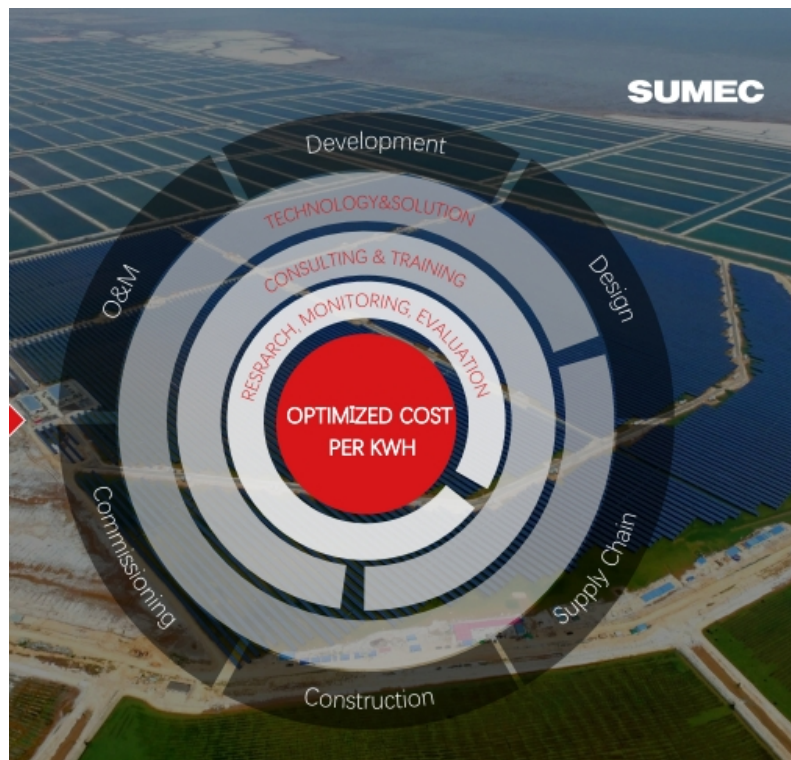




Create sustainable economic, social and ecological values for investors and power users globally.



SUMEC ENERGY HOLDINGS, a leading global provider of clean energy solutions, committed to customer centered solutions for Energy Supply, Energy Management, Energy Saving and Energy Storage.

We're also in order to provide efficient and economically sustainable solutions, uses extensive and innovated supply chain strategies, principles and techniques.

5000 MW Global shipments	2000 MW Domestic projects
5.5 billion kwh/y Generating capacity	6.05 million tons/y Reduction of standard coal



Company Overview

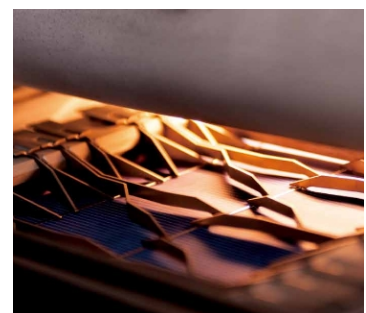
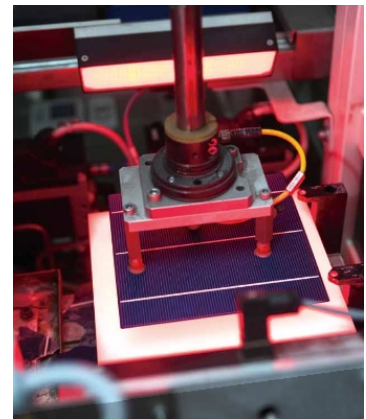
Phono Solar Technology Co., Ltd., was founded by SUMEC Group Corporation, a member of the China National Machinery Industry Corporation (SINOMACH). Phono Solar is a leading brand in the new energy industry, providing high quality new energy products since 2004.

Driven by both innovations in technology and an effective brand strategy, Phono Solar continuously extends the industry chain downstream and has realized moderate horizontal expansion. This has been achieved through cutting-edge applications of technology including on/off-grid systems and smart micro-grid systems and also through the successful implementation of PV power plant investments, construction and operations globally.

The Phono Solar brand has become synonymous with high performing, top quality photovoltaic modules and specializes in PV technology innovation, application and system development. The company is a **KEY COMPONENT SUPPLIER, SYSTEM INTEGRATOR** and **PROJECT DEVELOPER**. Phono Solar's worldwide sales and marketing network and service system effectively provides end-users with accessible clean energy, whilst promoting its core brand values of **STABILITY, RELIABILITY** and **CREATIVITY**.

Leading Manufacturing

Phono Solar focuses on the manufacture of solar modules and selects only the highest quality materials and components. This, together with a world leading automated production line enables us to offer a competitive price for our modules. Our experienced engineers are committed to this round-the-clock operation and ensure each module, from soldering to packaging, flows smoothly along this world-class assembly line.



17% Up to 17% module efficiency

PID A+ class in PI Berlin test

IP68 IP68 connectors enhance the reliability of the PV system

5400Pa Certified to withstand increased loads of up to 5400Pa


25 YEAR 10-year product warranty*
25-year performance warranty*


Outstanding performance in weak-light conditions


Excellent temperature coefficient giving higher yields in the long term

Positive current sorting

Durability assured:

 Salt mist corrosion certification

 Ammonia corrosion certification

 Fire test certification

Rigorous Testing

Phono Solar owns a world leading PV testing centre, qualified by several international certification authorities. A broad range of equipment is used to conduct quality-control tests, product certifications, material reliability checks, and in-depth research. Up to 35 different tests can be run uninterrupted 24 hours a day, to higher standards than both IEC and UL. A 100% testing ratio for visual inspection, EL testing, pressure testing, mechanical load testing and age testing ensures that Phono Solar modules operate safely and smoothly for at least 25 years, therefore guaranteeing a strong and stable return on investment for investors.

• Environmental Reliability Testing

We put a selection of PV modules through extreme environmental testing to ensure reliability and superior performance in even the world's most unforgiving conditions.

- UV Preconditioning
- Surface Impact
- Corrosive Atmospheres
- Hotspot Endurance
- Insulation (wet and dry)
- Thermal Cycling
- Wet Leakage
- Damp Heat
- Mechanical Load
- Highly Accelerated Stress
- Humidity Freeze
- Outdoor Exposure



Insured Warranty

We provide customers with a 25-year warranty and liability insurance from a world-renowned insurance company to ensure your PV investment is secure.

- 25-year Warranty
- Public Liability and Products Liability Insurance
- Manufactures Errors & Omissions Insurance



GREENESCO Ομήρου 8, 10564 Αθήνα
T. 2103677744, 2111077744
info@greenesco.gr

www.greenesco.gr

SUMEC

Top Class Materials

Ultra Clear AR Coating Tempered PV Glass

Higher Transmittance

Higher Than Common Glass **12%**

Lower Reflection

Lower Than Common Glass **30%**

High Efficiency PV Cells

Higher Efficiency

up to **22.00%**



Impact Resisted



Pressure Resisted



Sand Resisted



Self-Cleaning

EVA

Higher Transmittance **>91%**

Longer Durability

No Delamination
Yellowing

Connector & Junction box

Durability

innovative full-glue-filled junction box

Outstanding sealability

IP68

waterproofness

4mm²

qualified cable

500N

tensile strength

Top Brands

top-level accessories

Frame

Durability



120N

Serrated-clip
design
tensile strength



110%

Seal-lip design
glue injection

User-friendly



16

drain holes
drain away water
effectively



○ ●

black/silver
optional

Back Sheet

Super Isolation

multilayer structure, against 21kV Hi-Voltage breakdown test

extremely low water absorption & permeability

guarantee its perfect performance in damp circumstance

Better Durability

withstand fire/dust/UV/tear tests

ensure its long durability in practical application scenarios

Excellent Performance

UV EXPOSURE TEST

Temperature 60°C	UV Irradiance 90KWh/m²
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6 Times Higher Than IEC Standard

The high-intensity ultraviolet radiation in sunlight will destroy the molecular chains of organic compounds in the module material and reduce the light transmission together with its mechanical properties, resulting in lower module efficiency and power generation

Our modules have superior UV resistance, which can prevent yellowing and delamination caused by ultraviolet light

HUMIDITY-FREEZE TEST

Temperature 85°C	Humidity 85%	Soak 21hrs	Frozen -40°C	Cycles 30
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3 Times Higher Than IEC Standard

Being exposed outdoor in rain and snow during winter is a enormous challenge for modules. Moisture will penetrate into the pores on the glass surface, which will corrode the modules

Good moisture and freezing resistant modules can survive and operate longer

PID Test

Temperature 85°C	Humidity 85%	Bias 600hrs	Period -1000V
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DAMP HEAT TEST

Temperature 85°C	Humidity 85%	Period 3000hrs
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3 Times Higher Than IEC Standard

Working in hot and humid environment for long time, modules and its components such as EVA and back sheet, are subjected to high temperatures moisture erosion

Good heat-resistant modules can generate more power and maintain its high effectiveness in the tropical and rainy region, while ensuring safety as well

THERMAL CYCLING TEST

Temperature -40~90°C	Cycles 800
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4 Times Higher Than IEC Standard

Thermal Cycles Test ensures the modules and its components can withstand the outdoor-exposure for more than 20 years of seasons changing

DNV·GL



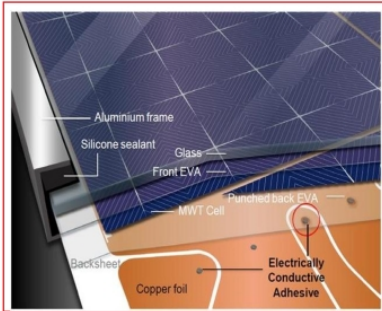
● IEC standard ● DNV-Gl

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SUMEC

Technology



MWT technology

- No bus-bar on the cells
- Enlarge module's light absorption area
- Improve module's efficiency

MWT

MWT (Metal-Wrap-Through) technology allows both positive and negative electrodes distributed on the rear side of solar cells. Unique cell structure and special module packaging process allow MWT module has lower power degradation and operating temperature.

Project using MWT module can generate **3% more**, based on the same installation capacity

Higher Efficiency and Generation

- The rated power is 20W+ higher than that of conventional module
- Power generation is **3% higher**, based on the same installation capacity
- BOS is reduced by 1.2-1.5 USD cent/W



Better Reliability and Stability

- Lower degradation
- Higher generating capacity

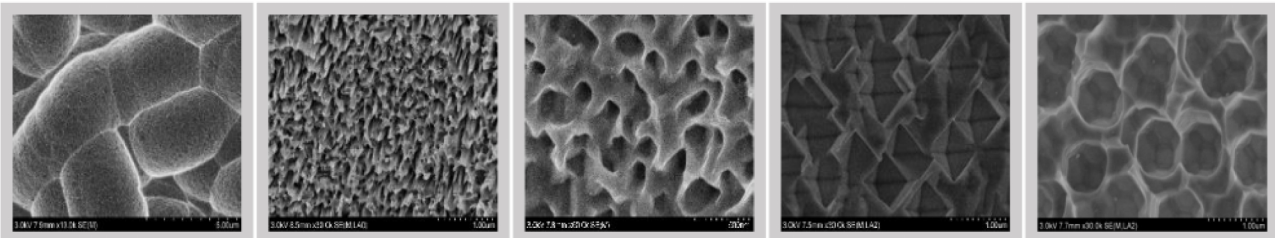


Wider Technical Compatibility

- MWT can be combined with most existing manufacturing process and technologies



Nano Texturing Tech



Less

- Light reflection 5% less
- LCOE 5% less

More

- Cell efficiency 0.4% more (avg 19%)
- Module yield 3% more (kwh/kw)

ABOUT PHONO SOLAR

Phono Solar Technology Co., Ltd. is one of the world's leading renewable energy product manufacturers and a well-trusted provider. The Phono Solar brand has become synonymous with high performing, top quality photovoltaic panels that are ideal for use in large scale power plants, commercial and residential installations.

The Enphase Microinverter is a compact unit that connects directly to Phono Solar PV modules, converting DC to AC power at source. The microinverter also sends vital health and performance information to the Enphase Envoy communications gateway.



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www.greencesco.gr

SUMEC

REFERENCE PROJECTS

China Largest Tidal-flat PV Power Plant

Dongtai, China | 50MW

| Anti-corrosion & Anti-salt

This project is only 10km away from the coast. Phono Solar (SUMEC) modules have passed salt mist corrosion test based on IEC 61701 standard from Intertek. The durable modules are assured to maintain high performance of consistent and stable power generation in coastal flat and tidal areas.

| Anti-PID

PID was the main challenge for Dongtai 50 MW power plant due to high humidity and high temperature. To solve PID problem, SUMEC chose world's leading high quality model inverters, assuring the solar modules could be grounded to negative poles.

| Foundation Reinforcement

Tidal-flat area is not easy to pile, the project engineers chose solid square piles in order to resist seawater corrosion. Engineers slightly adjusted the column's angle to ensure all installed Phono Solar (SUMEC) modules would have the same angle and height for the same solar radiation without shadow.

SUMEC

China Largest Distributed Rooftop PV Plant

Hefei, China | 100MW

| Flexible Modularization

Different plant conditions (roof structure, direction, contamination, power usage) were given varied overall photovoltaic plans, which consist of standard modularized small unit plans as "construction blocks".

| Higher Safety

In consideration of the high safety requirements for factory roof PV power plants, the project adopts such fire resistant components with higher safety as zero-fuse string inverters, fire resistant power cables, dry transformers, etc. The project is equipped with precise and reliable monitoring systems to ensure safety and reliability throughout the power station life cycle.

| Smart O&M

Continuous 24-hour precision data monitoring is conducted on the roof PV power plants, with prompt discovery of problem equipment and switch-out of problematic equipment. Analysis of long-term accumulated data is helpful for finding methods of improving power generation and minimizing risks.

| "Low interference, zero damage"

In consideration of factory structural and production characteristics, construction and organization planning are precise and realistic in design, thereby ensuring low interference to factory production and zero damage to the factory area and building during the course of

SUMEC

Customized LOGO PV power plant

UK Kent | 1.1 MW
Japan Chiba | 4.5 MW

| "All Black" module embellished

The highlighted customers' LOGO is decorated with Phono Solar "All Black" modules (poly/mono), surrounded by Phono Solar poly modules.

Thus special design and installation ensure the stability of projects' generation and operation, and to the greatest degree of display of customers' LOGO.



The World's 9th Largest Solar Power Plant in 2010

Veprek, Czech | 35MW

| 16% Higher output, High ROI

Veprek PV plant has been in full good operation till now. The plant actual output is approximately **16%** higher than expected in the past seven years, proving its excellent performance, and scientific design with minimal system loss.

