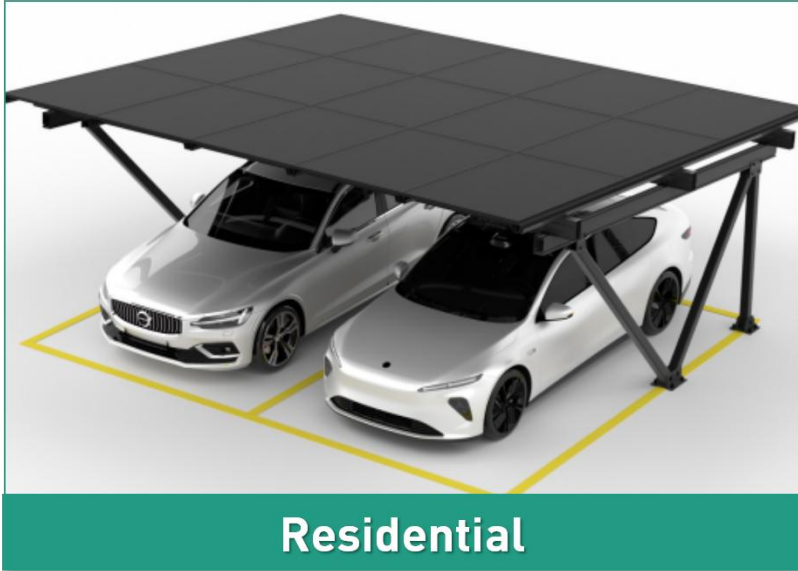
BESS

+

EV Charging



PV Carport Application Scenario



A PV carport not only offers you protection from wind and rain, but also generates electricity from solar modules.

By electricity generation, you can reduce your dependence on rising electricity prices. You can upgrade your PV carport with a battery storage unit and EV charging station to increase the proportion of self-consumption.

PV Carport Module



Suitable for PV carports and distributed power plants



Aesthetic Design



Transport and installation friendly



Extraordinary Power Generation Performance



High Quality Reliability



Specifications of the PV modules

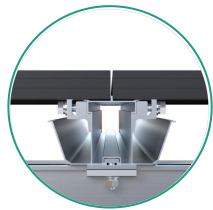
Module Type	PHONO Draco Module Series 435~455Wp
	N Type Monocrystalline
Module Size	1762*1134*30mm
Module Weight	23kg
Glass	2.0mm/2.0mm Heat Strengthened Glass
Frame	Anodized Aluminum Alloy
Cable (including connector)	4mm ² (IEC), (+): 350mm,(-): 250mm or Customized Length
Product Warranty	15 years
Linear Performance Warranty	30 years

PV Carport Mounting System

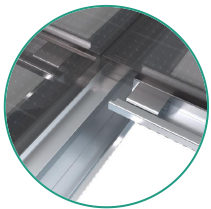
- ✓ Customizable for efficient use of parking
- ✓ Robust construction with durable materials
- ✓ Great weather resistance
- ✓ High level of corrosion protection



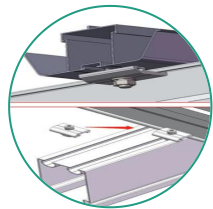
Optimal Space Utilization



Innovative Hook Design



Waterproof



Modular design

Example calculation for 2 cars

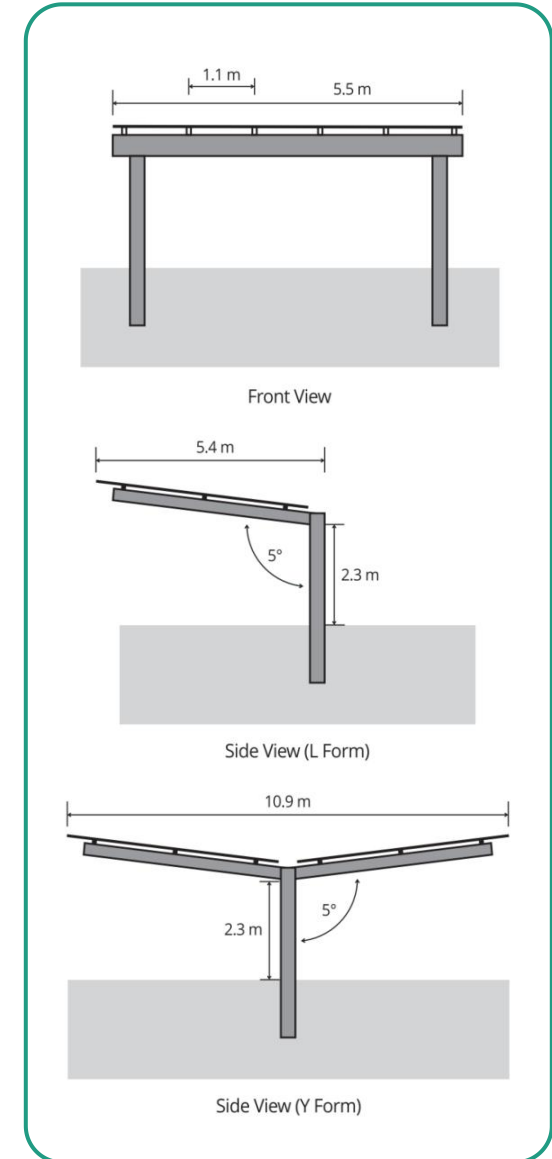
Length*Width	5.5m*5.4m
Total area	29.7m ²
Span	5.3m
Number of PV Modules	15 (3*5)
Installed power	6.7kWp
Drive-through height	2.3m, customizable

*with a module size of 1762*1134mm and a module power of 445Wp

PV Carport Mounting System

Technical Details

Application	Wide-open spaces, commercial and industrial areas, parking lots
Scalability	Modularly expandable with modular segments and extension sets for additional parking spaces
Tilt Angle	5° or Customized
Foundation	Mounted on concrete foundations, Soil expertise is necessary and is the responsibility of the customer
Module Orientation	Horizontal
Warranty	12 years on the durability of the materials
Corrosion Resistance	Class C5
Standard Span	Up to 5.5 m, customizable
Standard	EURCODE 0-9/AS NZS 1170.2/ASCE 7-16/JISC 8955
Certificate	CE



Turnkey Solution

We help overseas clients comply with local incentive policies to build or upgrade overseas local production capacity, **including engineering, finance, technology training, operation management** and it covers the manufacturing plants of **ingot, wafer, cell and module**.

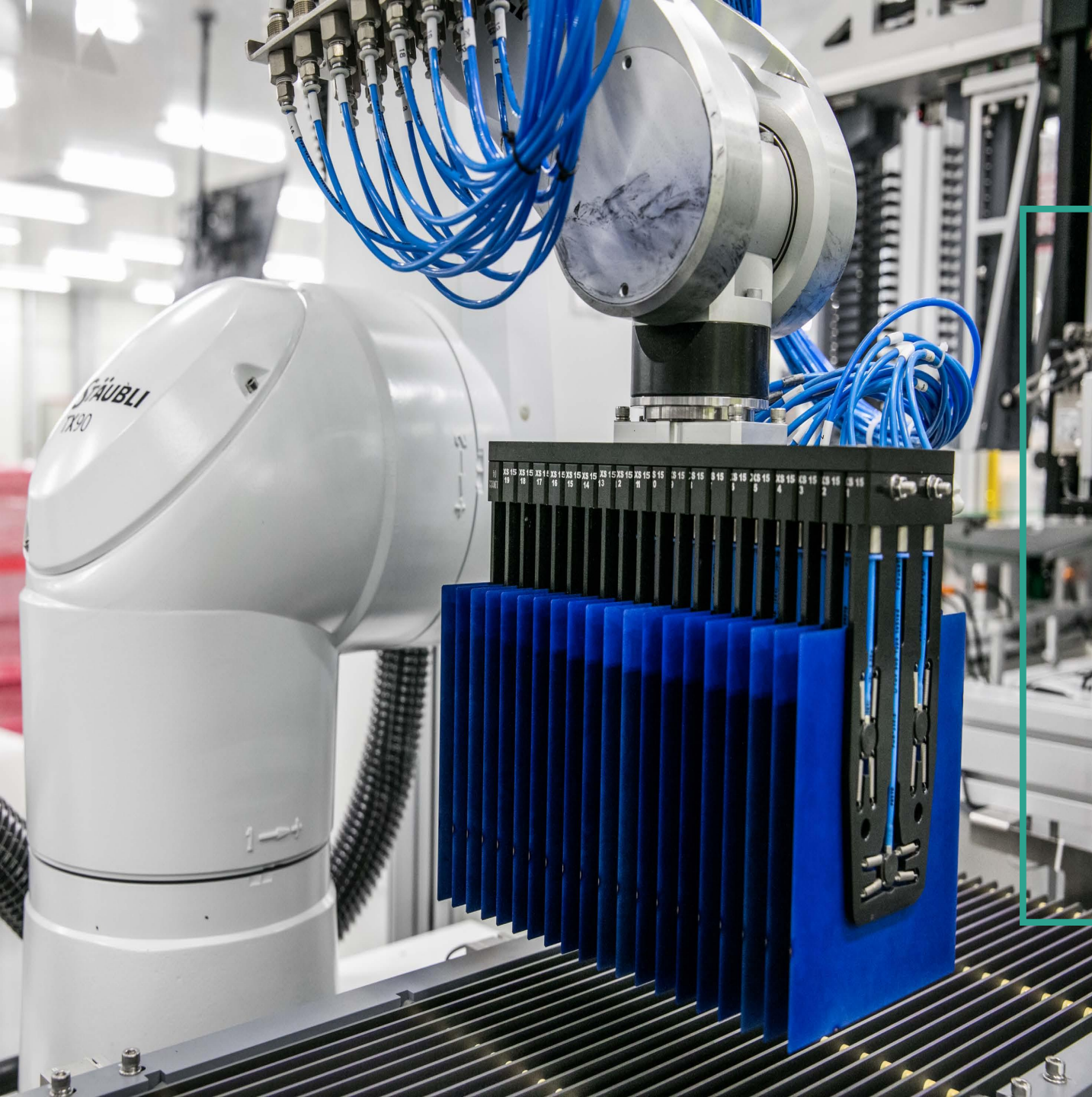


-  Factory Planning and Engineering
-  Process Design
-  Equipment Package Procurement
-  Financing, Financial Scheme
-  Operations Management

03 WHY PHONO

PHONO is a global leading solar products and services provider. It is differentiated across three categories, stable state owned company, reliable high quality products, and sustainability management & development.





PHONO INTELLIGENT MANUFACTURING

Advanced equipment including **Automated Production Lines**, laminating machines, stringers, solar simulators, and **Real-time Interaction System** such as MES “smart workshop” to create a “green and smart” photovoltaic manufacturing group, equipped with the production line with leading manufacturing capability in the industry.





Guaranteed Quality

- 38 steps quality control and inspection process
- Up to 30-year performance warranty



Rigorous Control

- Stringent triple IEC test
- FQC 100% material inspection, 2*100% EL test, OQC delivery inspection



Management System

- Certification of ISO9001 quality system
- ISO14001 environmental management system
- ISO45001 occupational health and safety management system



Qualified R&D Center

- Total **250,000** Sqm full functioned R&D center
- A R&D team of **80** people

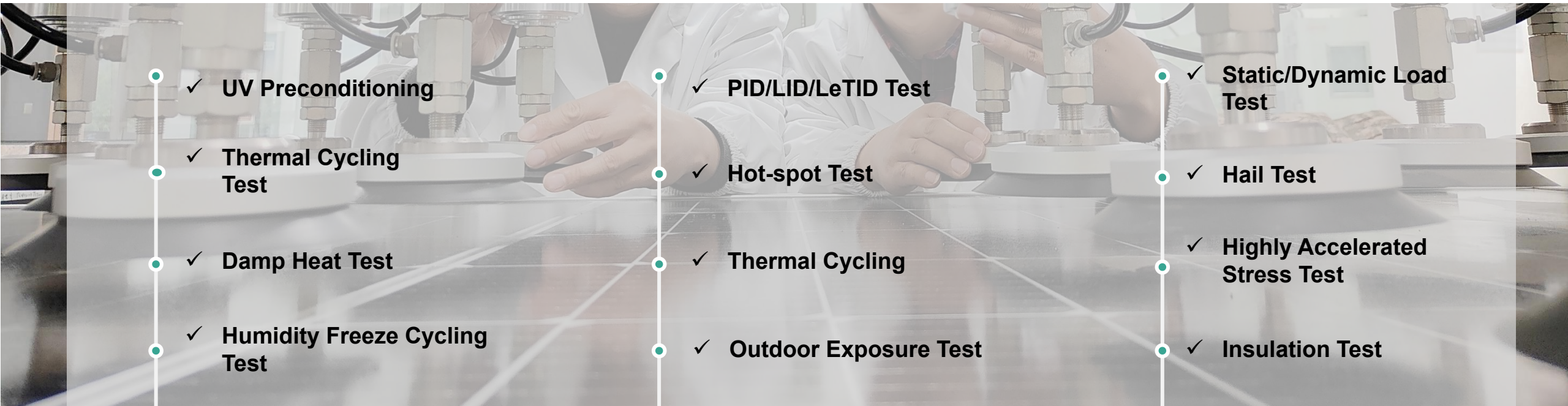
- National and provisional certified R&D institute (CNAS)
- Satellite Lab for Intertek and TUV SUD



Rigorous Testing Ensure High Quality

Up to **38** Different Quality Control and Inspection Process
and **324** inspection items above industry standard

PHONO owns a world leading PV testing center, we put a selection of PV modules through extreme environmental testing to ensure reliability and superior performance.



✓ UV Preconditioning

✓ Thermal Cycling Test

✓ Damp Heat Test

✓ Humidity Freeze Cycling Test

✓ PID/LID/LeTID Test

✓ Hot-spot Test

✓ Thermal Cycling

✓ Outdoor Exposure Test

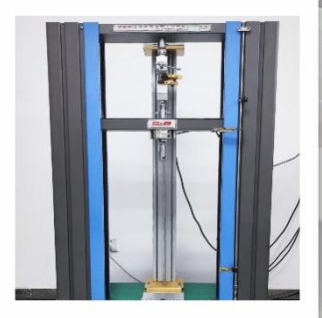
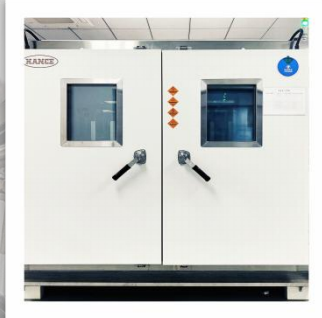
✓ Static/Dynamic Load Test

✓ Hail Test

✓ Highly Accelerated Stress Test

✓ Insulation Test

Equipment of Test Center



NOVTEC UVPLUS2100
UV Preconditioning Test

HANCEHHW2120F
Damp Heat Test

HANCE HRW4120F
Thermal Cycling Test

SUNTECK PWH
Humidity Freeze Test

PASAN Sunsime 3A+
Module I-V test

HANCE HTC630
Thermal Shock Test

HASTES PC-422R8
Highly Accelerated Stress Test

HANCE SNB1500
Stabilization Test

HANCE BB-200F
Hail Test

HANCE HTC630
Static/Dynamic Load Test

S&D WDW-1
Peel strength test

Kipp & Zonen CMP6
Outdoor Exposure
Test

Third-party Recognition



Bloomberg Tier 1

PHONO has been rated as Tier1 PV module manufacturer by Bloomberg New Energy Finance, a world-renowned financial institution since 2014



PVEL "Top Performer"

PHONO was named "Top Performer" by PVEL the world's largest independent energy expert and certification body for many years



EUPD "Top Brand" PV Module

PHONO has been awarded "Top Brand" PV Module by EUPD Research 7 years in a row

Widely Recognized by Third-party Authorities

Strict quality control system and product testing system ensure the quality of each module of PHONO. The products have passed international certifications such as TUV, IEC, UL, etc., which provide professional and reliable guarantee for customers.



04 PROJECT REFERENCE

PHONO consistently provides affordable and stable solar energy to create a sustainable future for our planet.





35 MW
Veprek, Czech Republic



75 MW
Florida

5 MW
Galten, Denmark



6 MW
Trecasali, Italy

8.5 MW
Nauroth, Germany



An aerial photograph of a large-scale solar farm. The solar panels are arranged in neat, parallel rows, creating a grid-like pattern. The farm is situated in a rural area with surrounding agricultural fields in various shades of brown and green. A dirt road or path runs through the middle of the solar array. The overall scene is captured from a high angle, showing the layout and scale of the project.

6.5 MW
Dnipropetrovsk Region, Ukraine

28 MW
Jekins, Georgia, USA



2.2 MW
Hrazdan, Armenia



14 MW
North Carolina, USA



36 MW

Various Sites, Las Turcas, Pitio, Chile



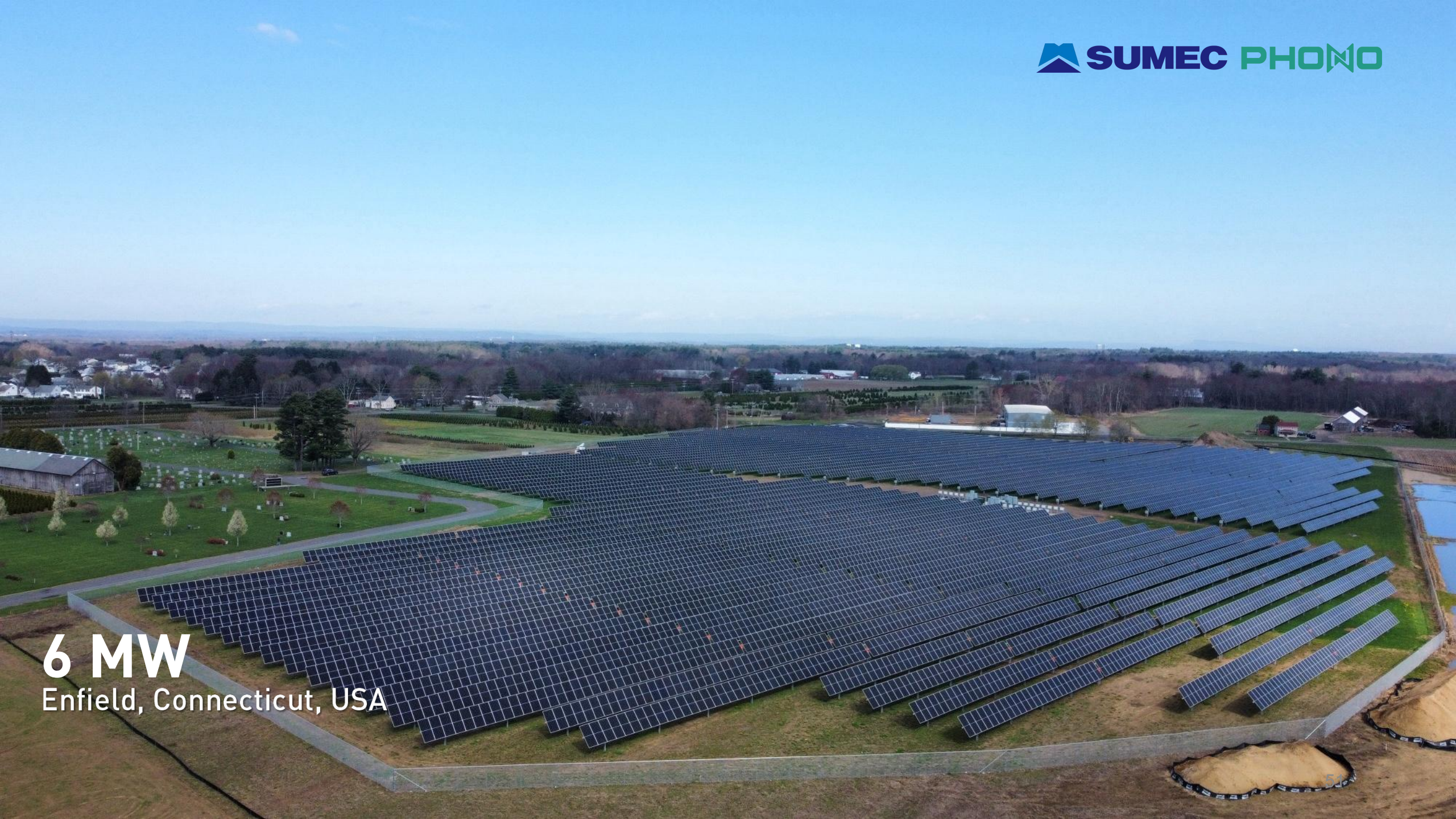


20 MW
Tsukuba, Japan



1.02 MW
Northern Victoria, Australia

6 MW
Enfield, Connecticut, USA





3.8 MW

Northern Victoria, Australia

An aerial photograph of a large-scale solar farm in Perak, Malaysia. The solar panels are arranged in neat, parallel rows across a hilly, forested landscape. A network of dirt roads winds through the site. In the foreground, there are several rectangular ponds, likely for water management or irrigation. The background shows rolling hills and mountains under a cloudy sky.

60 MW
Perak, Malaysia

1.1 MW
Kangwon , Korea



80 MW
Zhejiang, China

50 MW
Jiangsu, China



PHONO

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