



Technical de-risking of Energy Storage and PV Assets in Asia and Worldwide

17.6+ GW

PV equipment & projects
quality assured

INNOVATIVE

AI-based quality assurance
with proprietary forensic
software tools

40+ COUNTRIES

Solar PV project and
client locations

250+ FACTORIES

Audited by our IRCA-
accredited auditors

#1 PARTNER

Of leading insurance
companies

Quality Assurance | Solar Farm Inspections | Factory Audits

Inspections & Insurance | Laboratory Testing

© **STATEMENT OF CONFIDENTIALITY**

This brochure and supporting materials contain confidential and proprietary business information of Sinovoltaics Group Limited. These materials may be printed or photocopied for use in evaluating the proposed project, but are not to be shared with other parties.

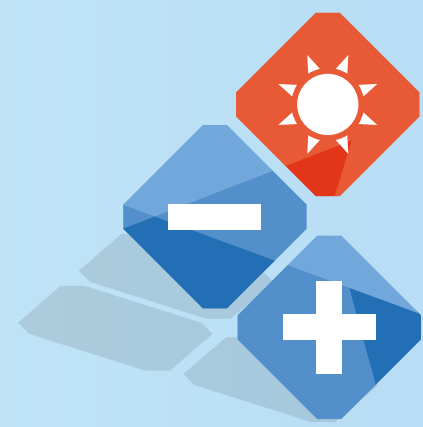




OUR MISSION

Sinovoltaics Group implements its
ZERO RISK SOLAR[®] services to eliminate risk and optimize
ROI in your Energy Storage and PV Supply Chain.

ZERO RISK SOLAR[®] is a proprietary, data-driven technical
service scope covering the entire Energy Storage and PV
supply chain.



PLANNING

Financial
Reliability Check

Insurance
Selection

Contract
Optimization

CONTENTS

ZERO RISK SOLAR® services

PLANNING STAGE

- Pick a financially strong factory
- Insurance selection
- Contract Optimization
- & Technical Document Review

PRE-PRODUCTION STAGE

- Lab Testing
- Factory Audit

PRODUCTION STAGE

- Quality Inspection Program, including:
- Production monitoring
 - Pre-shipment inspection
 - Material verification
 - 100% EL review

LOGISTICS STAGE

- Shock monitoring
- Packaging & Loading Supervision

COMMISSIONING + O&M + M&A STAGE

- Solar farm inspection

PRODUCTION

Quality
Inspection
Program

COMMISSIONING

O&M

M&A

Solar farm
Inspection

PRE-PRODUCTION

Factory Audit

Lab Testing

LOGISTICS

Packing
& Loading
Supervision

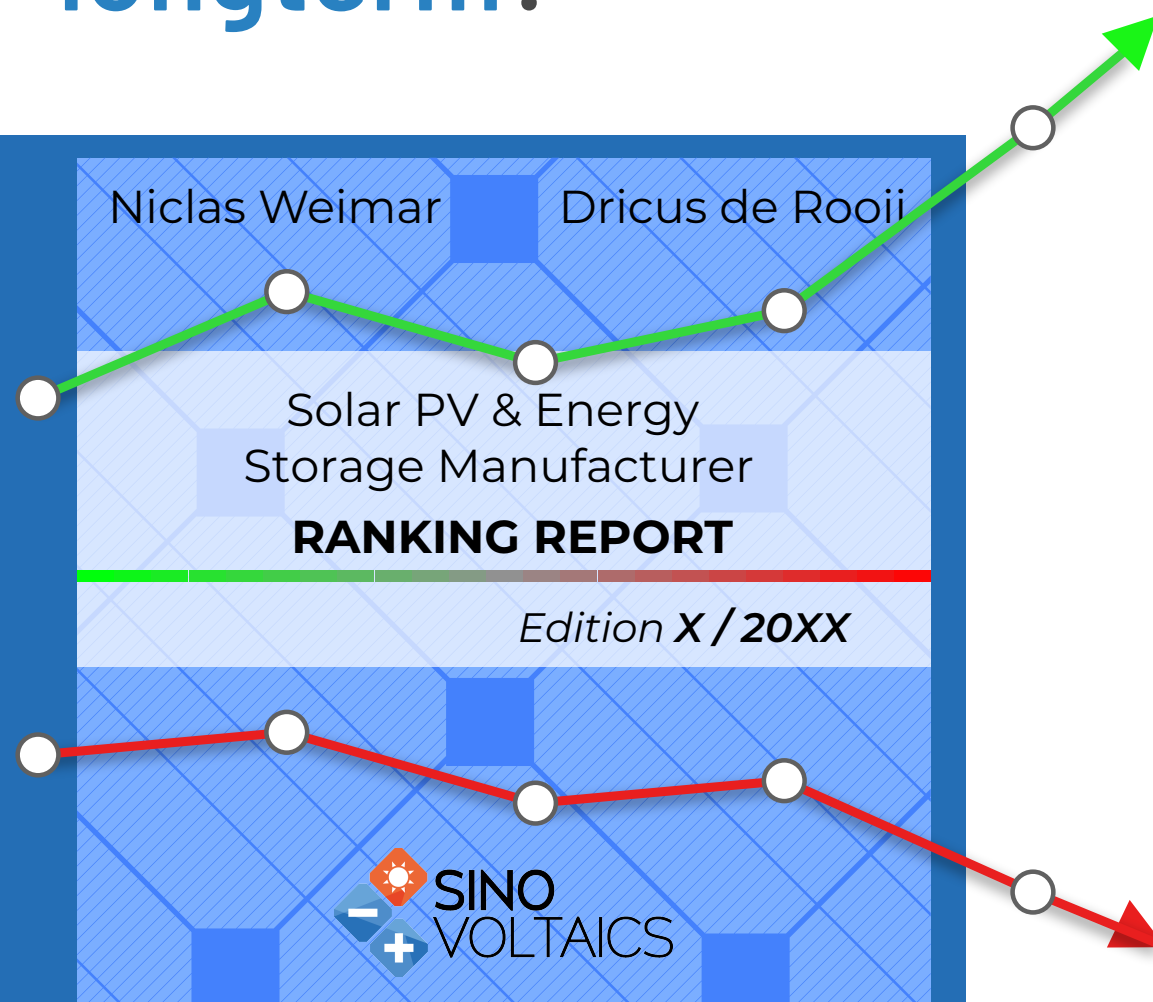
Shock
Monitoring

PLANNING PHASE



FINANCIAL RELIABILITY CHECK

How to pick a financially strong factory that **supports your warranties longterm?**



With the Sinovoltaics Solar PV & Energy Storage Manufacturer Ranking Reports you have access to the ranking of 150+ PV module, inverter and energy storage manufacturers according to their financial strength.

During the planning phase of your PV projects, we recommend to work with a PV manufacturer that is able to guarantee your warranties for the long term.

NEW: Ranking scores of Energy Storage manufacturers!

You can download the Ranking Reports for free on our website:
www.sinovoltaics.com/ranking-report/



YOUR BENEFITS

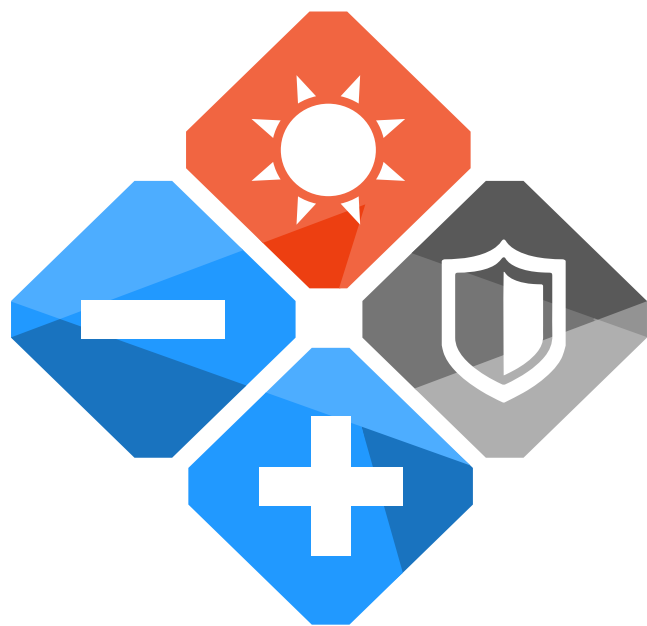
- 1 Only work with the financially strong PV factories
- 2 150+ PV module, inverter and energy storage manufacturers ranked according to their financial strength
- 3 Bankruptcy predictability scores for Energy Storage & PV manufacturers
- 4 Ensure that you factory warranties are valid for the longterm

PLANNING PHASE



INSURANCE SELECTION

How to use insurance to **guarantee** your project ROI?



The quality of the PV components, the engine behind the ROI of any project, is essence for a 100% functioning solar farm.

Quality is key, and insurance companies are now willing to insure solar energy projects based on the approved quality of solar modules.

AVAILABLE INSURANCE SOLUTIONS INCLUDE:

- Marine / cargo
- Construction all risk
- Operational all risk
- Inherent defect coverage
- PV Performance Warranty insurance
- PV Performance Guarantee insurance

BENEFITS INCLUDE:

- Insurance coverage possible for any module brand from any module manufacturer.
- Insurance eligibility upon quality confirmation.



YOUR BENEFITS

- 1 Facilitate project financing with insurance by leading insurers in the PV industry
- 2 Make PV projects and equipment bankable
- 3 Guarantee your ROI with comprehensive risk and performance insurance
- 4 Product and Performance Warranty are insurable
- 5 Insure projects from 3MW+

PARTNERS:

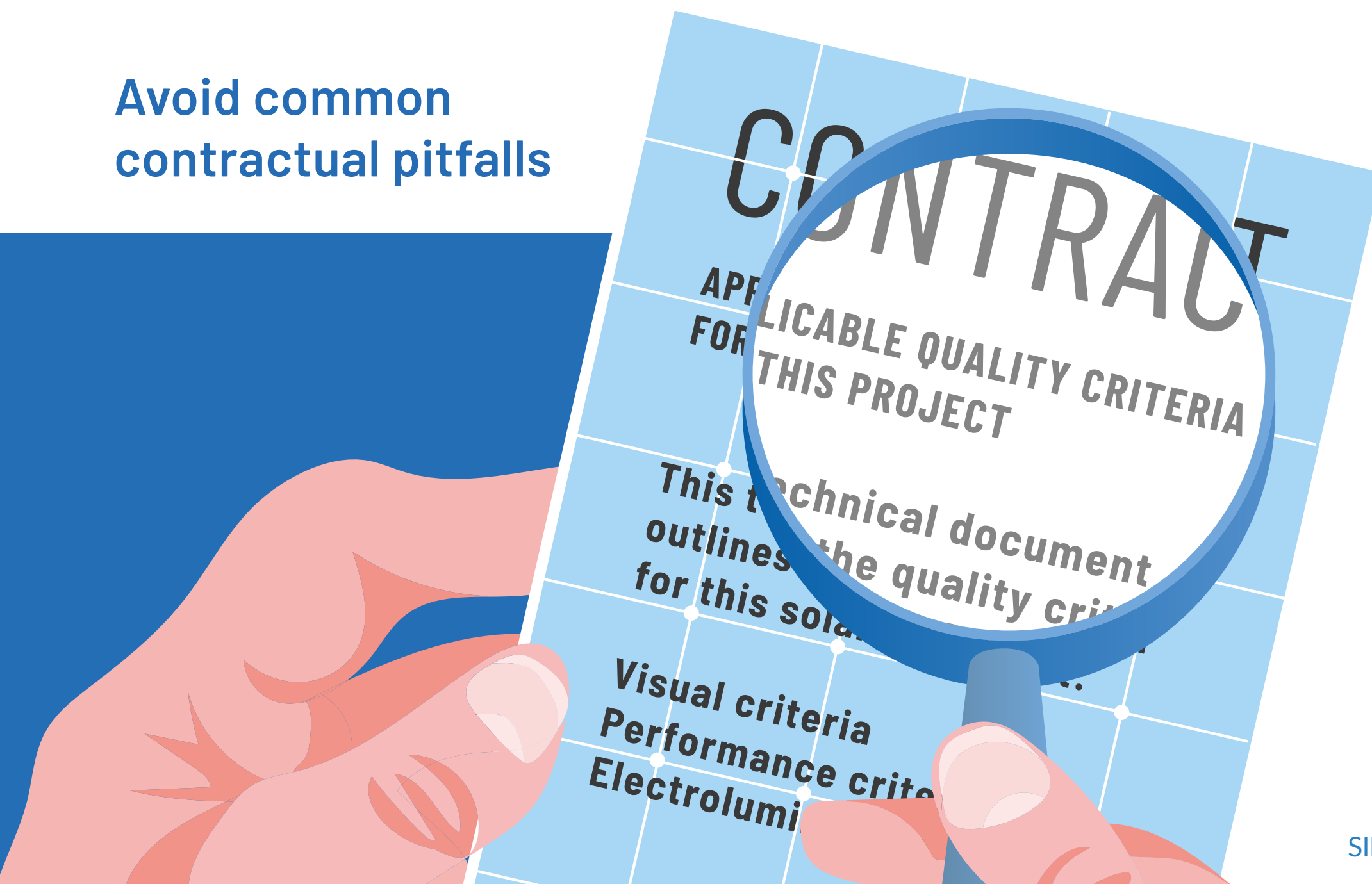




PROCUREMENT CONTRACT OPTIMIZATION

How to optimize your procurement contract to **eliminate risk**?

Avoid common contractual pitfalls



YOUR BENEFITS

1

Implement quality standards from the start to agree with the factory on a high quality level of your PV components.

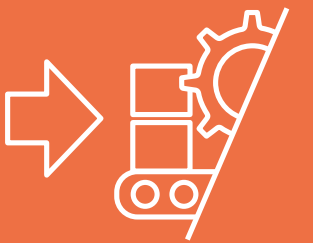
Including:

- PV component + energy storage standards
- Visual and EL standards
- Packing requirements
- Equipment calibration
- Inspection procedures
- + MORE

2

Include penalty clauses to avoid delays in production and shipping schedule.

PRE-PRODUCTION PHASE



LABORATORY TESTING

How do you ensure that your unique project will **perform** as it should?

For external laboratory testing, we partner with CBTL KIWA, which operates laboratories in Europe and Asia. Based on our strong partnership, we can offer a broad range of cost-efficient and instant laboratory testing services on solar PV modules and module primary materials, complementary to our quality inspection services.



LABORATORY TESTS INCLUDE:

- I-V measurement
- Electroluminescence (EL) imaging
- Potential induced degradation (PID) test
- Light induced degradation (LID) test
- Dynamic mechanical load test
- Low irradiance I-V measurement (200W/m²)
- Temperature coefficient test
- Wet leakage current test
- Damp heat test (1000hrs)
- TC200
- EVA gel content test
- Peel strength test
- Humidity Freeze (HF 10) test



YOUR BENEFITS

- 1 **No waiting time: testing can commence upon receipt of samples**
- 2 **Short testing lead-time**
- 3 **Fast reporting on test results**
- 4 **Partnership with CBTL KIWA for laboratory tests in Europe and Asia**
- 5 **Cost-efficient**

PRE-PRODUCTION PHASE



FACTORY AUDIT

How do you know which factories are **reliable**?

Dealing with manufacturers in foreign countries brings certain risks. Before making large investments it is wise to investigate the reliability of the manufacturer.

As the reality is often different from what many manufacturers try to portray, sustainable solar PV business development requires careful pre-screening and professional pre-qualification of prospective suppliers to make the right purchase decisions.



For a PV factory to be World Class, there are multiple requirements that need to be in place.

These requirements relate to product quality, reliability, manufacturing processes and compliance with various technology, safety, and environmental standards.

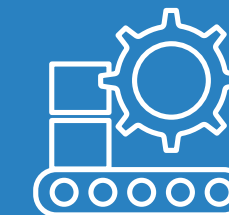
We cover a wide range of factory audits, including QMS, HSE, sustainability and financial audits. Sinovoltaics issues audit reports which are accepted by the leading banks and insurance companies.



WHY WORK WITH US?

- 1 Reports accepted by the leading banks and insurance companies in the PV industry
- 2 Corrective checklist for factory before production can start
- 3 Unique score card to compare factories
- 4 ISO system standards- trained multilingual auditors (IRCA accredited)
- 5 Punctual audit reports within 5 business days

PRODUCTION PHASE



INSPECTION PROGRAM

How do you make sure the factory delivers the **quality** you paid for?

Our comprehensive quality assurance services cover all components and critical primary materials of small and large solar photovoltaic systems.

MODULES	INVERTERS	MOUNTING SYSTEMS
TRACKERS	ISOLATORS	COMBINER BOXES
CABLES	STORAGE	TRANSFORMERS

OUR INSPECTION SERVICES COVER:

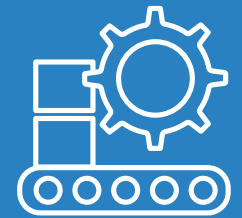
- 24/7 in-line production monitoring
- Pre-shipment inspections
- Post-shipment inspections
- FAT witnessing on-site at the factory

WHY WORK WITH US?

- 1 Proprietary quality standards and inspection procedures for each PV component type
- 2 Specialized quality engineers for each PV component type
- 3 Replace PV components with defects on-site at the factory
- 4 24/7 online inspection progress monitoring systems
- 5 Punctual inspection reports within 5 business days



PRODUCTION PHASE - SOLAR MODULES



INSPECTION PROGRAM - AI DRIVEN EL DEFECT ANALYSIS

How do you
eliminate all major
micro cracks from
a shipment?

100% EL IMAGE ANALYSIS

Our in-house IT team has over the years developed proprietary software to speed up Quality Assurance work. With access to our highly precise defect detection software, you're able to eliminate all significant cell-inherent defects, such as micro cracks, from your shipments.

PHOTO-FORENSIC SOFTWARE

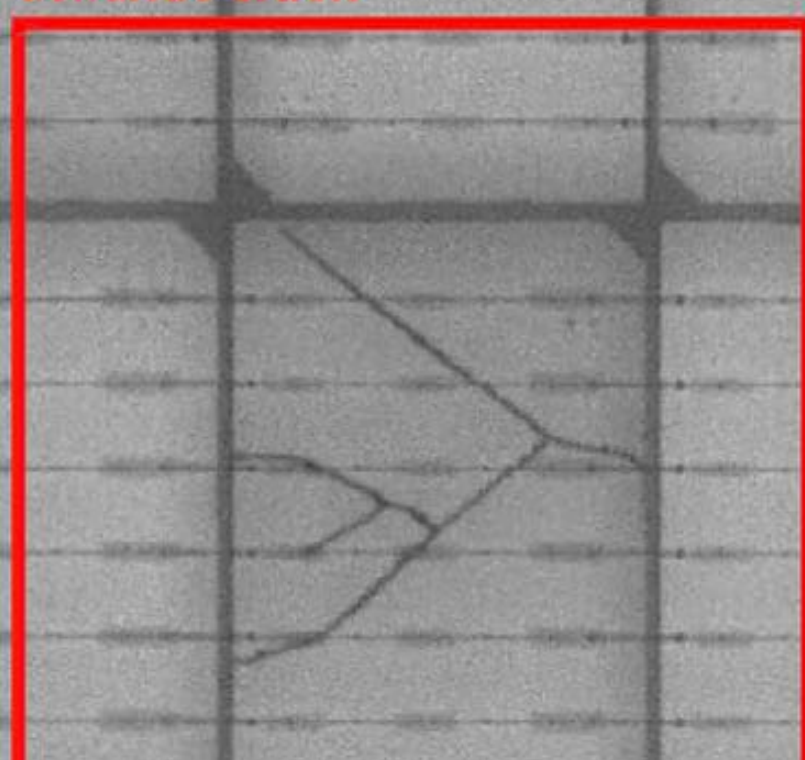
In addition to automated software to detect and mark micro cracks, you can also access our photo-forensic software to avoid any fake EL image that have been tampered with.



YOUR BENEFITS

- 1 Replace all solar modules with major cell-inherent defects
- 2 Automatic defect detection and marking
- 3 Photo-forensic analysis and identification of edited and fake EL images
- 4 Cost- and time-efficient mass-scale technical due diligence
- 5 Adjustable quality criteria

dendritic crack



LOGISTICS PHASE

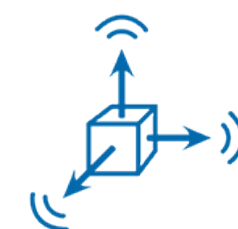


PACKING & LOADING SUPERVISION

How to make sure
your PV components
arrive in a **perfect**
state?

After the general inspections have been finished, our team will remain on-site to make sure your solar products are properly packed and loaded in the shipping containers.

Include vibration sensors
in your containers for
shock monitoring

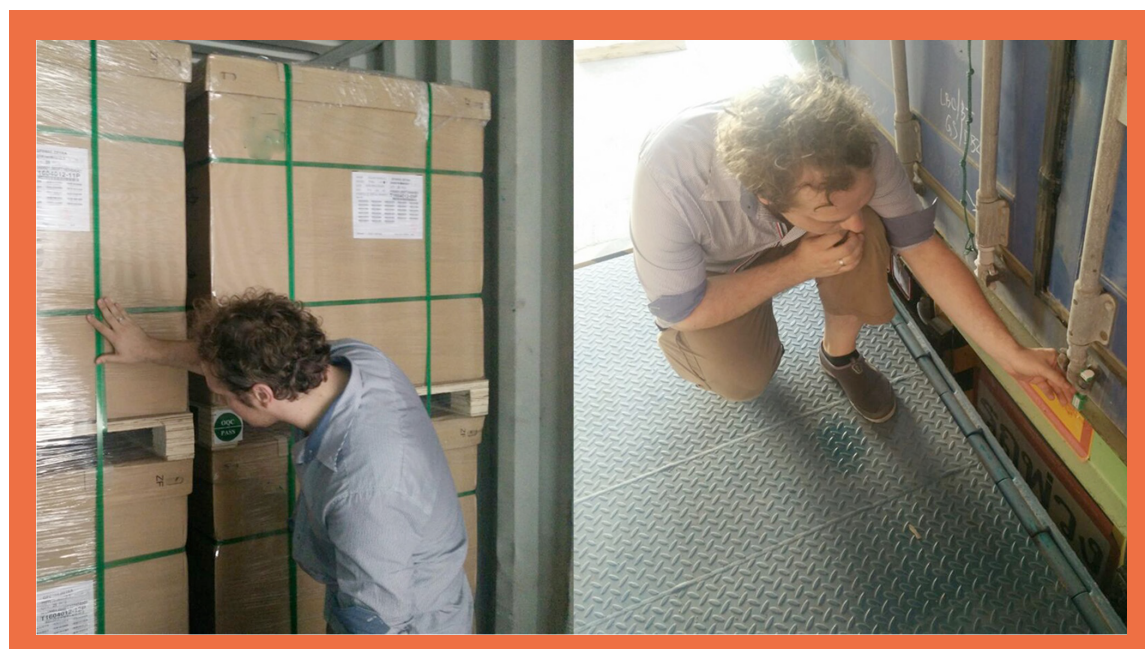


VIBRATION SENSOR

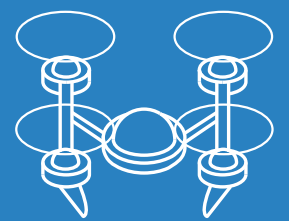


YOUR BENEFITS

- 1 Ensure best practices in packing of solar modules
- 2 Safe packing supervision
- 3 Supervise container loading and register shipping data



AUDITS AT ANY STAGE: COMMISSIONING + O&M STAGE + M&A



SOLAR FARM INSPECTIONS

Is your solar farm
performing as it
should perform?

Our solar farm inspection team specializes in on-site technical audits and defect troubleshooting of solar farms worldwide.

With state of the art proprietary procedures and techniques Sinovoltaics can precisely inspect and troubleshoot every element of your solar farm.

Our team has performed hundreds on-site inspections at solar farms in every part of the world.

ON-SITE TESTING INCLUDES:

- Infrared Thermography
- Electroluminescence Imaging
- Module/ String I-V Measurement



YOUR BENEFITS

- 1 **PV doctor: Fast diagnosis and repair of PV projects**
- 2 **In-house developed hardware and software solutions for cost- and time-efficient inspections**
- 3 **Certification of solar farms in collaboration with our CB partners**
- 4 **Targeted and mass-scale solar farm inspections based on proprietary procedures**
- 5 **Services offered worldwide**



RECENT PROJECT REFERENCES

2022 project references

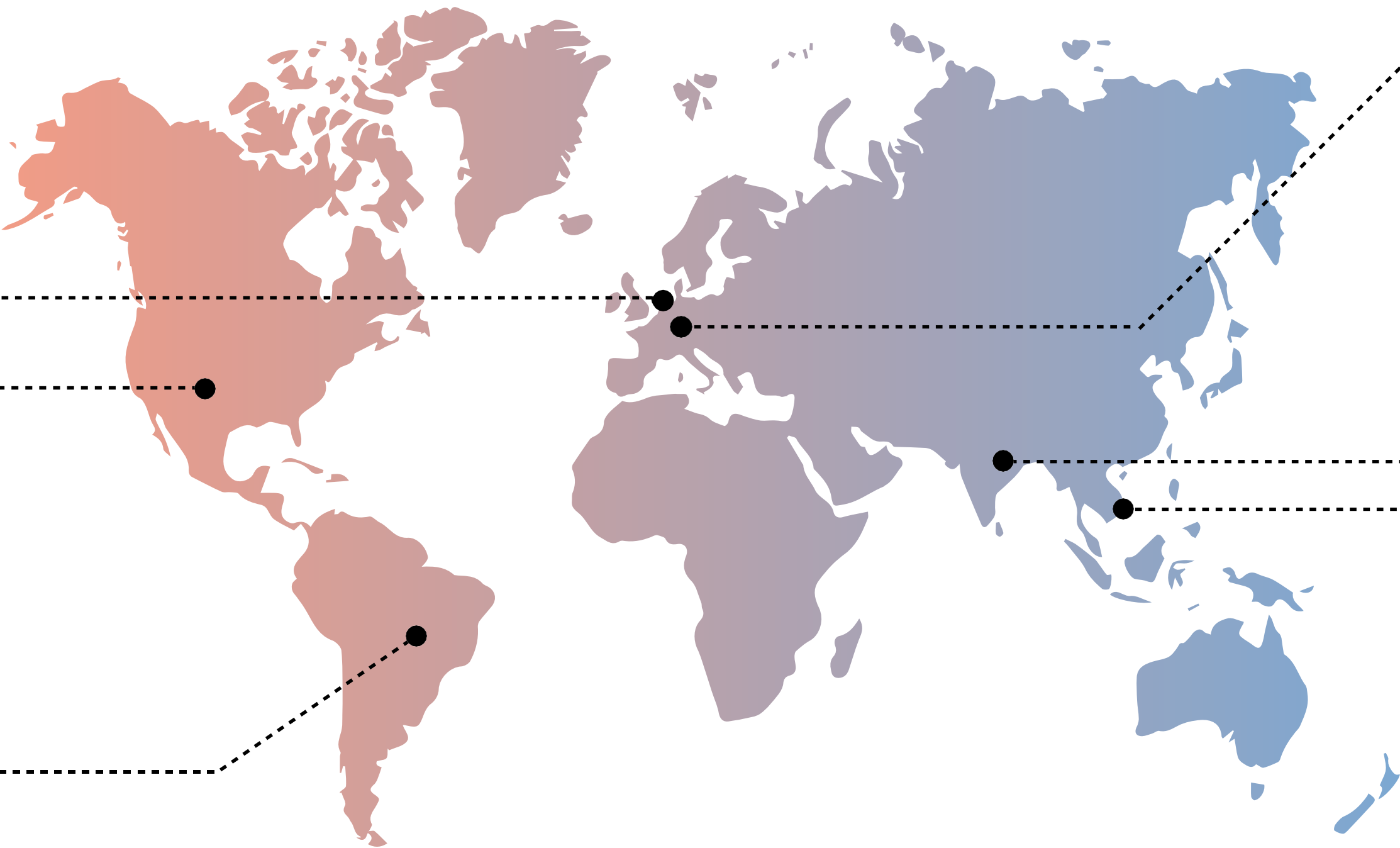


NETHERLANDS **60MWp**

USA **320MWp**



BRAZIL **94MWp**



GERMANY **128MWp**



INDIA **350MWp**

VIETNAM **50MWp**



OUR TRUSTED CLIENTS

A selection of established client references:

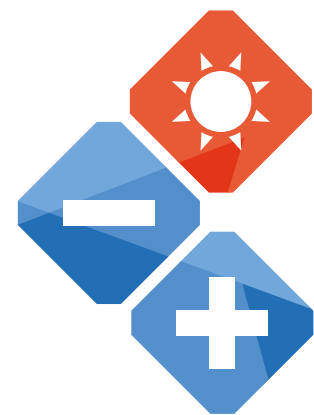


FACTORIES AUDITED

A selection of the over 250+ factories where our inspection team has been active:



ABOUT



SINOVOLTAICS GROUP

Sinovoltaics Group is a Dutch-German quality assurance, product engineering and technical compliance consulting firm, specialised in de-risking of solar photovoltaic & Energy Storage assets and investments.

Headquartered in Hong Kong and with subsidiaries in Shanghai and Vietnam, we are strategically located close to all solar PV component manufacturing bases and shipping ports in Asia.

Benefit from the experience of our **30 MEN-STRONG**, multi-national auditing and quality engineering team from Germany, Netherlands, Austria, Egypt, Philippines and China, having performed audits and PV quality inspections at over **250+ DIFFERENT SOLAR FACTORIES** across Asia-Pacific and Europe, including Mainland China, India, Malaysia, Portugal, South Korea, Taiwan, Thailand, Turkey, and Vietnam, comprising over 17.6+ GW of solar PV & Energy Storage equipment.

Sinovoltaics Group assists project owners, IPPs, EPCs, utilities and financial institutions worldwide with the execution of **ZERO RISK SOLAR®** projects - implemented by our multi-national team of solar PV-specialized and accredited auditors and engineers on-site in Asia.

Sinovoltaics Group has been active in the field of PV Risk Management for over 10 years.



ELIMINATE RISKS AND GUARANTEE PROJECT ROI

CONTACT US

HONG KONG OFFICE (HEADQUARTERS)

📍 5 Tai Mong Tsai Road, Sai Kung, New Territories
HONG KONG SAR, CHINA

☎ +852 2868 4588

SWITZERLAND OFFICE

📍 Rue du Liseron 7,
1006 Lausanne
SWITZERLAND

☎ +41 76 537 61 29

MAINLAND CHINA OFFICE

📍 4718 Gonghexin Road, Jing'an District,
Shanghai, CHINA

☎ +86 21 6627 0298

SPAIN OFFICE

📍 Madrid, **SPAIN**

VIETNAM OFFICE

📍 94 Xuan Thuy, Thao Dien Ward District 2,
Ho Chi Minh City, VIETNAM

☎ +84 89 8455 4455

USA OFFICE

📍 Austin, Texas, **USA**

✉ contact@sinovoltaics.com