

ASTRONERGY BANKABILITY

THE POWER OF ASTRONERGY



ASTRONERGY

A **CHNT** COMPANY

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CHINT GROUP

COROPORATE OVERVIEW

The Chint Group consists of 8 major divisions that mainly cover high and low voltage electronic products, measuring instruments, construction appliances, automobile appliances, as well as PV modules and other balance of system components. Chint also owns more than 2,000 domestic distribution centers and more than 40 sales organizations worldwide. The strong performance of the Chint Group's products and services has made Chint one of the most comprehensive enterprises in China.

The complete electrical product lines and horizontal integration strategy of the Chint Group make it simple for clients to enjoy a total solution covered under a single warranty from one supplier.

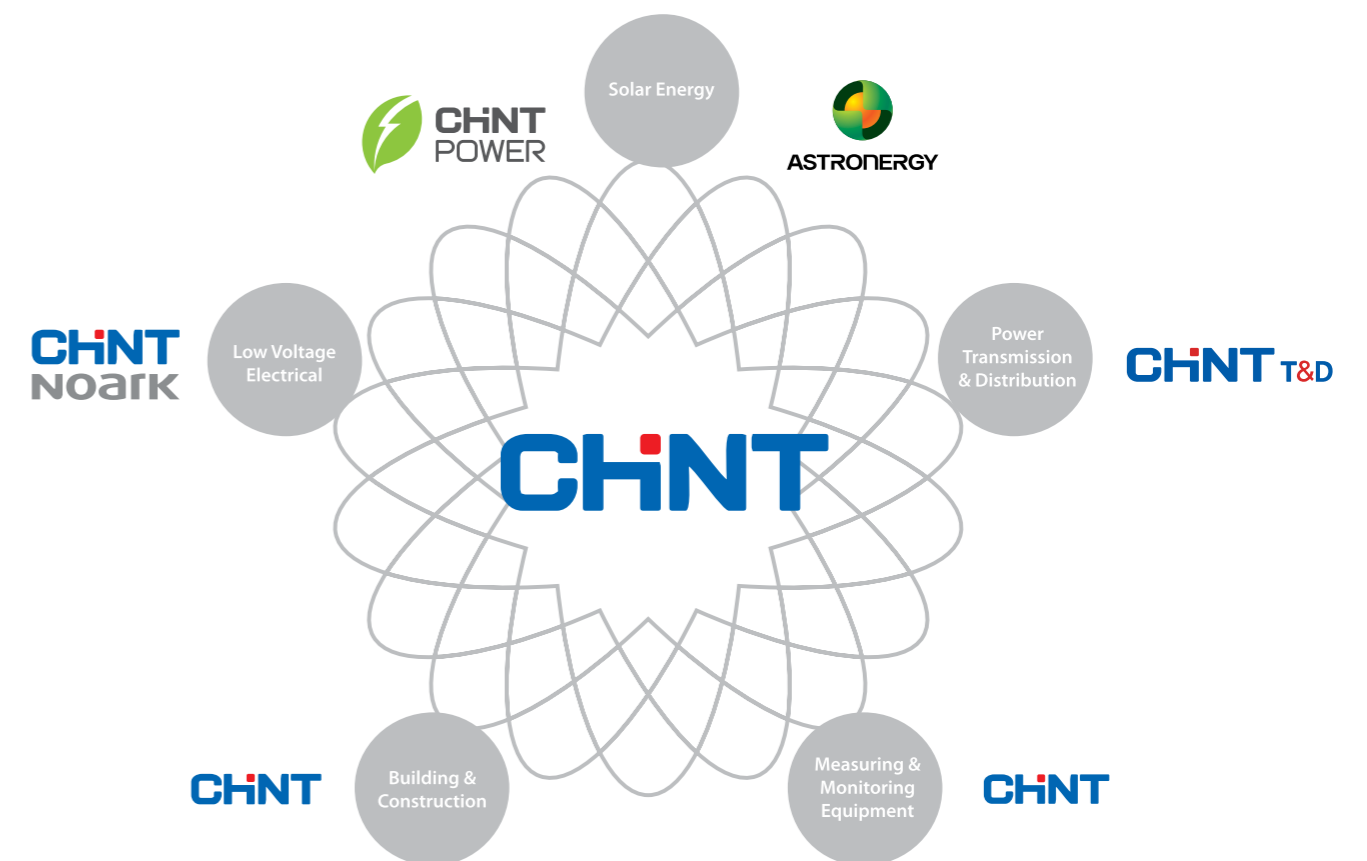
Chint Group Key Facts

Revenue (2012): \$4.8 Billion
Assets (2012): \$3.6 billion
Employees (2012): 23,000 +

4th largest private enterprise in China
40% domestic market share in low voltage electronics and components

Business Focus

- Low & High Voltage Electrical Transmission & Distribution Equipment
- Instruments / Meters
- Construction Electrics
- Switchgears, Fuses & Cables
- DC/DC Converters, DC/AC Inverters
- Transformers
- PV Panels



CHINT GROUP

CHINT GROUP PRODUCT PORTFOLIO

Chint is a diversified, high-volume manufacturer of various electrical and electronic components and tools. The product portfolio ranges from transformers, such as the Chint T&D oil-immersed transformer, rated up to 750 kV; to Chint T&D cables, which are suitable for both high- and low-voltage transmission as well as data communication and control; to fuses and switch gears used in high- and low-voltage applications. Other key Chint Group products include:

- DC combiner boxes manufactured by Noark:

Ready-to-install or preassembled combiner boxes used for the wiring and string combining of PV modules on the DC level.



- PV inverter manufactured by Chint Power Systems:

Highly efficient and reliable inverter portfolio with cost-competitive structure and technology as well as appealing aesthetics.

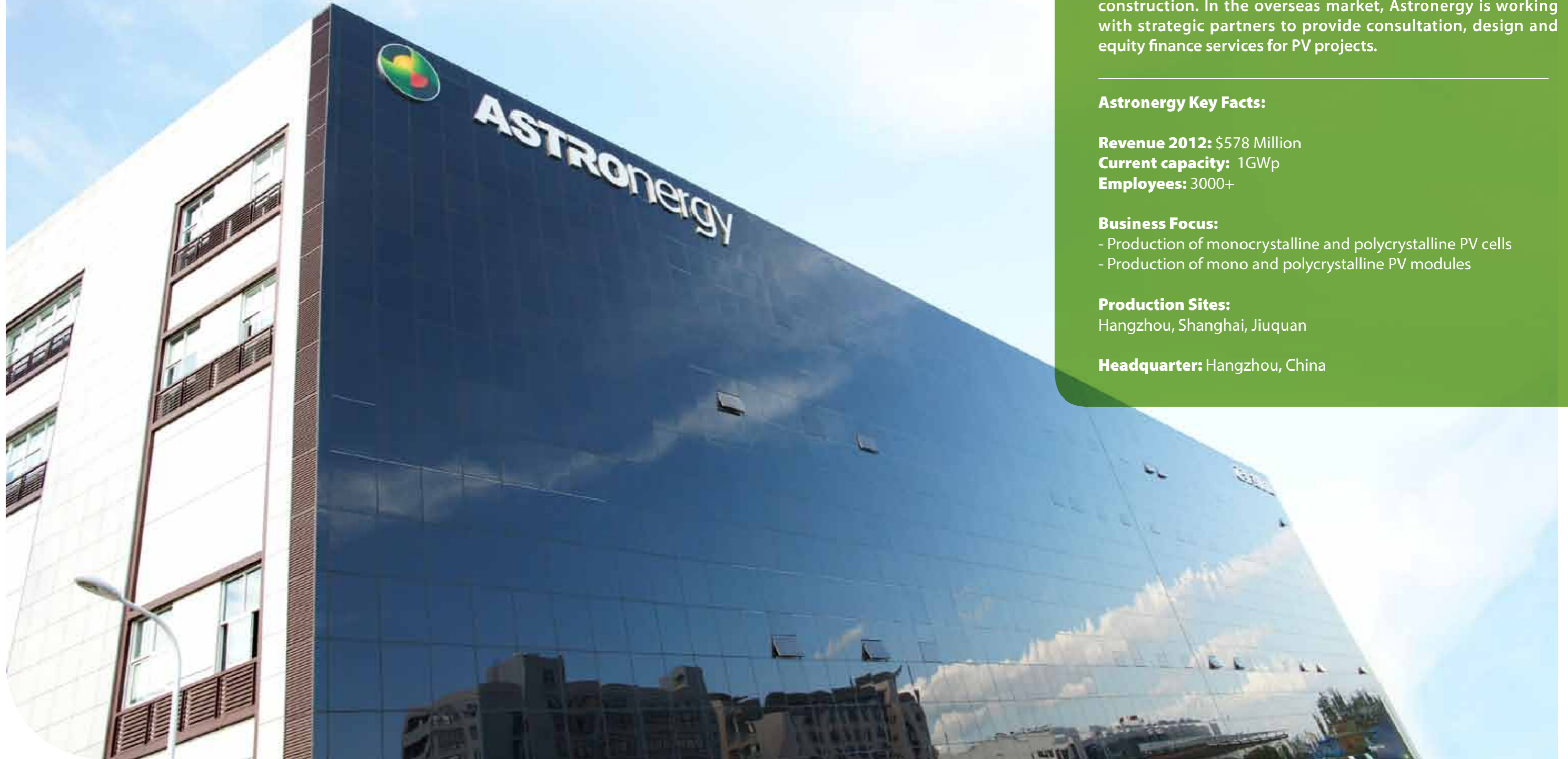


- Meters and sensors manufactured by Chint:

For use in measuring power generation, power distribution, power consumption and other relevant data for managing and optimizing electrical systems.



ASTRONERGY CORPORATE OVERVIEW



Astronergy, a subsidiary of the Chint Group, has been a trusted provider of monocrystalline and polycrystalline PV modules since its founding in 2006 with manufacturing capacity reaching 1GW.

In addition to PV cell and module production, Astronergy is actively engaged in project development around the world. To date, Astronergy has become one of the largest PV project developers in China with over 800MWp completed and under construction. In the overseas market, Astronergy is working with strategic partners to provide consultation, design and equity finance services for PV projects.

Astronergy Key Facts:

Revenue 2012: \$578 Million

Current capacity: 1GWp

Employees: 3000+

Business Focus:

- Production of monocrystalline and polycrystalline PV cells
- Production of mono and polycrystalline PV modules

Production Sites:

Hangzhou, Shanghai, Jiuquan

Headquarter: Hangzhou, China

ASTRONERGY WORLDWIDE

Astronergy has established its sales offices globally to bring quality products and superior service to customers around the world. With a presence in both developed and emerging global markets, we are able to meet our customers' needs with fast, localized, and customized services.



CORPORATE HEADQUARTERS

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1335 Bin'an Road, Binjiang District
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China
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MANUFACTURING PLANTS

Hangzhou, Shanghai & Jiuquan

SUBSIDIARIES

Spain
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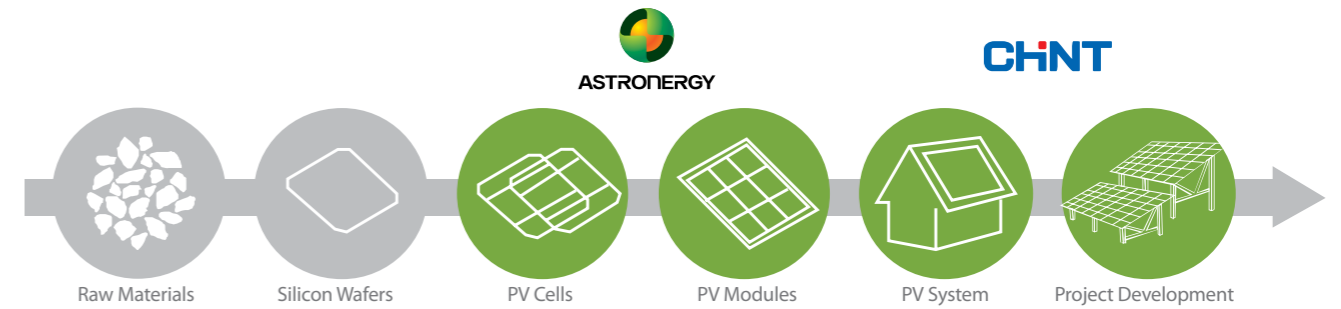
Korea
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Thailand
Tel: + 662 645 4155
Fax: + 662 245 3185

ASTRONERGY STRATEGY

VALUE CHAIN COVERAGE

Best-in-class cell & module manufacturing process,
100% in-house production.



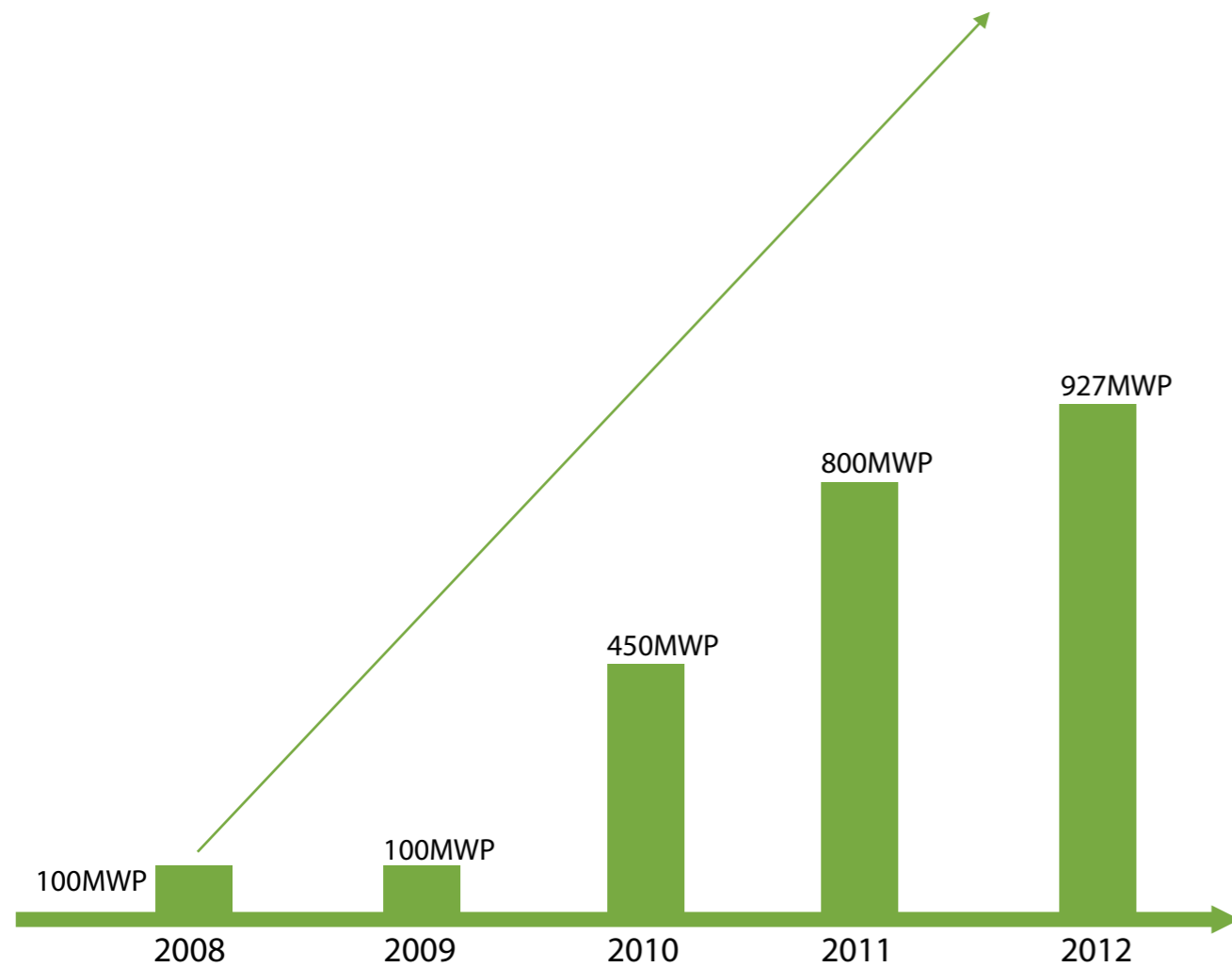
○ Mono

○ Poly

ASTRONERGY STRATEGY

CAPACITY & EXPANSION PLAN

■ Crystalline

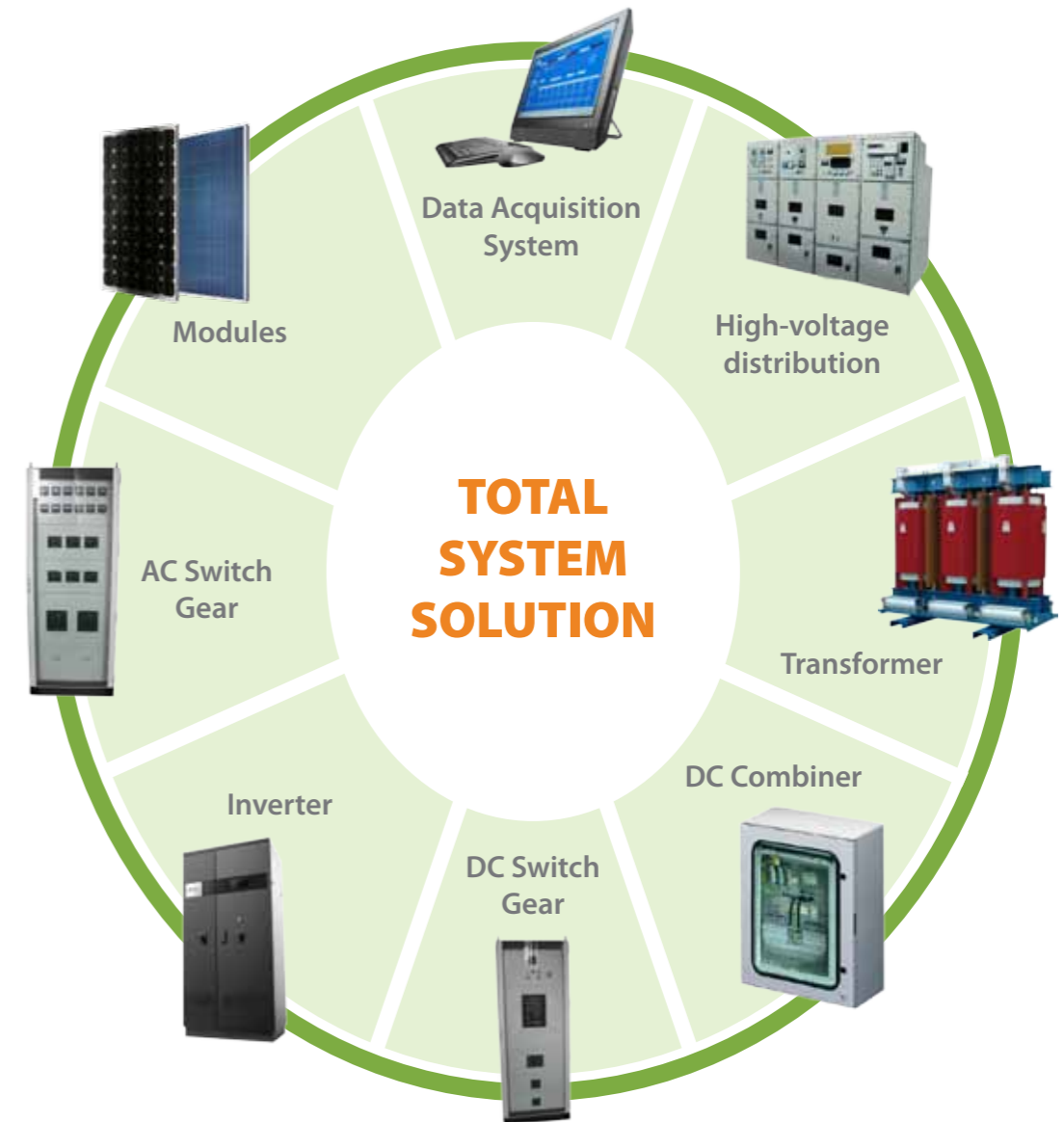


ASTRONERGY STRATEGY

TOTAL SYSTEM SOLUTION

Astronergy's overall strategy involves moving towards a total system solution through horizontal growth. To do so, Astronergy will develop and offer over time all key components which are required for a complete PV system: inverters, racking systems, combiner boxes, solar cables, and fuses, among other components.

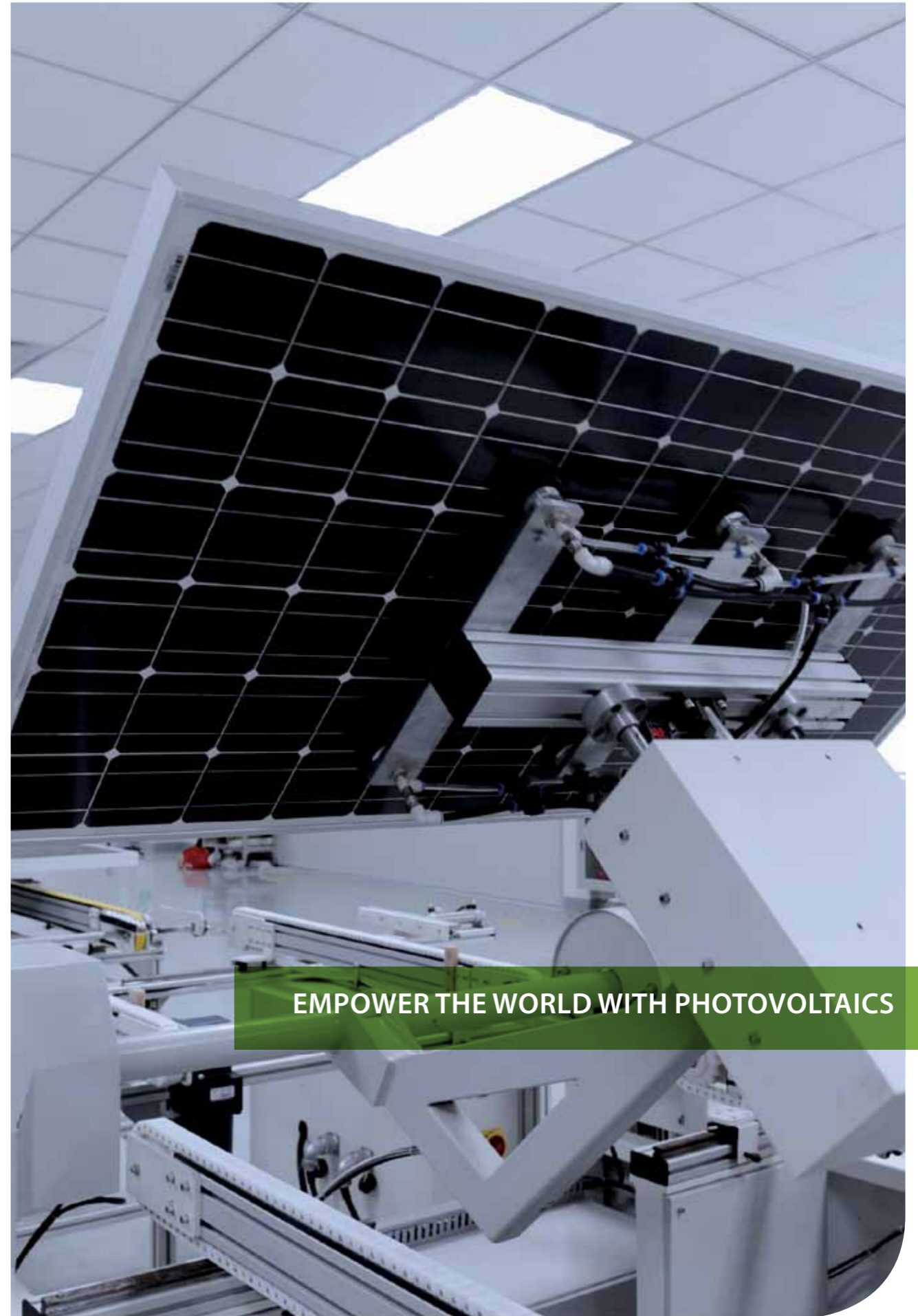
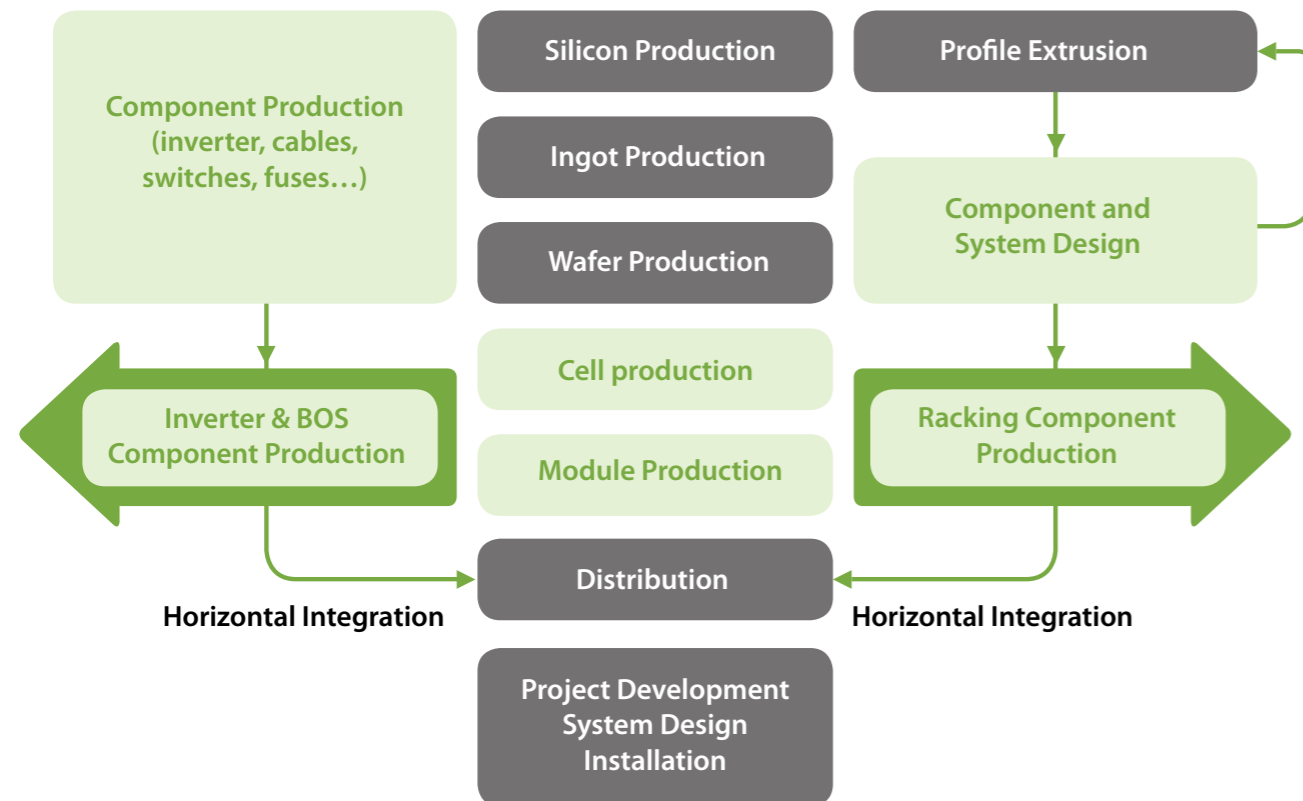
This strategy is supported by the broad, high-volume production experience and the diversified product portfolio of Noark, Chint T&D, Chint Power Systems, and other Chint Group divisions. This strategy enables Astronergy to be a one-stop shop for energy generation and transmission and to further support its customers by pre-defining and pre-developing certain product and system combinations.



ASTRONERGY STRATEGY

HORIZONTAL INTEGRATION OF ASTRONERGY

The horizontal integration of Astronergy through the usage of the Chint Group's product portfolio generates a unique and compelling opportunity for clients to buy all required key components out of one hand. This opportunity enables a faster and smoother purchase and product selection process as well as avoiding mismatched components or incompatible products. In addition, one service contact and sales support hotline is available to answer product-related questions to maximize customer support effectiveness.



EMPOWER THE WORLD WITH PHOTOVOLTAICS

ASTRONERGY TECHNOLOGY & PRODUCTION

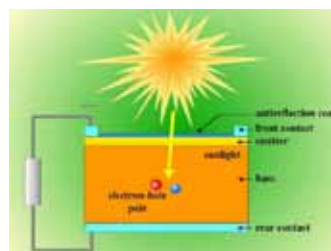
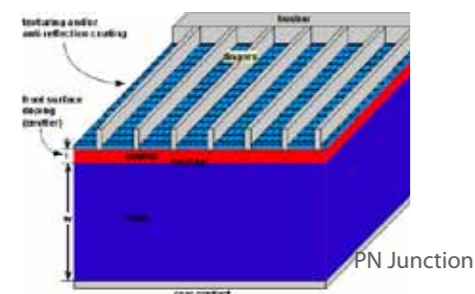
CRYSTALLINE

Astronergy's crystalline silicon solar modules are made from p-type monocrystalline or polycrystalline silicon wafers with state-of-the-art solar cell mass-production processing, including texturing, phosphorus diffusion, edge isolation, removal of phosphorus-doped oxide layer, surface passivation, anti-reflective coating, and metallization using screen-printing technology. All cells used in Astronergy's crystalline panels are 100% in-house produced. The company is committed to continuously improving the conversion efficiency by implementing advanced solar cell processing technologies, including double printing of front grid lines, selective emitters, ion implantation, RIE, PID free, HIT, and more.

Astronergy's crystalline production line has been armed with advanced, world-leading PV manufacturing equipment to create a best-in-class manufacturing process, which allows us to always provide our customers with top-quality products.

Crystalline Silicon Cell Technology

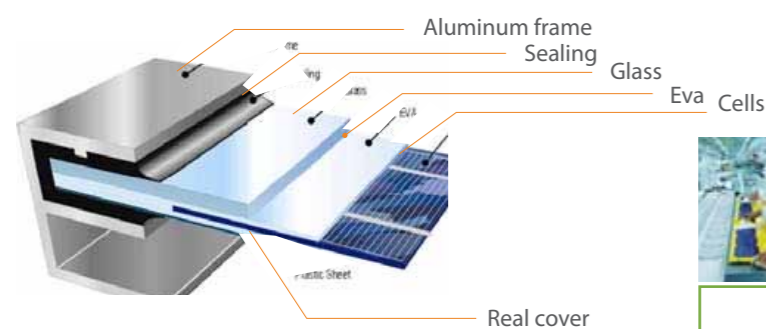
Cell Structure:



Cell Manufacturing

Crystalline Silicon Module Technology

Module Structure:

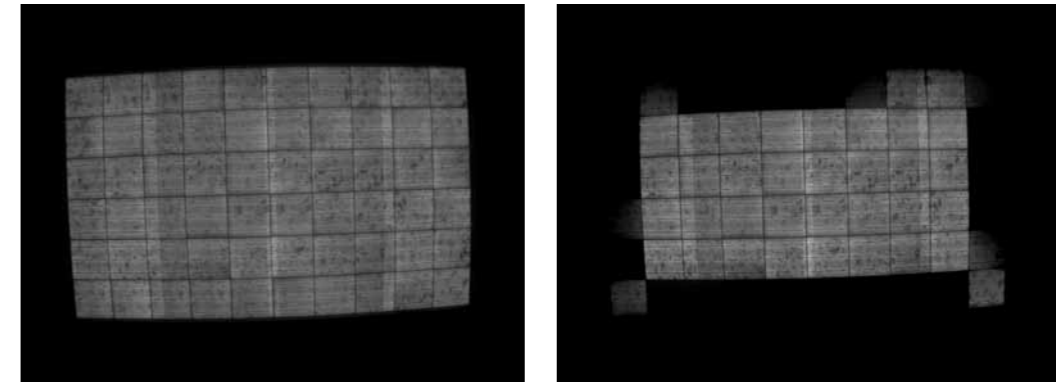


Module Manufacturing

ASTRONERGY TECHNOLOGY & PRODUCTION

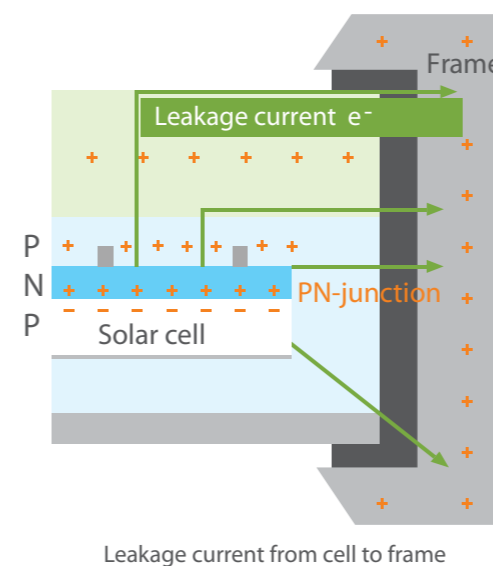
PID FREE

PID is an effect that leads to significant power output decline of PV modules under the condition of negative bias voltage, high temperature and increased humidity. It has become an increasing concern in the solar industry because of the negative impacts. Power Degradation is caused by the exposure to a potential relative to ground, and dependent on its magnitude and sign.



EL photos showing the PID effect for PV Modules

This electrical voltage between the cells and the frame can cause the electrons to come loose from the materials used in the PV module, migrate into the electrical field, and then discharge through the grounded frame. The result is an electrical charge (polarization). If it goes undetected, it can negatively affect the solar cells' IV curve.

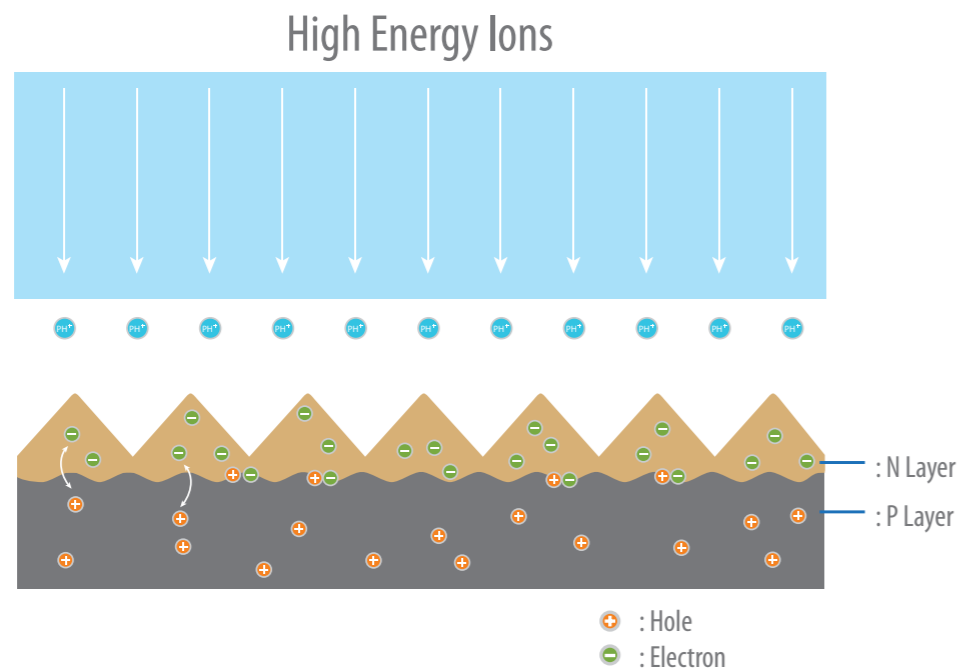
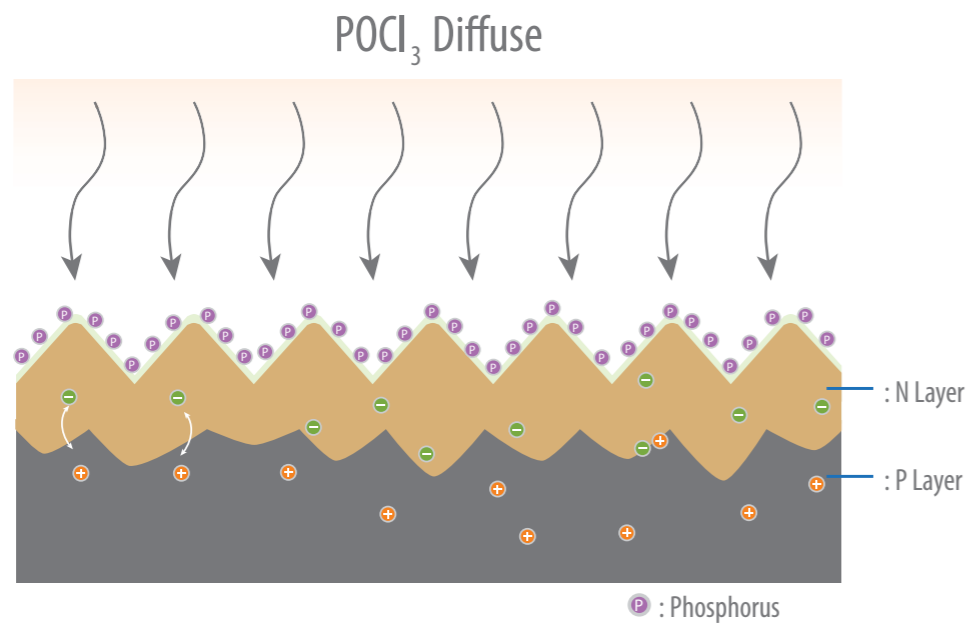


Astronergy's PID-Free PV Modules:

In 2012, Astronergy has successfully developed new technology and manufacturing process for PV modules to pass the PID test conducted by TUV Rheinland. In the test, PV modules from Astronergy were assessed after being exposed in the -1000 voltage condition with the temperature 85°C as well as relative humidity 85% for 96 hours. The modules have achieved a less than 1.4% degradation result, which is well below the TUV standard of not exceeding 5% under such restricting requirements.

ASTRONERGY TECHNOLOGY & PRODUCTION

"NOVA" TECHNOLOGY



Advantages:

1. Better uniformity for better PN junction
2. Arbitrary doping profile for all kinds of novel cell structures
3. Easy and capable for both Phosphorous and Boron doping
4. Higher conversion efficiency and better quality control guaranteed
5. PID free. Test condition: Temperature 85°C, Relative Humidity 85%, Voltage -1000V, 96 hours.



ASTRONERGY TECHNOLOGY & PRODUCTION

QUALITY MANAGEMENT

Astronergy is focusing on high-quality products with long-term reliability exceeding the market expectations for PV modules. A detailed quality management and quality control system is in place, highlighted below

Supplier Management System (SMS)

Astronergy performs an incoming quality assurance (IQA) audit on all suppliers to ensure that raw materials perform to specification. It also maintains a performance ranking of suppliers to avoid any quality issues.

Manufacturing Execution System (MES)

Astronergy tracks both the production process as well as the performance data of all cells and modules in order to rapidly pinpoint any defects and to ensure that production lines are operating at peak efficiency.

Statistical Process Control (SPC)

Products, processes, and equipment are controlled using Statistical Process Control (SPC) for the highest levels of quality and performance. Within the same power range and efficiency, our crystalline cells are further sorted and grouped by the current they produce in order to minimize losses caused by electric-mismatch.

Power Measurement Calibration

A single module "flasher" directly measures the electrical characteristics of every solar module that Astronergy produces. To ensure the machine's efficiency accuracy of +/- 3%, a series of tested samples is used to calibrate it. Firstly, a "golden sample" solar cell is sent to a third-party for testing and verification every year. Every month, this sample is tested in-house against identical samples, which are then used to calibrate the flash machine every two hours.

Process Change Control (PCC)

Any deviation from the standard recipe at any stage of processing is reviewed by a review board comprising teams from Quality Assurance, Process, and Production & Equipment departments. Any process changes deemed remotely significant undergo electrical testing, reliability testing, or both.

Outgoing Quality Assurance (OQA)

A number of tests, including power output testing and inspection for micro-cracks, are conducted before and after module packaging to ensure that all delivered products meet power generation expectations. IV and EL tests are performed before and after lamination to ensure the consistency of encapsulated cells and process reliability. The EL test is repeated on each module before shipping to ensure product's quality and reliability. (For details, see Appendix 1.)

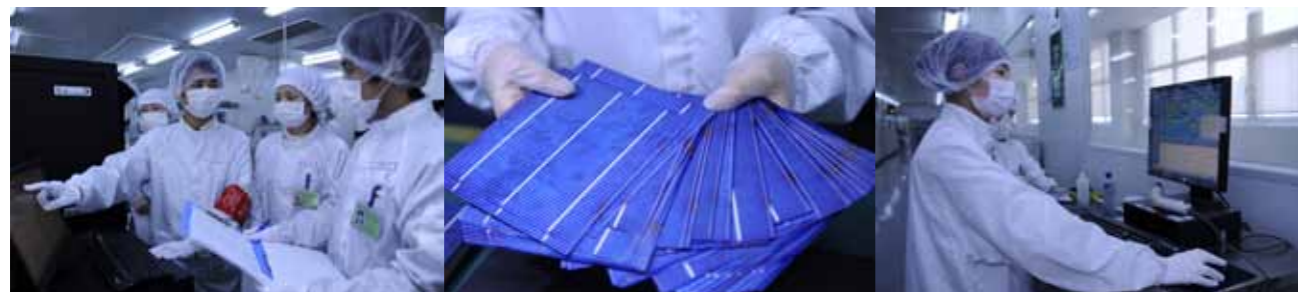
• **Double EL Inspection for 100% panels**

Non-conformance Control

Any defect that might affect reliability (MRB-type defect) within a given lot number puts the entire lot on hold while the MES system is used to pinpoint the problem, while an MRB meeting is called. A correction has to be implemented within 48 hours.

Customer Complaints

Within three business days of receiving a complaint, Astronergy's quality assurance team will review the potential root cause and inform customer about the receipt as well as the next steps of this complaints. After verifying with the customer that the problem has been corrected, a final 8D report is issued.



ASTRONERGY PRODUCTS

Why choose if you can have it all? Working with various companies in the PV market generally means that you have to decide what general product type you want to use and what technology might be the best for your system. With Astronergy, the choice is easy: with multiple PV technologies on hand—from monocrystalline for high efficiency; polycrystalline for economical system designs—every project can be individually supported with an ideal solution tailored to its specific circumstances and requirements.

Just as important as the choice in overall technology is the opportunity to choose among each technology's different power classes and product designs. Each choice is important in the creation of an ideal project for the specific requirements of every project's unique circumstances. With one of the largest product portfolios in the market – with both technical and aesthetic options – Astronergy is the ideal partner for all different kinds of systems, such as residential roof-top systems; commercial flat-roof systems; all types of ground-mounted projects; and even off-grid and tracker-based systems.

Astronergy product portfolio ranges from 85 Wp modules designed for off-grid and small residential systems to 310 Wp commercial / utility-grade products with optimized size / performance ratio. Different color stages such as silver or black frames as well as various back-sheet colors enables black, aesthetically appealing installations on dark residential roofs or energy-yield optimizing installations that use a white reflector layer.

10 / YEAR PRODUCT WARRANTY
25 / YEAR PERFORMANCE GUARANTEE



(90% up to 10 years, 80% up to 25 years)
 See warranty details in Appendix 2.

ASTRONERGY PRODUCTS

PRODUCT PORTFOLIO

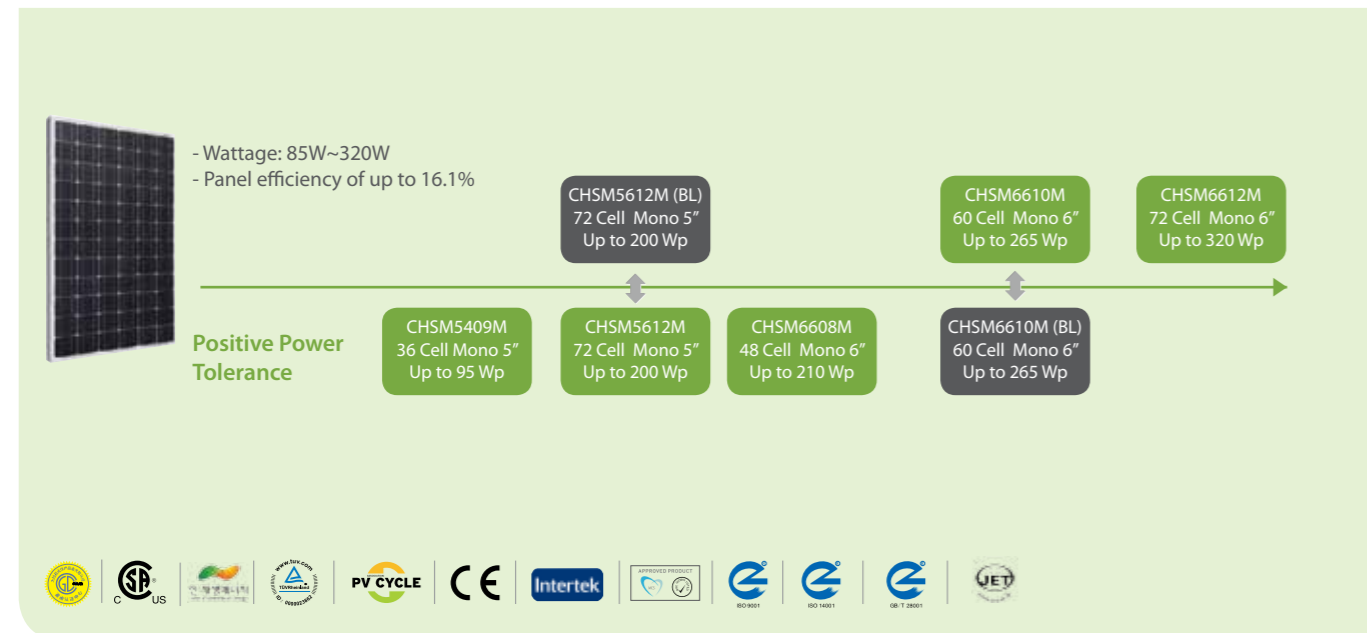
POLYCRYSTALLINE

See sample datasheet in Appendix 3.



MONOCRYSTALLINE

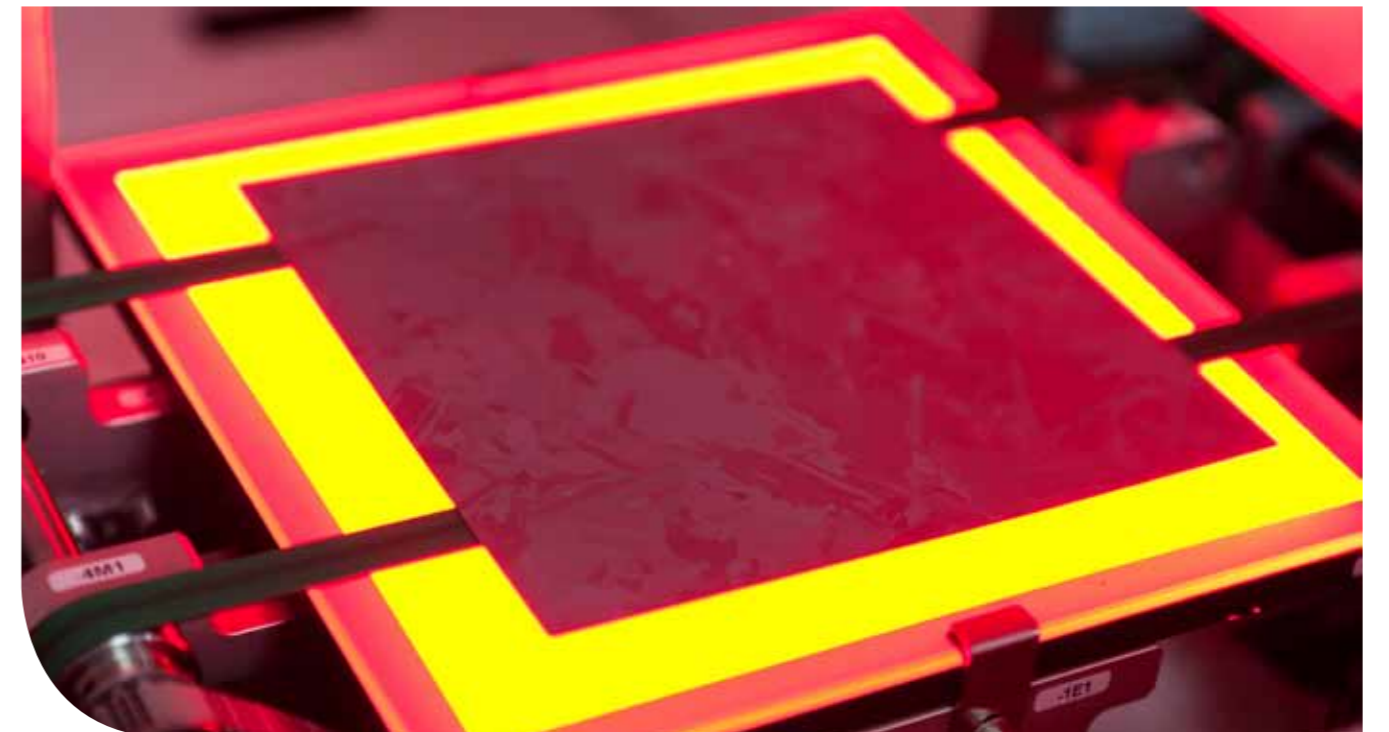
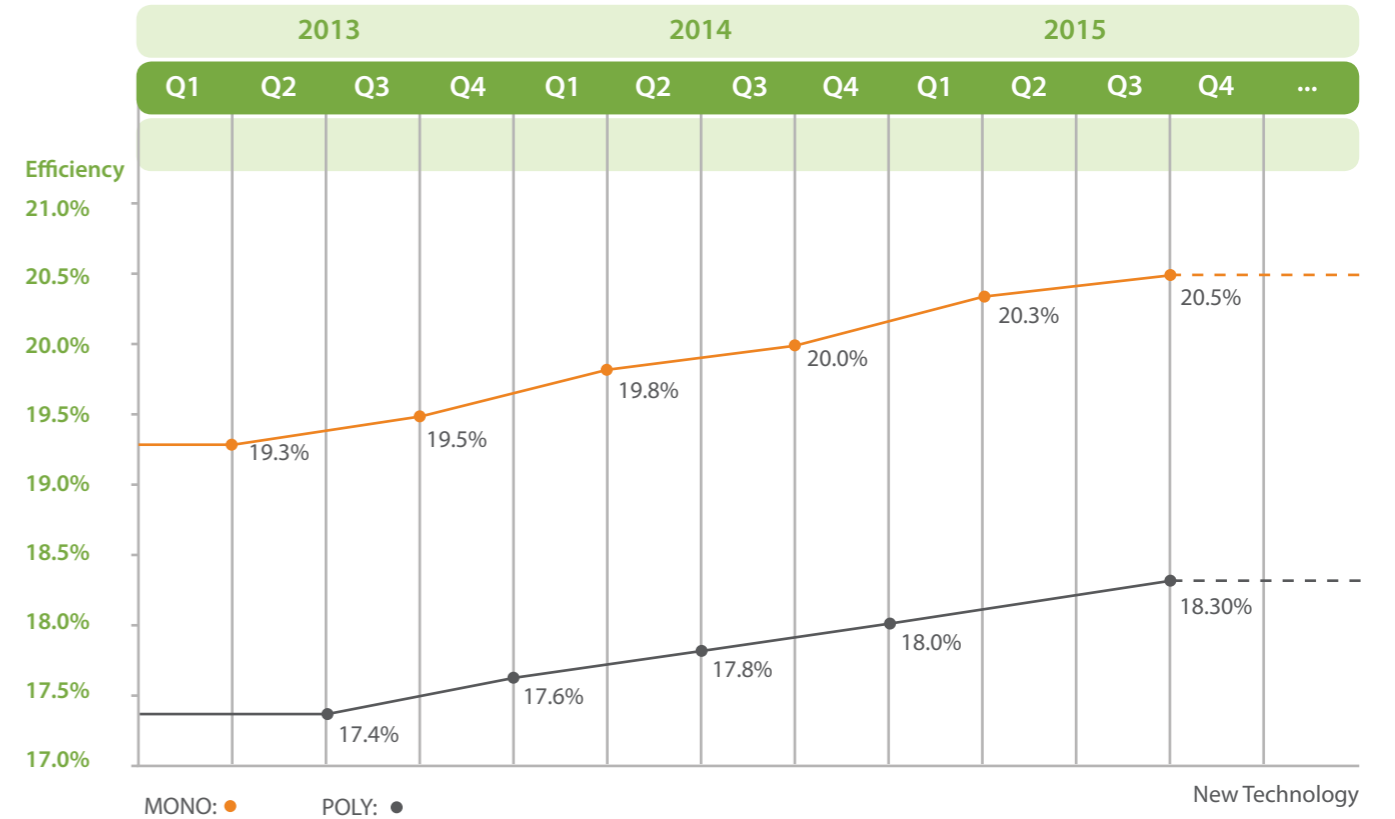
See sample datasheet in Appendix 4.



ASTRONERGY PRODUCTS

CRYSTALLINE CELL EFFICIENCY ROADMAP

We are committed to constantly improving our solar modules first and foremost by increasing cell efficiencies.



THIRD PARTY REVIEW & ASSURANCE

SAMPLE CERTIFICATIONS

Astronergy's products have been tested by a number of institutes and laboratories and have met many national and international standards. These certifications are a testament to the high quality of Astronergy's solar modules and allow for entry into major international markets.



INTERTEK CERTIFICATION:
Salt Mist And Corrosion Test



GLD/VED CERTIFICATION:
Ammonia resistance Test



PVEL CERTIFICATION:
PID Test



See certification details in Appendix 5.

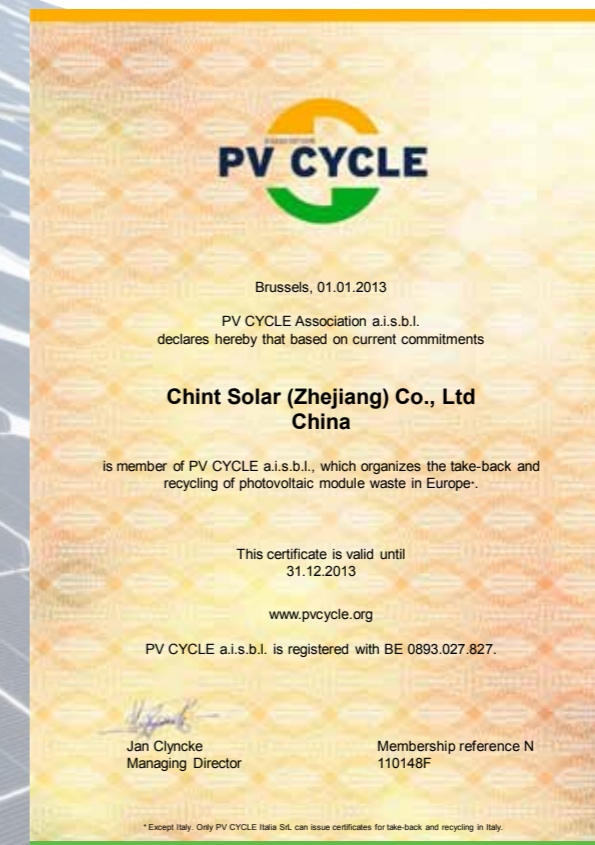
THIRD PARTY REVIEW & ASSURANCE

PV CYCLE

Economic and ecological decisions and activities go hand-in-hand at Astronergy. For this reason we not only make sure that the entire production process is optimally efficient in energy and material usage, but we also minimize as much as possible the production of exhaust gases, unrecyclables, and other waste products. Our high-tech filter systems reduce our overall carbon footprint, and our latest production equipment includes integrated recycling and cleaning steps to minimize other sources of environmental pollution. Our dedication to environmentally-responsible manufacturing culminates in our participation in the PV CYCLE program:

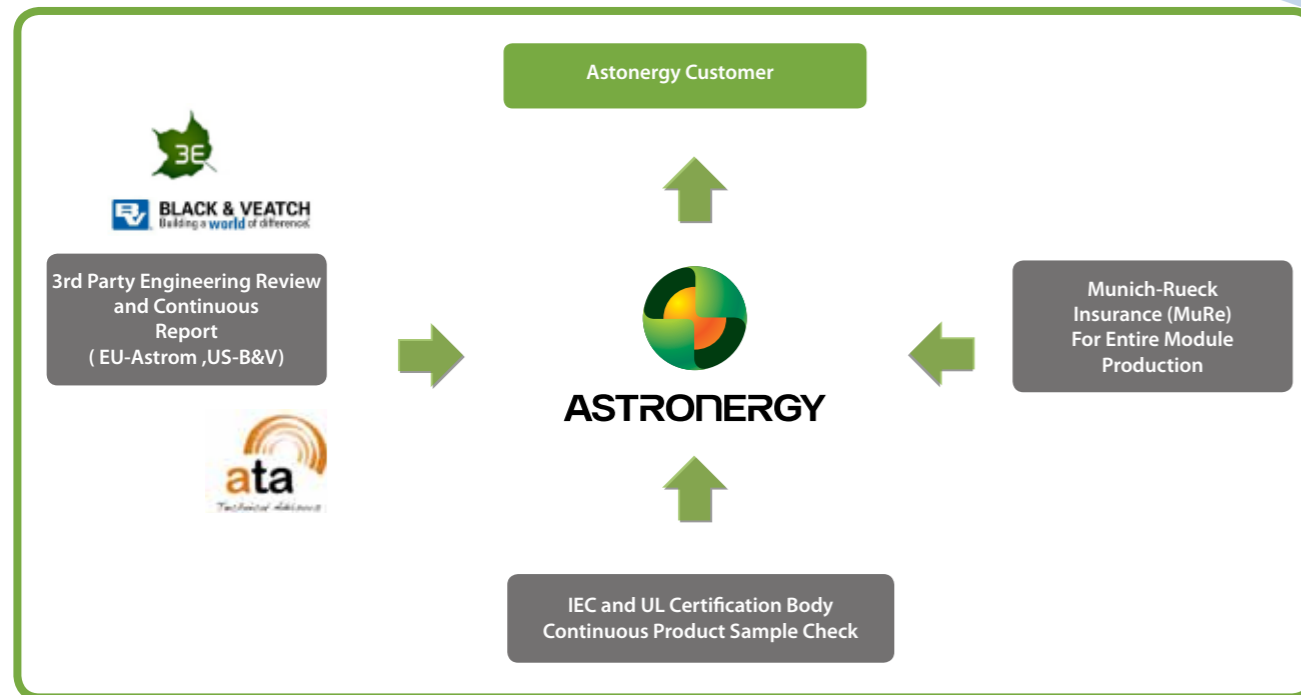
PV CYCLE was founded in July 2007 to implement the photovoltaic industry's commitment to set up a voluntary take back and recycling program for end-of-life-modules and to take responsibility for PV modules throughout their entire value chain. PV modules are designed to generate clean, renewable energy for over 25 years. Although the PV industry is young, leading manufacturers embrace the concept of producer responsibility

and have come together to put in place a voluntary, industry-wide take-back and recycling program – and Astronergy participates in these activities. Through PV Cycle, the photovoltaic industry is installing an overall waste management and recycling policy which achieves the highest economically feasible and environmentally responsible collection and recycling of PV modules.



THIRD PARTY REVIEW & ASSURANCE

THIRD PARTY QUALITY VERIFICATION



See Munich Re brochure in Appendix 6.

Quality is important, and quality verification is one of Astronergy's key processes. Nevertheless, external third-party review and confirmation are key not only in winning customer trust and commitment, but also in confirming the effectiveness and reliability of in-house quality verification data and processes.

For these reasons, Astronergy and MuRe, one of the largest back-insurance companies worldwide, have together signed a back-insurance contract which covers and supports the power warranty of Astronergy-made products through the expiration of their warranties—25 years. This insurance enables investors to reduce and to recalculate their risk assessment. In addition, Munich Re offers an additional insurance on insured products to project investors which allows them to secure and reinforce their investment in a PV project – another unique and excellent tool to make installing PV an easy decision.

But how shall customers and financing partners know about technical and product details? Black & Veatch, one of the world's largest and most experienced engineering teams, is currently performing an independent engineering review and recommendations audit. Their report will review every production step and present a detailed quality assessment of the overall Astronergy manufacturing process to reinforce our partners' and customers' financing and project decisions.

3E is an as an independent engineering advisor to carry out a comprehensive technical assessment on the module product portfolio. They focuses on aspects directly relevant to the module quality such as : the product specification, manufacturing practice (process and equipment), test and quality system, material and supply chain management, certification and guarantees, and installation and delivery.

The success of this independent bankable analysis has further reinforced Astronergy modules's quality and reliable design, which enables its downstream partners to obtain positive due diligence of their PV projects, granting support from EU financial institutions.

MARKET SEGMENTS

Astronergy provides a range of products to suit customer needs in a wide variety of solar applications.

Ground-mounted

- Solar Parks
- Power Plants
- Covered Installations

Commercial Rooftop

- Production Facilities
- Large Enterprises
- Supermarkets

Residential Rooftop

- Solar Solutions for Different Types of Residential Applications

Building Integrated Photovoltaics (BIPV)

- Curtain Wall
- Railing
- Rooftop

GLOBAL CUSTOMER REFERENCE

Astronergy and its solid, worldwide customer base are committed to helping each other succeed.



REFERENCE PROJECTS

Astronergy's solar projects are supported by banks around the world. From a 30 kWp installation in Gerona to 15 MW of modules at the largest single-operating PV solar farm in Europe (in Rovigo, Italy), Astronergy's many successful contributions to renewable energy projects are indicative of its strength and reliability as a manufacturing partner.





REFERENCE PROJECT

ROVIGO PROJECT

The Largest Single-Operating PV Solar Farm in Europe



Location: Rovigo, Italy
Modules Used: CHSM 6610M | CHSM 6610P
System Size: 70 MW (15 MW using Astronergy modules)
Completed: 11/2010
EPC: Isolux Corsan Ingeneria
Developer: SUN EDISON
Bank: Santander, UniCredit, Dexia, Natixis, Credit Agricole, Societe Generale



REFERENCE PROJECT

SAN GIOVANNI ROTONDO PROJECT



Location: Posta Della Valle, Italy
Module Used: CHSM 6610P
System Size: 8 MW (5 MW using Astronergy modules)
Completed: 08/2011
EPC: Sistem Energetici
Bank: UniCredit

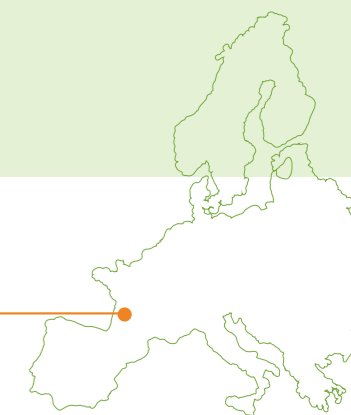


REFERENCE PROJECT

BIENVENU ROOFTOP PV PLANT



Location: Zone Artisanale "La Pitage" 886410 L'Hommaize, France
Modules Used: Crystalline PV CHSM 6610P
System Size: 397 KW
Completed: 02/2012
EPC: Technique Solaire



MODENA PROJECT



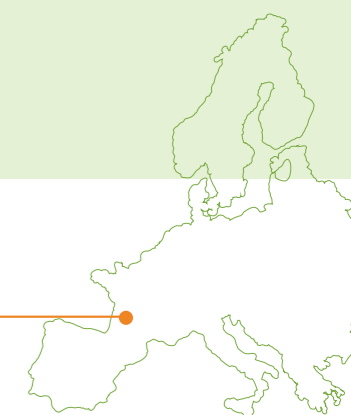
Location: Modena, Italy
Modules Used: Crystalline PV CHSM 6610P
System Size: 880 KW
Developer: PV Line GmbH



GROSDENIER ROOFTOP PV PLANT



Location: Lieu-dit La Choltiere 86800 Terce, France
Modules Used: Crystalline PV CHSM 6610P
System Size: 243 KW Completed: 02/2012
EPC: Technique Solaire

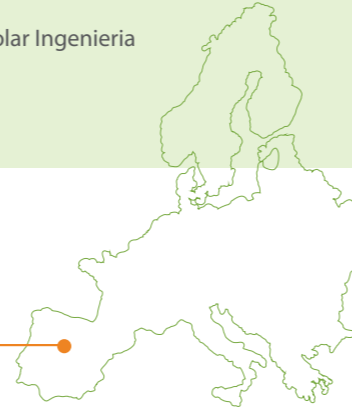


REFERENCE PROJECT

PARKING SOLAR PV PROJECT



Location: Hospital Infanta Leonor, Madrid, Spain
Modules Used: CHSM 6610M
System Size: 1.25 MW
Completed: 12/2010
EPC: Vallecas Solar, Enertis Solar Ingenieria



REFERENCE PROJECT

TOLEDO - A JOINT-VENTURE SOLAR PARK



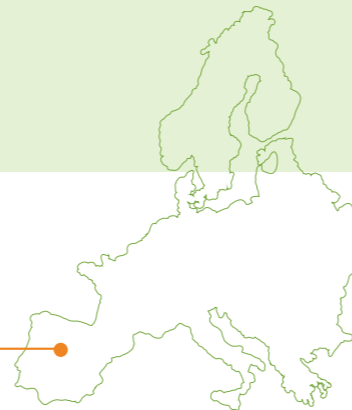
Location: Palacio Cremado, Spain
Modules Used: CHSM 5612M
System Size: 3.15 MWp
Completed: 2009
EPC: Bayerische Landessiedlung



CASABLANCA WATER TREATMENT PLANT



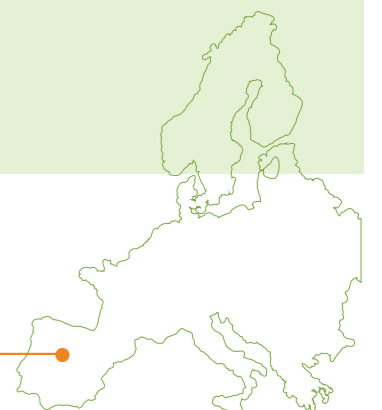
Location: Zaragoza, Spain
Modules Used: CHSM 6610 M
System Size: 2.35 MW
Completed: 2009



ALMORACIL SV SOLAR PARK



Location: Almoracil, Zaragoza, Spain
Modules Used: CHSM 5612M
System Size: 5.6 MW
Completed: 6/2008
EPC: Maetel BBVA

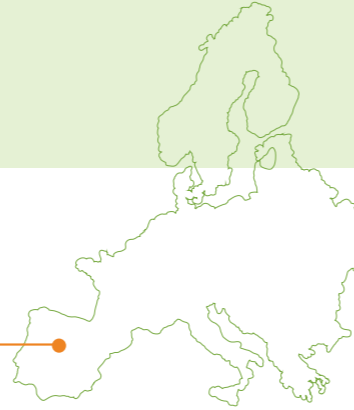


REFERENCE PROJECT

MERIDA SOLAR FARM



Location: Merida, Spain
Modules Used: CHSM 6610M
System Size: 3.4 MW
Completed: 2008

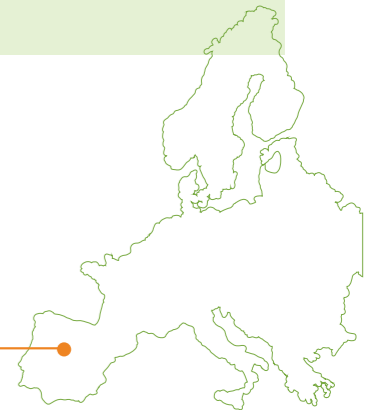


REFERENCE PROJECT

JUMILLA SOLAR FARM



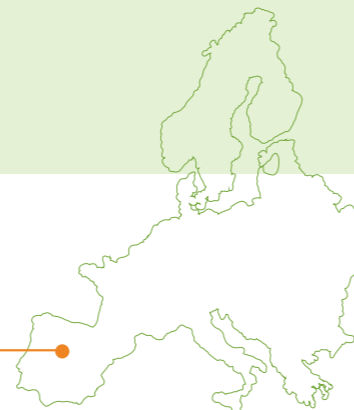
Location: Jumilla, Spain
Modules Used: CHSM 5612M
System Size: 3.5 MW
Completed: 2008



CAMPORROBLES SOLAR FARM



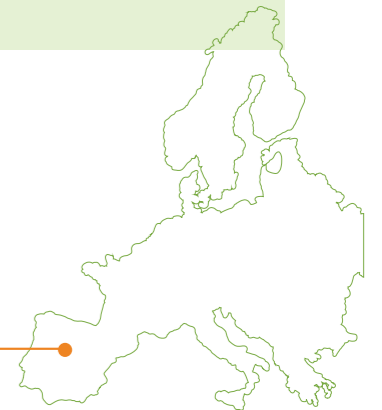
Location: Merida, Spain
Modules Used: CHSM 5612M
System Size: 1.1 MW
Completed: 2008



MALLORCA SOLAR FARM



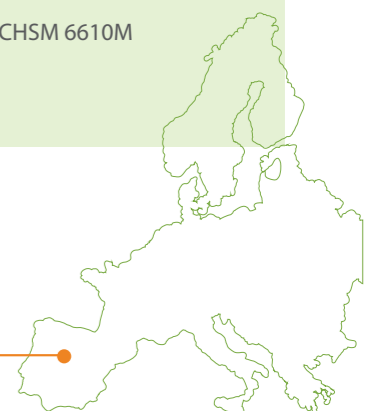
Location: Mallorca, Spain
Modules Used: CHSM 5612M
System Size: 2.4 MW
Completed: 2008



GERONA ROOFTOP SYSTEM



Location: Gerona, Spain
Modules Used: Crystalline PV CHSM 6610M
System Size: 30 KW
Completed: 08/2009

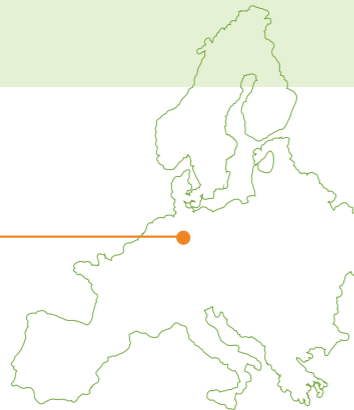


REFERENCE PROJECT

MAXSOLAR ROOFTOP PV PLANT TOLEDO - A JOINT-VENTURE SOLAR PARK



Location: Eggstatt, Germany
 Modules Used: CHSM 5612M
 System Size: 1.2 MW
 Completed: 06/2010
 EPC: Max Solar

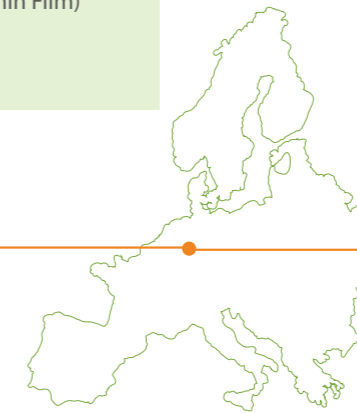


REFERENCE PROJECT

ARAUSOL ROOFTOP SYSTEM



Location: Arausol, Germany
 Modules Used: CHSM 5001T(Thin Film)
 System Size: 500 KW
 Completed: 11/2010



Location: Königsbrück, Germany
 Modules Used: CHSM 6610P
 System Size: 2.79 MW
 Developer: VISSOLIS GmbH, Solmotion
 EPC: VISSOLIS GmbH, solmotion
 Bank: Deutsche Kreditbank AG (DKB)

KÖNIGSBRÜCK PROJECT

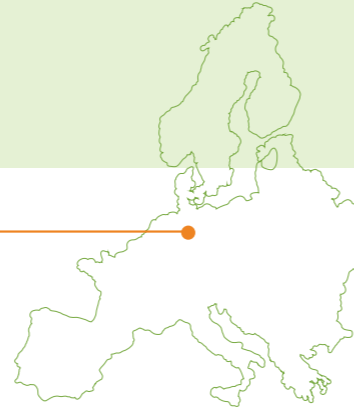


REFERENCE PROJECT

PV GRANDL



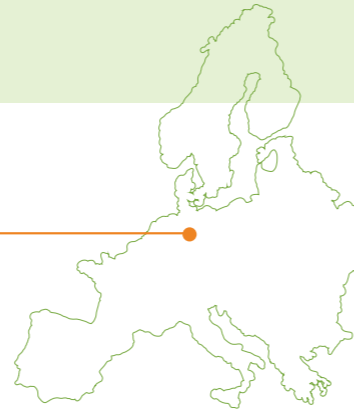
Location: München, Germany
Modules Used: Crystalline PV CHSM 5612M
System Size: 100 KW
Completed: 12/2009



PV SCHNEIDER



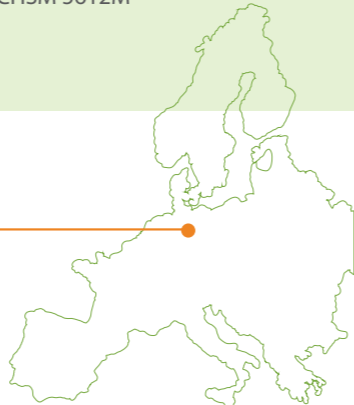
Location: Nußdorf, Germany
Modules Used: Crystalline PV CHSM 5612M
System Size: 58 KW
Completed: 12/2009



PV STANGLMEIER



Location: Abensberg, Germany
Modules Used: Crystalline PV CHSM 5612M
System Size: 160 KW
Completed: 12/2010

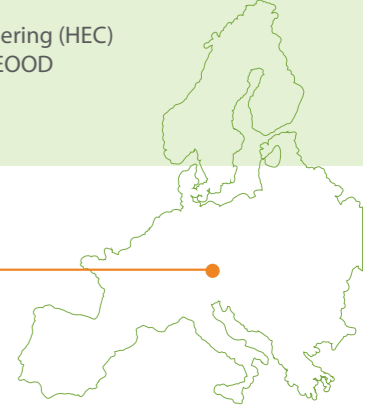


REFERENCE PROJECT

PALAUOVO



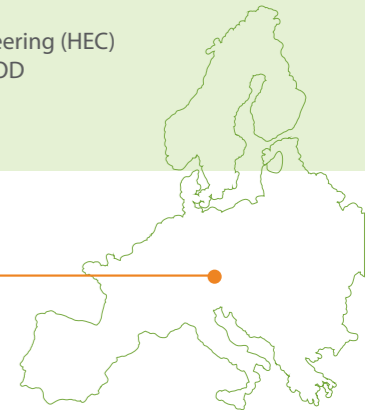
Location: Bulgaria
Modules Used: Crystalline PVCHSM 6610P
System Size: 5 MW
Completed: 6/2012
EPC: Hyundai Engineering (HEC)
Developer: Solar 11 EOOD



CHERVENIAKOVO



Location: Bulgaria
Modules Used: Crystalline PVCHSM 6610P
System Size: 4 MW
Completed: 6/2012
EPC: Hyundai Engineering (HEC)
Developer: SP02 EOOD

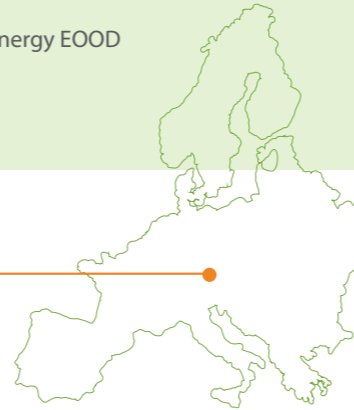


REFERENCE PROJECT

SMOLNIK



Location: Bulgaria
Modules Used: Crystalline PVCHSM 6610P
System Size: 2.8 MW
EPC: LG CNS
Developer: SmolnikEnergy EOOD

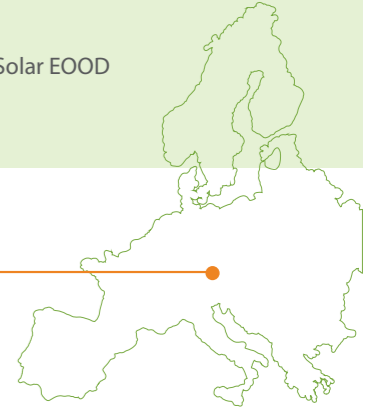


REFERENCE PROJECT

SKOBELEVO



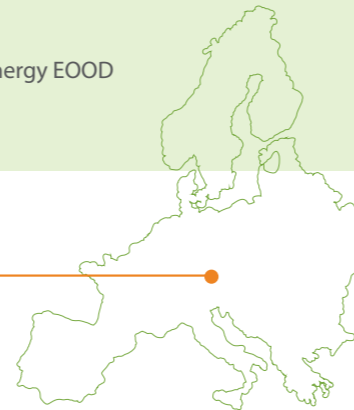
Location: Bulgaria
Modules Used: Crystalline PVCHSM 6610P
System Size: 5 MW
Completed: 6/2012
EPC: LG CNS
Developer: Phoenix Solar EOOD



VALCHIN



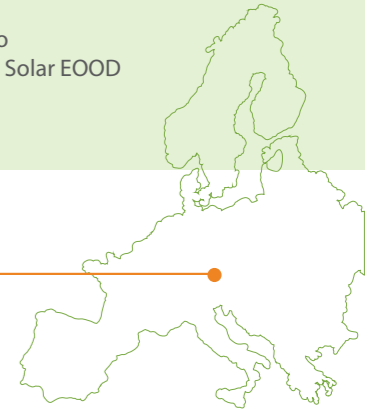
Location: Bulgaria
Modules Used: Crystalline PVCHSM 6610P
System Size: 3.6 MW
Completed: 6/2012
EPC: LG CNS
Developer: ValchinEnergy EOOD



HANOVO



Location: Bulgaria
Modules Used: Crystalline PVCHSM 6610P
System Size: 4.5 MW
Completed: 6/2012
EPC: LSIS; Evertechno
Developer: Hanovo1 Solar EOOD

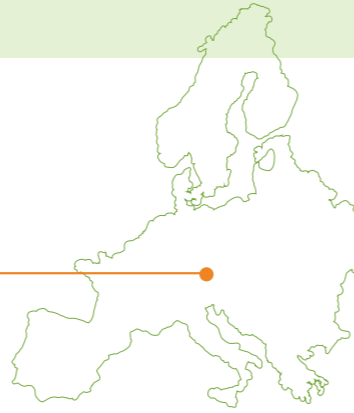


REFERENCE PROJECT

YAMBOL



Location: Bulgaria
Modules Used: Crystalline PVCHSM 6610P
System Size: 10 MW
Completed: 6/2012
EPC: LG CNS
Developer: InnimmoSolar EAD; Solar Projects EAD

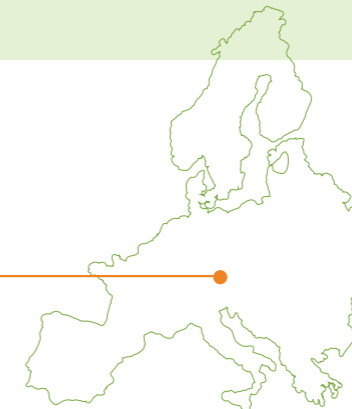


REFERENCE PROJECT

CHARGAN



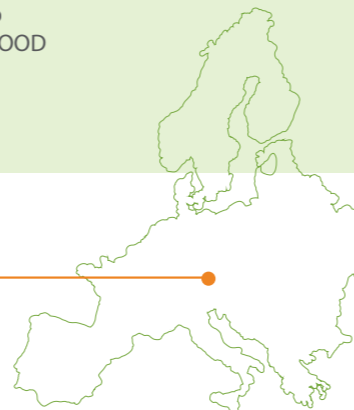
Location: Bulgaria
Modules Used: Crystalline PVCHSM 6610P
System Size: 10 MW
Completed: 6/2012
EPC: LG CNS
Developer: InnimmoSolar EAD; Solar Projects EAD



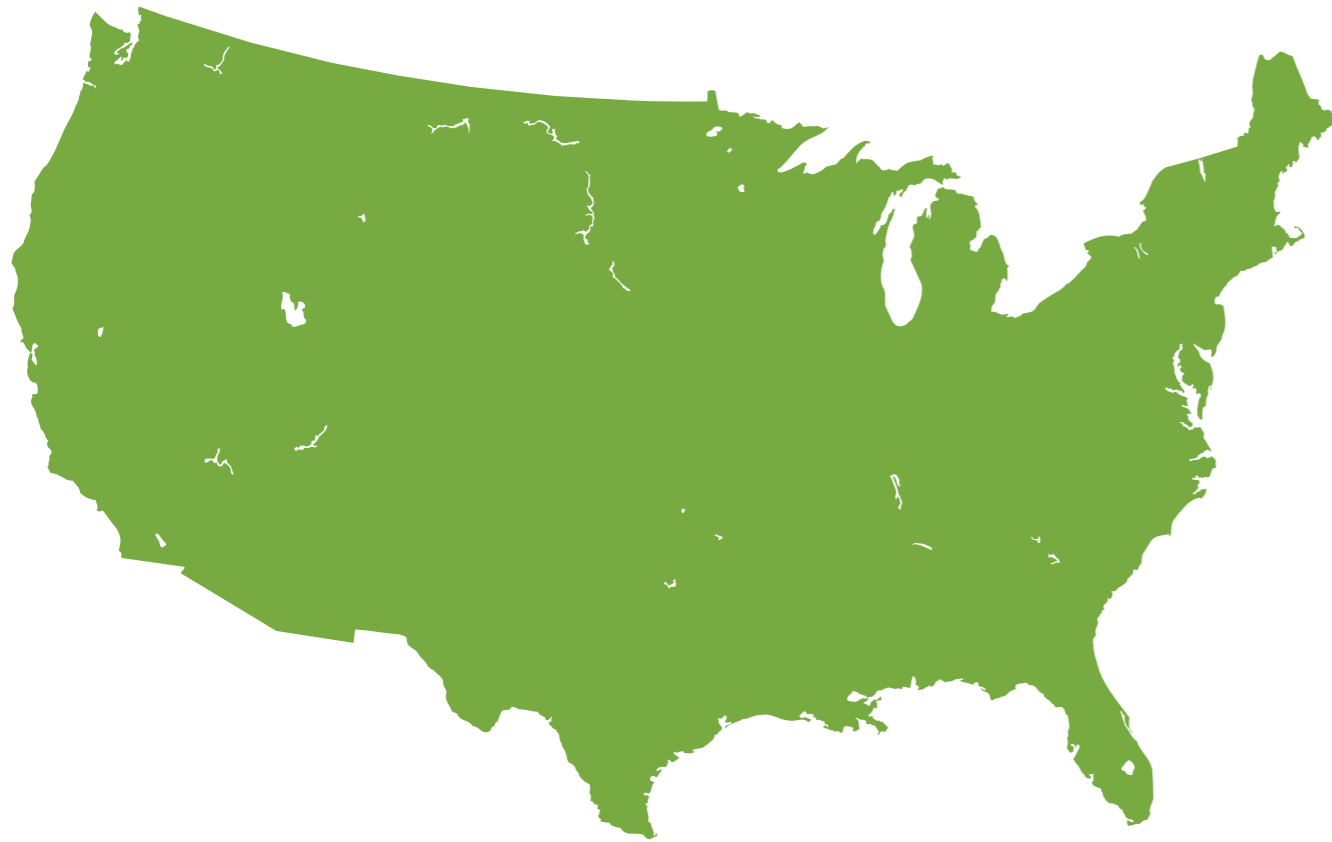
BEZMER



Location: Bulgaria
Modules Used: Crystalline PVCHSM 6610P
System Size: 10 MW
Completed: 6/2012
EPC: LSIS; Evertechno
Developer: JB Solar EOOD



NORTH AMERICA

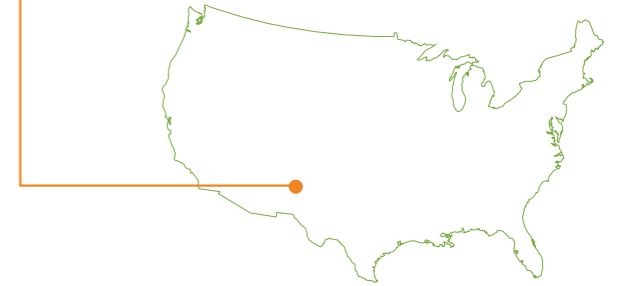


REFERENCE PROJECT

UNIVERSITY OF ARIZONA SCIENCE



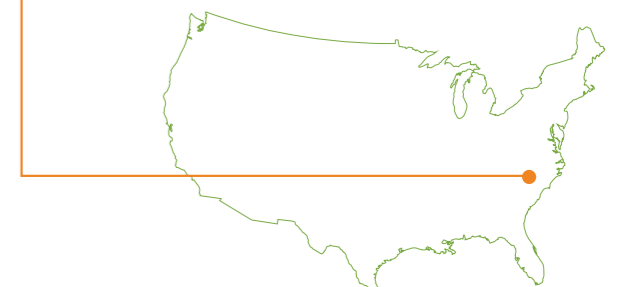
Location: Tucson Arizona, USA
Modules Use: Thin Film CHSM 5031(LR)
System Size: 6.1 MW
Developer: Solmotion & CTC Electric
Completed: 05/2012



KINGS MOUNTAIN SOLAR FARM



Location: North Carolina, USA
System Size: 5 MW
Developer: Strata Solar
Completion Time: 12/2011

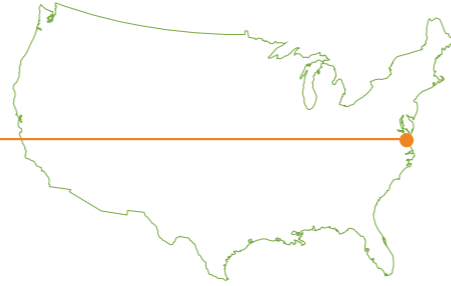


REFERENCE PROJECT

CLEAN HARBORS ENVIRONMENTAL SERVICES



Location: Bridgeport, NJ, USA
Modules Used: CHSM 6610P
System Size: 1.5MW
Completed: 1/2011
EPC: gro Solar



AIR PRODUCTS HEADQUARTERS



Location: Allentown, PA, USA
Modules Used: CHSM 5001T
System Size: 2 MW (1MW using Astronergy thin film)
Completed: 07/2011



REFERENCE PROJECT

DEPOT PARK PROJECT

One of the largest ground-mounted tracking solar power projects in Sacramento, California



Location: Sacramento, CA
Modules Used: CHSM 6610P
System Size: 3 MW Completed: 12/2010
EPC: SPG Solar, Inc
Bank: East West Bank

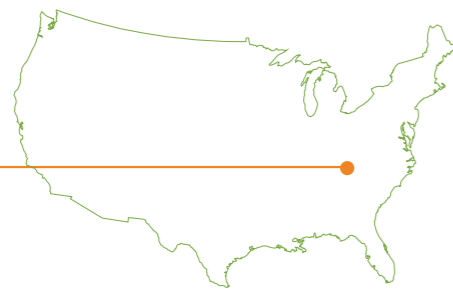


REFERENCE PROJECT

LINCOLN COUNTY PROJECT



Location: Fayetteville, TN, USA
 Modules Used: CHSM 6610P
 System Size: 3 MW
 Completed: 10/2011
 EPC: Vis Solis LLC, Franklin
 Project Developer: Lincoln Farm LLC



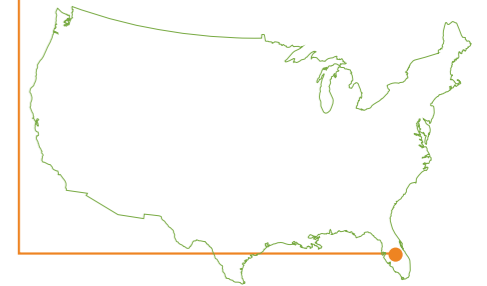
REFERENCE PROJECT

BUTLER PLAZA PROJECT

The largest solar rooftop array in south east USA



Location: Gainesville, FL
 Modules Used: CHSM 6610P
 System Size: 2.2 MW
 Completed: 10/2010
 EPC: SPG Solar, Inc
 Bank: East West Bank; US Bank

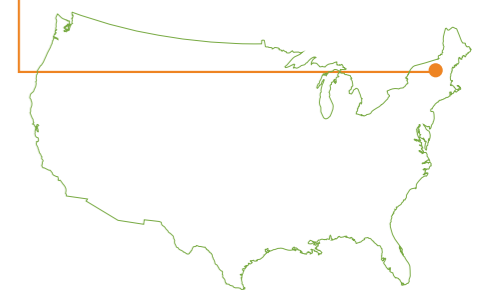


SOUTH BURLINGTON SOLAR FARM

The Largest Distributed Solar Tracker Farm in North America



Location: South Burlington, VT, USA
 System Size: 2.2 MW
 Completed: 7/2011
 Developer/EPC: AllEarth Renewables



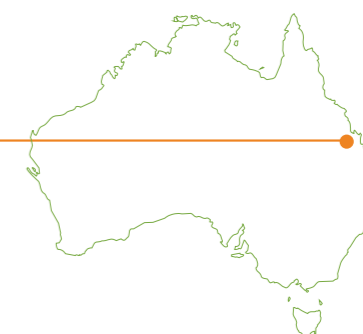


REFERENCE PROJECT

SHIRE OF MUNDARING WA



Location: Shire of Mundaring WA, Australia
Modules Used: CHSM 5612M
System Size: 16KW
Completed: 09/2010



KUMENANCHO



Location: Kumenancho, Japan
Modules Used: Crystalline PVCHSM6612P
System Size: 701KW
Completed: 10/2012

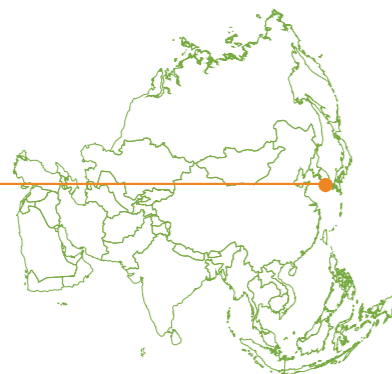


REFERENCE PROJECT

DAEBANG PV PLANT



Location: Daebang, Korea
Modules Used: Crystalline PV CHSM 6610M
System Size: 1 MW
Completed: 3/2010
Developer: Chint Group
Bank: KB Bank



REFERENCE PROJECT

WIN-TECH SOLAR FARM



Location: Korea
Developer: Astronergy Solar Korea & JESE
System Size: 1MW
Completed: Jun 2010

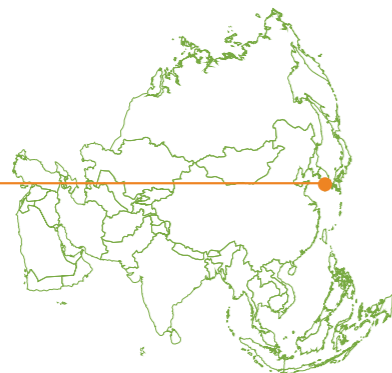


REFERENCE PROJECT

BOONGEO-SEOM PV PLANT



Location: Songam-dong, Chuncheon city, Korea
 Module Used: CHSM6610M – 230W
 Developer: Chint Group
 System Size: 6 MW
 Completed: Dec, 2011

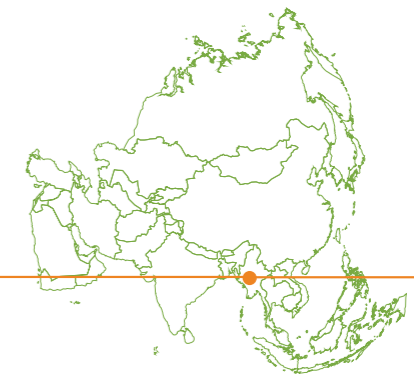


REFERENCE PROJECT

SPP2 SARABURI PROJECT



Location: Saraburi, Thailand
 Module Used: Crystalline PVCHSM6612P
 System Size: 9.6 MW
 Completed: 5/2012
 EPC: Sunedison



LOPBURI SOLAR PARK



Lopburi Solar Park
 Location: Lopburi, Thailand
 Modules Used: CHSM 5001T (thin film)
 System Size: 1.65 MW
 EPC: JECE
 Bank: Tisco



REFERENCE PROJECT

SARABURI PV PLANT



Location: Saraburi, Thailand
Module Used: CHSM6610P-230W)
Developer: Chint Group
System Size: 5.5 MW
Completed: Dec, 2011



REFERENCE PROJECT

CHONBURI SOLAR FARM



Location: Chonburi, Thailand
Module Used: CHSM6610P-235W)
Developer: Chint Group
System Size: 24 MW
Completed: Dec, 2012



REFERENCE PROJECT DUNHUANG SOLAR PARK



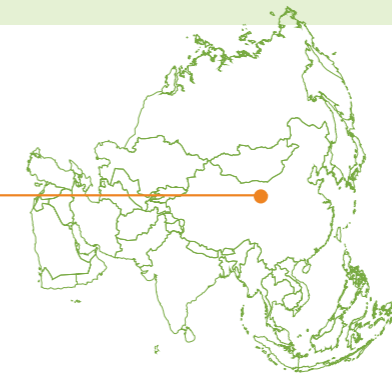
Location: Dunhuang, Gansu, China
Module Used: Crystalline PV CHSM6610P
Developer: Chint Group
System Size: 50MW
Expected Completion Time: 05/2012



REFERENCE PROJECT TAIYANGSHAN PV PLANT



Location: Ningxia, China
Module Used: Crystalline PV CHSM6610P
Developer: Chint Group
System Size: 10MW
Completed : 05/2012

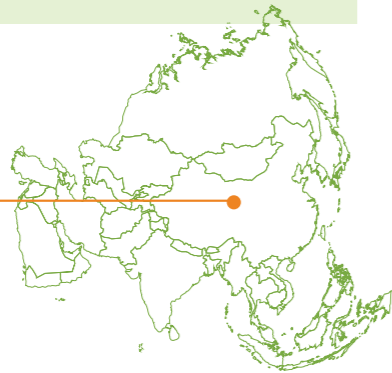


REFERENCE PROJECT

JINTA PV PLANT



Location: Gansu , China
Module Used: Crystalline PV CHSM6610P
Developer: Chint Group
System Size: 40MW
Expected Completion Time: 05/2012



REFERENCE PROJECT

NANJI ISLAND OFF-GRID SOLAR STATION

Part of China "Golden Sun" Project



Location: Nanji Island, Wenzhou, China
Developer: Chint Group
System Size: 1MW
Expected Completion Time: 2012

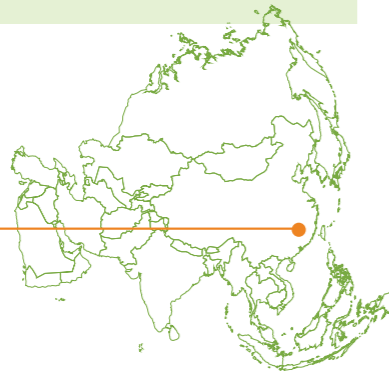


REFERENCE PROJECT

HANGZHOU JIANGNAN EXPERIMENTAL SCHOOL



Location: Hangzhou, China
Modules Used: CHSM 5001 T
System Size: 250 kWp
Completed: 10/2010

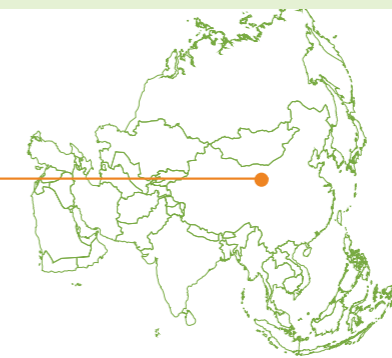


REFERENCE PROJECT

SHIZUISHAN SOLAR POWER STATION



Location: Shizuishan, Ningxia Province, China
Modules Used: CHSM 5001T | CHSM 5612M
System Size: 100 MW (first phase- 10 MW)
Completed: In Progress



REFERENCE PROJECT

SION STEEL PROJECT

Part of China "Golden Sun" Project



Location: Huzhou, China
Modules Used: Crystalline PV CHSM 6610P
System Size: 4.25MW
Expected Completion Time: 2012 (First half completed in 09/2011)



REFERENCE PROJECT

HANGZHOU QIGE SEWAGE TREATMENT PLANT PROJECT

Part of China "Golden Sun" Project



Location: Hangzhou, China
Modules Used: Crystalline PV CHSM 6610P
System Size: 2MW
Completed: 2011



REFERENCE PROJECT

HANGZHOU ZHONGNAN BUILDING - BIPV



Location: Hangzhou, China
Modules Used: CHSM 5612M
System Size: 100 KWp
Completed: 1/2010



REFERENCE PROJECT

HANGZHOU EAST RAILWAY STATION PV SYSTEM



Location: Hangzhou, China
Modules Used: CHSM 6610P
System Size: 10 MW



REFERENCE PROJECT

HANGZHOU ENERGY AND ENVIRONMENT INDUSTRIAL PARK



Location: Hangzhou, China
Modules Used: CHSM 5001T (thin film) | CHSM 5612M
System Size: 2 MW
Completed: 9/2009
EPC: CHINA ENERGY CONSERVATION INVESTMENT CORPORATION



REFERENCE PROJECT

ASTRONERGY BUILDING C - BIPV



Location: Hangzhou, China
Modules Used: CHSM 5001T (thin film)
System Size: 180 kWp
Completed: 5/2010



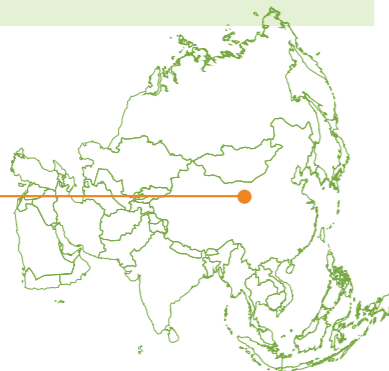
REFERENCE PROJECT

NINGXIA HUINONG CULTURE CENTER-BIPV

Part of China "Golden Sun" Project



Location: Ningxia
Modules Used: Thin Film CHSM 5001T
System Size: 800 KW
Completed: 01/2010



REFERENCE PROJECT

SEVEN STAR HOTEL PYRAMID- BIPV



Location: Inner Mongolia, China
System Size: 409.17KW (Ground Mount + BIPV)
Completed: 07/2010



REFERENCE PROJECT

GOLMUD SOLAR PARK



Location: Golmud, Qinghai Province, China
 Module Used: CHSM6610P
 System Size: 20MW
 Completed: 10/2011

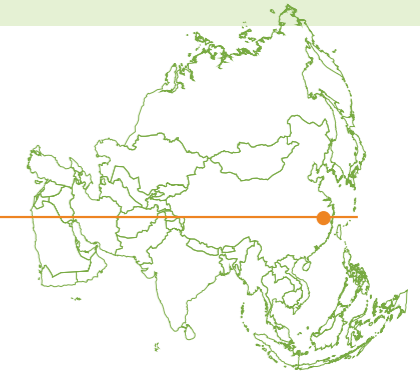


REFERENCE PROJECT

SHANGHAI EXPO RAILING - BIPV



Location: Shanghai, China
 Modules Used: CHSM 5001T (thin film)
 System Size: 565 kWp
 Completed: 1/2010



K-STRUCTURES ROOFTOP PV PLANT



Location: Kuala Lumpur, Malaysia
 Modules Used: Crystalline PVCHSM6610P
 System Size: 1.1MW
 Completed: 01/2013
 EPC: K-STRUCTURES



REFERENCE PROJECT

OTHER PROJECTS IN PROGRESS

GANSU PROJECTS



Location: Gansu Province, China (3 sites)
 Total System Size: 100 MW
 Developer: Chint Group
 Completion Time: Dec 2011



REFERENCE PROJECT

OTHER PROJECTS IN PROGRESS

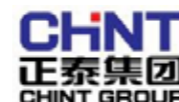
AGRO 2

Location: Italy
 System Size: 2.5 MW
 Investor: SEP
 EPC: Global Energy Service
 Bank: UniCredit



ROMANIA PROJECTS

Location: Romania
 Total System Size: 95MW
 Investor: Chint Group
 EPC:
 BESTER GENERACION S.L.
 INSTALACIONES ELECTRICAS DE
 SANXENXO, S.L.U. (INELSA)
 Completion Time : First Phase 03/2013



OTANNA

Location: Italy
 System Size: 11.2MW (7.5MW Astronergy CHSM6610P)
 Investor: Otanna Energy, Winch Energy
 EPC: Global Energy Service
 Bank: UniCredit, Investec



SOUTHAFRICA PROJECTS

Location: Soutpan Solar Park
 Total System Size: 28MW
 Developer: Chint Group
 Completion Time: 2012-2013

Location: Witkop Solar Park
 Total System Size: 30MW
 Developer: Chint Group
 Completion Time: 2012-2013



ADDITIONAL:

DKB has financed an additional 10MW of Astronergy projects with Solmotion GmbH.



RAJASTHAN PROJECTS

Location: Rajasthan, India
 Total System Size: 20MW
 Developer: Chint Group
 Completion Time: 12/2012



Astronergy has provided 101 MW products for MEMC's projects installing in 2011 (eg. projects in Thailand, India, Italy)



APPENDICES

APPENDIX 1

OQA AUDIT

Astronergy conducts an OQA Audit to ensure that delivered products meet our customers' requirements.

Items	Inspection Point	Frequency	Acceptance Criteria	Inspection Method
Material Consistency	Production Requirement Issued	Every Lot	Same as materials in BOM list	Visual Inspection
	During Production	Per Shift	Same as materials in BOM list	Line Audit
Visual Appearance	Before Packaging	Acc. To AQL Level 2 Standard	AQL 1.0	Visual Inspection
Power Output	After Packaging	20 pcs/ shift 20 pcs/type	+/-1.0%	Flasher
Micro-crack	Before Packaging	AQL Level 2	AQL 1.0	EL Image Check
	After Packaging	20 pcs/ shift 20 pcs/type	+/-1.0%	EL Tester
Packaging	After Packaging	Acc. To AQL Level 2 Standard	AQL 1.0	Visual Inspection
Special Requirements	Before Shipment	Per Shift	Meet Customer's Requirements	Line Audit

APPENDIX 2 WARRANTY

Astronergy/Chint Solar provides limited warranty to purchasers (hereafter referred to as the “customer”) of Astronergy Crystalline products. The terms of the limited warranty are as follows:

1. Limited Product Warranty – Ten Year Repair, Replacement or Refund Remedy

Astronergy warrants its Crystalline photovoltaic solar modules (hereafter referred to as “modules”), including factory-assembled DC connectors and cables, if any, to be free from defects in materials and workmanship under normal application, conditions, use, installation, and maintenance, within a period of 120 months from the day of installation at the first application, (hereafter referred to as the “warranty start date”).

If a module is found defective in material or workmanship, Astronergy will, at its sole discretion, repair or replace the module, or refund the purchase price as paid by the customer within the above specified period according to the type of defect. For clarification purpose: “material or workmanship defects” are defined per IEC 61215 Clause 7, IEC 61215 Clause 10.1 and IEC 61730 Clause 10.1 for visual defects, and per IEC 61215 entire Clause 10 for electrical and mechanical defects. .

The options to repair or replace defective modules, or refund the purchase price are the only and exclusive remedies guaranteed under this Limited Warranty for Crystalline PV Modules and shall not extend beyond the period of 120 months set forth here. Remedies will be performed directly to the customer only. This Limited

Warranty for Crystalline PV Modules does not warrant a specific power output, which shall be exclusively covered under Clause 2 hereinafter (“Limited Peak Power Warranty – Limited Remedy”).

2. Limited Peak Power Warranty – Limited Remedy

Astronergy provides two solutions of peak power warranty base on the product types and contract terms as below:

① Standard Peak Power Warranty

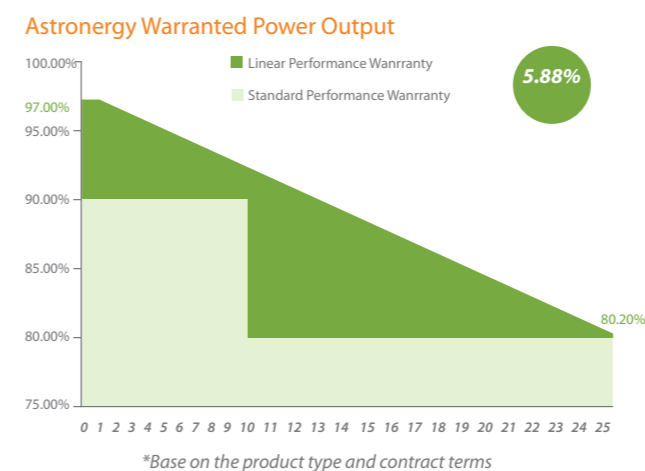
Astronergy warrants that any module(s) exhibits a power output no less than 90% of the nominal peak power at Standard Testing Conditions (STC, defined as: (a) light spectrum of AM 1.5, (b) an irradiation of 1000 W per m2 and (c) a cell temperature of 25 degrees Celsius at right angle irradiation.) specified on the respective datasheet within a period of 10 years from the warranty start date, or any module(s) exhibits a power output no less than 80% of the nominal peak power at STC specified on the respective datasheet within a period of 25 years from the warranty start date.

② Linear Peak Power Warranty

Astronergy warrants that module(s) exhibits a power output no less than 97% of the nominal peak power at STC specified on the respective datasheet within the first year from the warranty start date, or power output decline

APPENDIX 2 WARRANTY

exhibits no more than 0.7%/ year of the nominal peak power at STC specified on the respective datasheet from the 2nd year to 25th year.



For the above such loss in power measured by Astronergy facility or the 3rd party testing institute recognized from both sides, it is determined by Astronergy (at its sole and absolute discretion) to be due to defects in material or workmanship, is eligible for claim under this Limited Warranty for Crystalline PV Modules. Astronergy will replace such loss in power by either providing additional modules to the customer to make up for such loss in power, or by repairing or replacing the defective modules at the discretion of Astronergy.

The remedies set forth in this Clause 2 shall be the sole and exclusive remedies provided under the “Limited Peak Power Warranty – Limited Remedy”.

CAVEAT: Any power measurement mentioned herein shall be subject to $\pm 3\%$ deviation of uncertainty due to the different measurement equipment being utilized.

3. Warranty Exclusions and Limitations

A. In any event, all warranty claims must be filed in accordance with the instructions outlined in Clause 4 of

this Limited Warranty for Crystalline PV Modules, within the applicable warranty period.

B. The Limited Warranty for Crystalline PV Modules does not apply to any modules which have been subjected to:

- Misuse, abuse, neglect or accident;
- Alteration, disassemble, reinstallation, and/or improper installation or application;
- Non-observance of Astronergy’s installation and maintenance instructions;
- Repair or modifications by persons that have not been previously authorized or approved by Astronergy;
- Failures caused by surrounding equipment of the module;
- Use under unusual conditions or environments that deviate from the product specifications and installation manual;
- Use for purposes unrelated to the generation of solar power;
- Connection with any other manufacturer’s PV modules, or Astronergy modules that are a different model or have different power output specifications;
- Defects occurring during transportation or storage after the modules have been delivered to the customer;
- Naturally occurring scratches, stains, mechanical wear, rust, degradation, discoloring, or other alteration occurring after the shipment from Astronergy that have no effect on the power generation performance or mechanical strength of the module, but not limited to the below visual alteration during the related warranty period:
 - a. Non-significant discoloration of laminate.
 - b. Non-significant loss of glass transparency.
 - c. Non-significant increase of surface roughness.
 - d. Non-significant frame damage due to environmental stress.

APPENDIX 2

WARRANTY

- e. Non-significant damage of junction box due to environmental stress or indication of corrosion.
 - f. Non-significant damage of connectors and cables due to environmental stress or indication of corrosion.
 - g. Non-significant damage of frame fixation due to environmental stress.
- Power failure surges, flood, fire, accidental breakage or other events caused by force of nature, force majeure, or other unforeseeable circumstances outside the range of influence of Astronergy.
- C. The Limited Warranty for Crystalline PV Modules does not cover any transportation charges, customs clearance or any other costs for return of the modules, for reshipment of any repaired or replaced modules, or costs associated with installation, removal or reinstallation of the modules.
- D. Warranty claims will not be honored if the type or serial number of the modules have been altered, removed or made illegible.
- E. Astronergy shall have no responsibility or liability whatsoever for damage or injury to persons or property, or for other loss or injury resulting from any cause whatsoever arising out of or related to modules, including, without limitation, any defects in the modules, or from use or installation. Under no circumstances shall Astronergy be liable for incidental, consequential, loss of use, loss of profits, loss of revenues, loss of production or special damages. Astronergy's aggregate liability, if any, in damages or otherwise, shall not exceed the invoice value against the affected modules as paid for by the customer.

4. Obtaining Warranty Performance

- A. Warranty claims should be sent to (a) the dealer who sold the modules, or (b) the authorized Astronergy

distributor who sold the modules, or (c) Astronergy at the address above.

- B. Warranty claims must be sent by registered mail or courier. The claims must include the serial number of the defective module(s), accompanied by a copy of the relevant invoice and purchase contract, and must state: "We hereby accept, and agree to, the choice of law, the choice of an expert appraiser and the choice of arbitration as set out in Clause 6 of your Limited Warranty for Crystalline PV Modules on which our claim is based." Together with the notification, the customer should enclose evidence of the date of sale on which the modules were purchased. Incomplete notifications claims that do not meet the notification deadline of Clause 4, Section C will not be processed.
- C. Any claim under this limited warranty shall be forfeited if (a) the customer does not notify Astronergy or their distributors of such claim in writing in accordance with Clause 4 paragraph A within twenty (20) days after discovering or after the customer should have discovered, the defect claimed under warranty; or (b) the customer does not commence court or arbitration action within six (6) months after proper notification of the claim.
- D. Astronergy reserves the right to deliver another type of module (different in size, form, color, shape and/or power) to replace the claimed one if it is no longer in production when the warranty claim is received.
- E. The repair, replacement, or additional delivery of a module neither renews nor extends the period of the warranty.
- F. Any claimed/defective product that has been replaced by Astronergy shall become the property of Astronergy. The claimed/defective product shall be returned or otherwise disposed of in accordance with the instructions of Astronergy and at the customer's expense.

APPENDIX 2

WARRANTY

5. Severability

If a part, provision or clause of this Limited Warranty for Crystalline PV Modules, or the application thereof to any person or circumstance, is held invalid, void or unenforceable, such holding shall not affect and shall leave all other parts, provisions, clauses or applications of this Limited Warranty for Crystalline PV Modules, and to this end such other parts, provisions, clauses or applications of this Limited Warranty for Crystalline PV Modules shall be treated as severable.

6. Disputes

No action, regardless of form, arising out of or in any way connected with this Limited Warranty for Crystalline PV Modules, maybe brought against Astronergy more than six (6) months after the cause of action has occurred.

In the case of a dispute in a warranty claim, a first-class international institute designated by Astronergy such as Fraunhofer ISE in Freiburg, Germany or TÜV Rheinland in Cologne, Germany shall be involved to judge the claim. All fees and expenses shall be borne by the losing party, unless otherwise awarded. The final right of interpretation shall be borne by Astronergy.

APPENDIX 3

DATA SHEET (POLYCRYSTALLINE)



Datasheet

Crystalline PV Module

CHSM6610P Series

230	235	240	245	250	255	260
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ELECTRICAL SPECIFICATIONS							
STC rated output (P _{mpp})*	230 Wp	235 Wp	240 Wp	245 Wp	250 Wp	255 Wp	260 Wp
PTC rated output (P _{mpp})**	209.2 Wp	213.9 Wp	218.5 Wp	223.2 Wp	227.9 Wp	232.5 Wp	237.2 Wp
Standard sorted output	-0/+5 Wp						
Warranted power output STC (P _{mpp min})	230 Wp	235 Wp	240 Wp	245 Wp	250 Wp	255 Wp	260 Wp
Rated voltage (V _{mpp}) at STC	28.78 V	29.16 V	29.54 V	29.92 V	30.30 V	30.68 V	31.05 V
Rated current (I _{mpp}) at STC	7.99 A	8.06 A	8.13 A	8.20 A	8.27 A	8.33 A	8.39 A
Open circuit voltage (V _{oc}) at STC	37.35 V	37.56 V	37.77 V	37.98 V	38.19 V	38.40 V	38.53 V
Short circuit current (I _{sc}) at STC	8.53 A	8.56 A	8.59 A	8.62 A	8.65 A	8.69 A	8.72 A
Module efficiency	14.0%	14.3%	14.6%	14.9%	15.2%	15.5%	15.8%
Rated output (P _{mpp}) at NOCT	172.5 Wp	176.3 Wp	180.0 Wp	183.8 Wp	187.5 Wp	191.3 Wp	195.0 Wp
Rated voltage (V _{mpp}) at NOCT	26.08 V	26.42 V	26.75 V	27.06 V	27.37 V	27.73 V	28.08 V
Rated current (I _{mpp}) at NOCT	6.61 A	6.67 A	6.73 A	6.79 A	6.85 A	6.90 A	6.95 A
Open circuit voltage (V _{oc}) at NOCT	34.12 V	34.31 V	34.50 V	34.70 V	34.89 V	35.08 V	35.20 V
Short circuit current (I _{sc}) at NOCT	7.18 A	7.21 A	7.23 A	7.26 A	7.28 A	7.32 A	7.34 A
Temperature coefficient (P _{mpp})	-0.469%/K	Maximum system voltage IEC		1000 V _{DC}			
Temperature coefficient (I _{sc})	+0.052%/K	Maximum system voltage UL		600 V _{DC} / 1000 V _{DC}			
Temperature coefficient (I _{mpp})	-0.008%/K	Number of diodes		6			
Temperature coefficient (V _{mpp})	-0.463%/K	Maximum series fuse rating		15 A			
Temperature coefficient (V _{oc})	-0.344%/K						
Normal operating cell temperature (NOCT)	43±2°C						

* Measurement tolerance +/- 3%
** Estimated

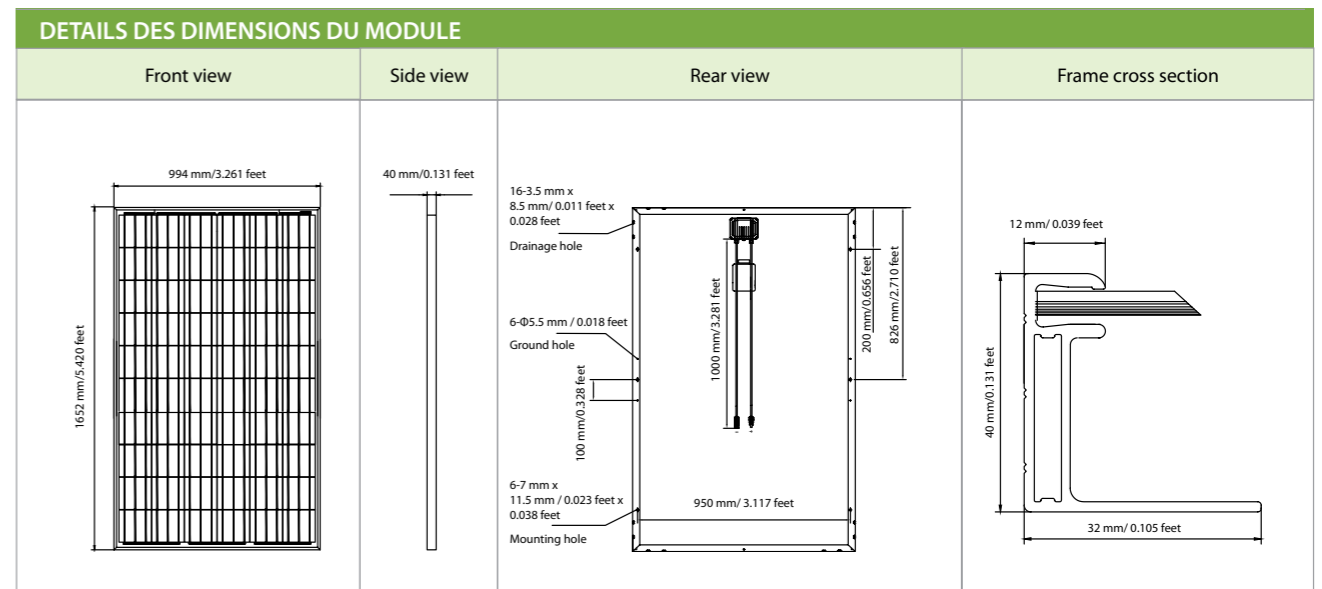
QUALIFICATION AND WARRANTIES	
Product standard	IEC 61215, 61730 / UL 1703
Extended product warranty	10 years
Output warranty of 90% performance P _{mpp} (STC)	10 years
Output warranty of 80% performance P _{mpp} (STC)	25 years

CELL TECHNOLOGY	
Cell type	polycrystalline
Number of cells / cell arrangement	60 / 6 x 10
Cells dimension	6"

MECHANICAL SPECIFICATIONS	
Outer dimensions (L x W x H)	1652 x 994 x 40 mm 65.04 x 39.13 x 1.57 in
Frame technology	Aluminum, silver anodized
Module composition	Glass / EVA / Backsheet (white)
Weight (module only)	19.5 kg / 42.9 lbs
Front glass thickness	3.2 mm / 0.13 in
Junction box IP rating	IP 65
Cable length / diameter (UL)	1000 mm / 39.37 in / 12 AWG
Cable length / diameter (IEC)	1000 mm / 39.37 in / 4 mm ²
Maximum load capacity	5400 Pa
Fire class	C
Connector type (UL)	Multi Contact type 4 / MC type 4 compatible
Connector type (TUV)	MC type 4 compatible

MISCELLANEOUS	
Packing unit	25 modules
Weight of packing unit	530 kg / 1166 lbs

ARTICLE NUMBER (per panel)-CHSM6610P Series		
Model	Article No. (IEC)	Article No. (UL)
CHSM6610P-230	200177	200185
CHSM6610P-235	200178	200186
CHSM6610P-240	200179	200187
CHSM6610P-245	200180	200188
CHSM6610P-250	200181	200189
CHSM6610P-255	200229	200231
CHSM6610P-260	200230	200232



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APPENDIX 3

DATA SHEET (POLYCRYSTALLINE)



Datasheet

Crystalline PV Module

CHSM6612P Series

275	280	285	290	295	300	305	310
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ELECTRICAL SPECIFICATIONS									
STC rated output (P _{mpp})*	275 Wp	280 Wp	285 Wp	290 Wp	295 Wp	300 Wp	305 Wp	310 Wp	
PTC rated output (P _{mpp})**	247.2 Wp	251.8 Wp	256.5 Wp	261.1 Wp	265.7 Wp	270.3 Wp	275.0 Wp	279.6 Wp	
Standard sorted output	-0/+5 Wp								
Warranted power output STC (P _{mpp min})	275 Wp	280 Wp	285 Wp	290 Wp	295 Wp	300 Wp	305 Wp	310 Wp	
Rated voltage (V _{mpp}) at STC	35.60 V	35.63 V	35.66 V	35.68 V	35.72 V	35.74 V	35.77 V	35.80 V	
Rated current (I _{mpp}) at STC	7.76 A	7.90 A	8.04 A	8.15 A	8.30 A	8.40 A	8.53 A	8.68 A	
Open circuit voltage (V _{oc}) at STC	44.51 V	44.64 V	44.77 V	44.90 V	45.03 V	45.16 V	45.29 V	45.42 V	
Short circuit current (I _{sc}) at STC	8.56 A	8.71 A	8.86 A	8.94 A	9.16 A	9.27 A	9.42 A	9.56 A	
Module efficiency	14.1%	14.4%	14.7%	14.9%	15.2%	15.4%	15.7%	15.9%	
Rated output (P _{mpp}) at NOCT	192.0 Wp	195.5 Wp	199.0 Wp	202.5 Wp	206.0 Wp	209.5 Wp	213.0 Wp	216.5 Wp	
Rated voltage (V _{mpp}) at NOCT	32.38 V	32.38 V	32.39 V	32.51 V	32.47 V	32.63 V	32.67 V	32.70 V	
Rated current (I _{mpp}) at NOCT	5.93 A	6.04 A	6.14 A	6.23 A	6.34 A	6.42 A	6.52 A	6.62 A	
Open circuit voltage (V _{oc}) at NOCT	40.84 V	40.96 V	41.08 V	41.20 V	41.32 V	41.44 V	41.56 V	41.68 V	
Short circuit current (I _{sc}) at NOCT	6.62 A	6.74 A	6.85 A	6.91 A	7.09 A	7.17 A	7.28 A	7.39 A	
Temperature coefficient (P _{mpp})	-0.451%/K		Maximum system voltage IEC		1000 V _{DC}				
Temperature coefficient (I _{sc})	+0.087%/K		Maximum system voltage UL		600 V _{DC} / 1000 V _{DC}				
Temperature coefficient (I _{mpp})	+0.007%/K		Number of diodes		6				
Temperature coefficient (V _{mpp})	-0.445%/K		Maximum series fuse rating		15 A				
Temperature coefficient (V _{oc})	-0.332%/K								
Normal operating cell temperature (NOCT)	46±2°C								

* Measurement tolerance +/- 3%
** Estimated

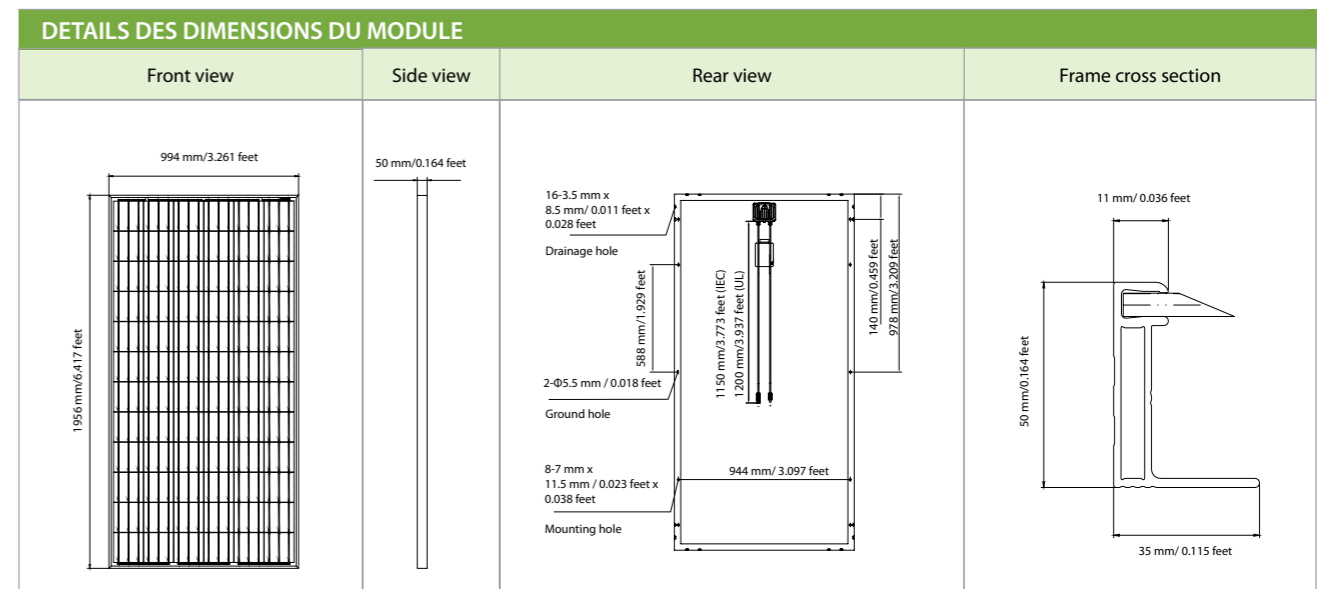
QUALIFICATION AND WARRANTIES	
Product standard	IEC 61215, 61730 / UL 1703
Extended product warranty	10 years
Output warranty of 90% performance P _{mpp} (STC)	10 years
Output warranty of 80% performance P _{mpp} (STC)	25 years

CELL TECHNOLOGY	
Cell type	polycrystalline
Number of cells / cell arrangement	72 / 6 x 12
Cells dimension	6"

MECHANICAL SPECIFICATIONS	
Outer dimensions (L x W x H)	1956 x 994 x 50 mm 77.01 x 39.13 x 1.97 in
Frame technology	Aluminum, silver anodized
Module composition	Glass / EVA / Backsheet (white)
Weight (module only)	23.5 kg / 51.7 lbs
Front glass thickness	3.2 mm / 0.13 in
Junction box IP rating	IP 65
Cable length / diameter (UL)	1200 mm / 47.24 in / 12 AWG
Cable length / diameter (IEC)	1150 mm / 45.28 in / 4 mm ²
Maximum load capacity	5400 Pa
Fire class	C
Connector type (UL)	Multi Contact type 4 / MC type 4 compatible
Connector type (TUV)	MC type 4 compatible

MISCELLANEOUS	
Packing unit	20 modules
Weight of packing unit	528 kg / 1162 lbs

ARTICLE NUMBER (per panel)-CHSM6612P Series		
Model	Article No. (IEC)	Article No. (UL)
CHSM6612P-275	200032	200039
CHSM6612P-280	200033	200040
CHSM6612P-285	200034	200041
CHSM6612P-290	200035	200042
CHSM6612P-295	200036	200043
CHSM6612P-300	200209	200211
CHSM6612P-305	200210	200212
CHSM6612P-310	200277	200278



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APPENDIX 4

DATA SHEET (MONOCRYSTALLINE)



Datasheet Crystalline PV Module CHSM6610M (BL) Series

245 250 255 260

ELECTRICAL SPECIFICATIONS			
STC rated output (P _{mpp})*	245 Wp	250 Wp	255 Wp
PTC rated output (P _{mpp})**	218.4 Wp	223.0 Wp	227.6 Wp
Standard sorted output	-0/+5 Wp		
Warranted power output STC (P _{mpp min})	245 Wp	250 Wp	255 Wp
Rated voltage (V _{mpp}) at STC	30.12 V	30.48 V	30.84 V
Rated current (I _{mpp}) at STC	8.16 A	8.23 A	8.31 A
Open circuit voltage (V _{oc}) at STC	37.94 V	38.09 V	38.24 V
Short circuit current (I _{sc}) at STC	8.61 A	8.64 A	8.67 A
Module efficiency	14.9%	15.2%	15.5%
Rated output (P _{mpp}) at NOCT	177.6 Wp	181.2 Wp	184.8 Wp
Rated voltage (V _{mpp}) at NOCT	26.84 V	27.15 V	27.43 V
Rated current (I _{mpp}) at NOCT	6.62 A	6.67 A	6.74 A
Open circuit voltage (V _{oc}) at NOCT	34.53 V	34.66 V	34.80 V
Short circuit current (I _{sc}) at NOCT	7.11 A	7.13 A	7.15 A
Temperature coefficient (P _{mpp})	-0.469%/K	Maximum system voltage IEC	
Temperature coefficient (I _{sc})	+0.035%/K	Maximum system voltage UL	
Temperature coefficient (I _{mpp})	-0.042%/K	Number of diodes	
Temperature coefficient (V _{mpp})	-0.433%/K	Maximum series fuse rating	
Temperature coefficient (V _{oc})	-0.328%/K		
Normal operating cell temperature (NOCT)	47±2°C		

* Measurement tolerance +/- 3%
** Estimated



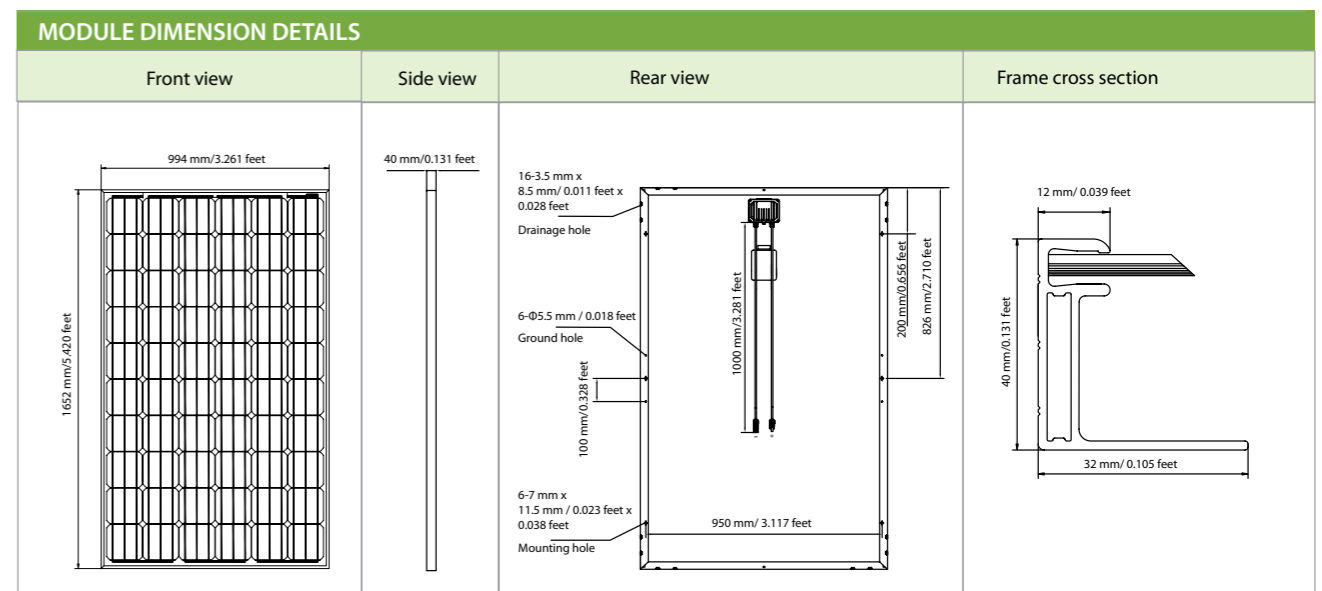
QUALIFICATION AND WARRANTIES	
Product standard	IEC 61215, 61730 / UL 1703
Extended product warranty	10 years
Output warranty of 90% performance P _{mpp} (STC)	10 years
Output warranty of 80% performance P _{mpp} (STC)	25 years

CELL TECHNOLOGY	
Cell type	monocrystalline
Number of cells / cell arrangement	60 / 6 x 10
Cells dimension	6"

MECHANICAL SPECIFICATIONS	
Outer dimensions (L x W x H)	1652 x 994 x 40 mm 65.04 x 39.13 x 1.57 in
Frame technology	Aluminum, black anodized
Module composition	Glass / EVA / Backsheet (black)
Weight (module only)	19.5 kg / 42.9 lbs
Front glass thickness	3.2 mm / 0.13 in
Junction box IP rating	IP 65
Cable length / diameter (UL)	1000 mm / 39.37 in / 12 AWG
Cable length / diameter (IEC)	1000 mm / 39.37 in / 4 mm ²
Maximum load capacity	5400 Pa
Fire class	C
Connector type (UL)	Multi Contact type 4 / MC type 4 compatible
Connector type (TUV)	MC type 4 compatible

MISCELLANEOUS	
Packing unit	25 modules
Weight of packing unit	530 kg / 1166 lbs

ARTICLE NUMBER (per panel)-CHSM6610M (BL) Series		
Model	Article No. (IEC)	Article No. (UL)
CHSM6610M(BL)-245	100319	100313
CHSM6610M(BL)-250	100320	100314
CHSM6610M(BL)-255	100321	100315
CHSM6610M(BL)-260	100322	100316



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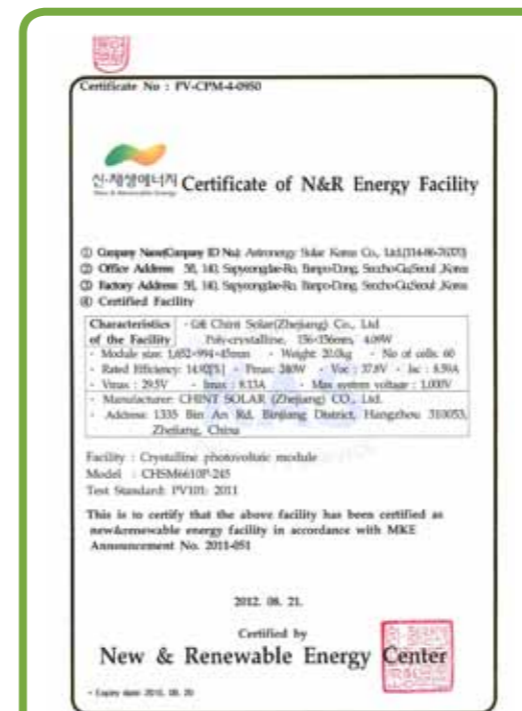
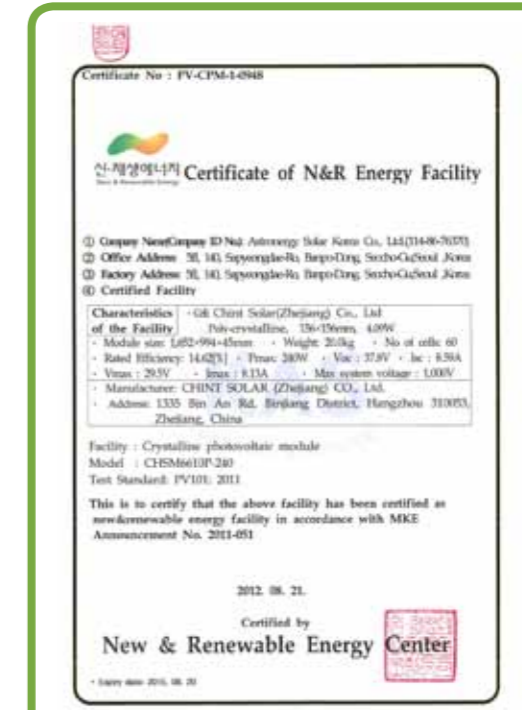
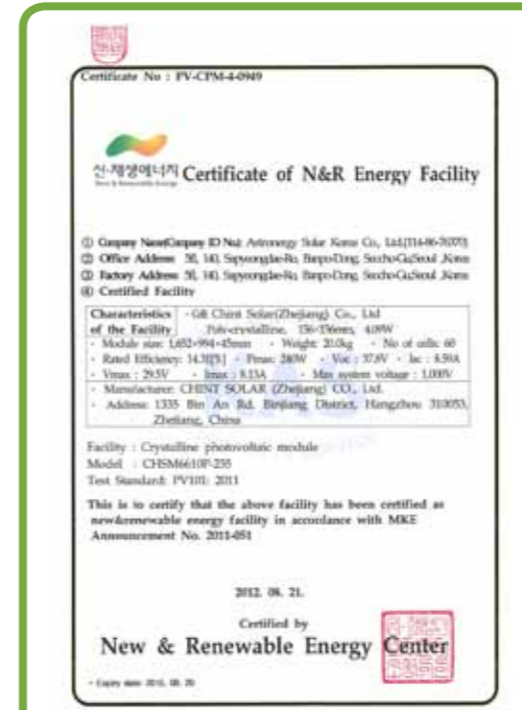
APPENDIX 5

CERTIFICATIONS (CRYSTALLINE)



APPENDIX 5

CERTIFICATIONS (CRYSTALLINE)

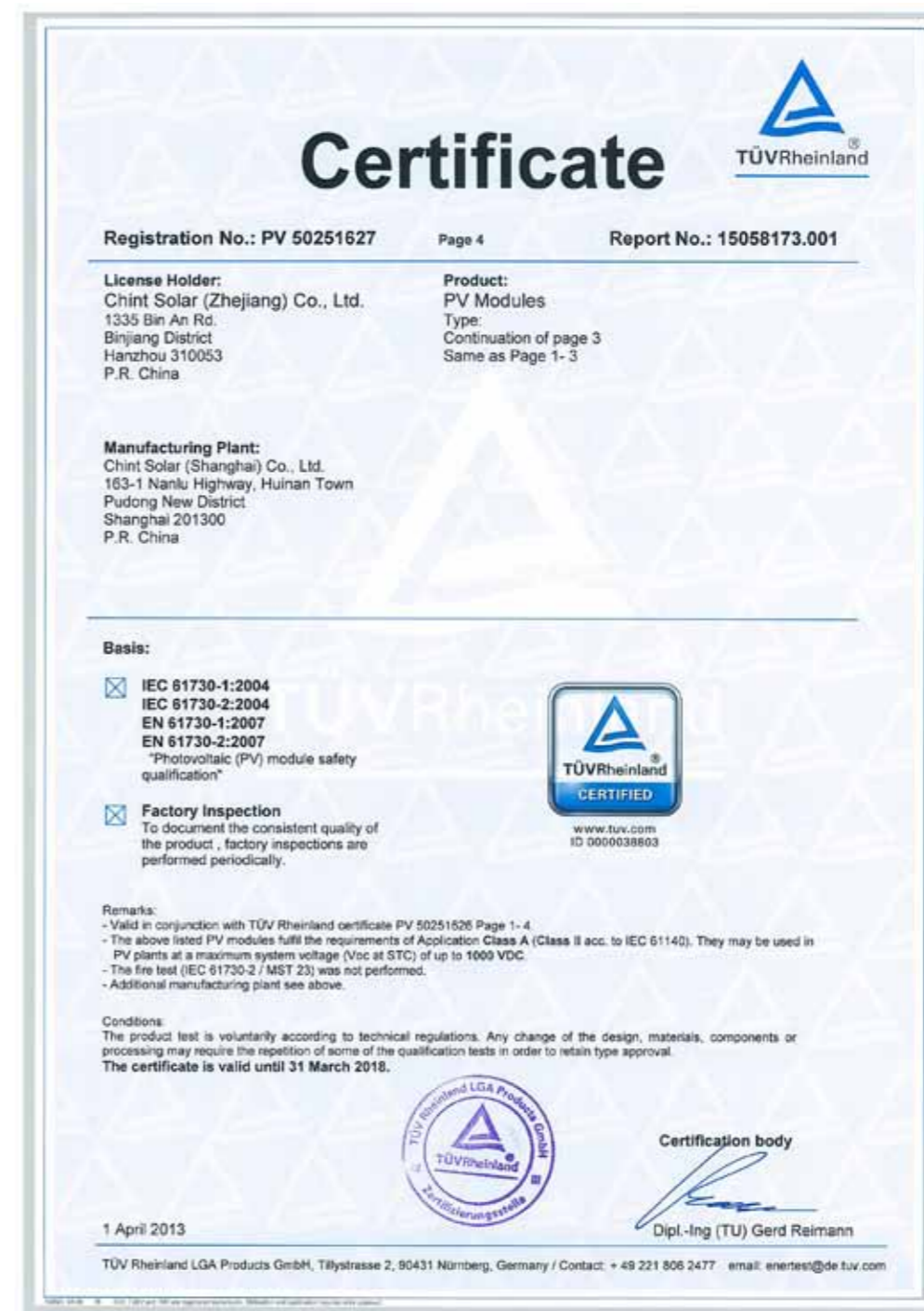


APPENDIX 5

CERTIFICATIONS (CRYSTALLINE)

APPENDIX 5

CERTIFICATIONS (CRYSTALLINE)



APPENDIX 6

MUNICH RE REINSURANCE COVERAGE

Who is Munich Re?

Founded in 1880 in Germany, Munich Re Group is currently the world's largest risk-management entity dealing in reinsurance, primary insurance, healthcare, and asset management. With a combined premium income of €45.5 billion in 2010; assets of €193 billion, and 47,000 employees around the world, Munich Re has a long history of financial stability: Munich Re was the only insurance company present in San Francisco to remain solvent after the city's devastating 1906 earthquake, and, even after the recent financial crisis, was ranked 71st on Fortune's 2010 Global 500 ranking—confirming the financial stability and agility of this heavyweight.



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What is power-loss reinsurance?

The degradation of power output from crystalline photovoltaic modules over time is well-understood. Astronergy guarantees a power loss of no more than 10% of the original power rating within 10 years and no more than 20% within 25 years. Munich Re reinsurance underwrites these guarantees in order to reduce the potential risk for investors and customers of Astronergy's photovoltaic systems. If modules perform at levels below those guaranteed by Astronergy because of faulty manufacturing, material defects, or material aging; and in the highly-unlikely event that a catastrophic setback prevents it from honoring resultant claims itself, Munich Re will provide financial support and coverage to Astronergy for the full duration of the module warranty – 25 years.

Why did Astronergy partner with Munich Re?

Astronergy's parent company is Chint, which has become one of the dominant players in the electric and photovoltaic industries since its founding in 1984. With the financial strength of a heavyweight mother company, Astronergy's warranties are already valuable and significant compared to manufacturer with limited assets who make only modules. The reinsurance of this guarantee by Munich Re is a powerful validation of the strength, product quality, and balance sheet of Chint and Astronergy. Munich Re is famous for its strict reinsurance requirements; in fact, Astronergy is currently the only Chinese manufacturer to announce publicly their fulfillment of the stringent Munich Re criteria for a full production module power reinsurance policy for crystalline silicon modules. Furthermore, Astronergy is currently the first manufacturer in the world to have Munich Re reinsurance coverage for both thin-film and crystalline modules.

How does Munich Re compare with other reinsurance providers?

	Munich Re (MuRe)	Other Reinsurers
Net reinsurance premiums written, 2009 (\$US millions) ¹	\$32,768	Top 10 median: \$9,175
Length of coverage	Years 6 to 25 (Astronergy)	Up to 10 years, but no full coverage
Type of analysis	Both financial and technical	Limited financial analysis only
Insurance expiration	Irrevocable; manufacturer unable to cancel insurance for the full 25 years	Renewed yearly; manufacturer can cancel insurance at any time
Optional investment insurance	Yes (called Option Cover)	Limited
Coverage of series-power losses	Unlimited; complete production volume.	Limited
Selectivity in offering insurance	Highly selective based on financial and technical risk	Granted to all companies who pay premiums
Meeting availability for investors and bankers	Experts available worldwide	Limited
Volume of coverage	Entire production volume	Often limited to partial volumes or specific production cycles

¹ Insurance Information Institute

What does it mean for me?

Reinsurance adds nothing but comfort to the relationship between customers and Astronergy. Rest easy that Munich Re's reinsurance coverage confirms what Astronergy already knew: that it truly is a world, Tier 1 player in solar energy. In the event that a module does not perform as guaranteed, claims will be addressed to your sales representative as usual. If, after reviewing the claim, the device has failed to perform to specifications, Astronergy will pursue one of two options: firstly, to repair, replace, or supplement the module; or secondly, to offer the customer financial compensation. For both options, Munich Re provides respective financial support and coverage to Astronergy.

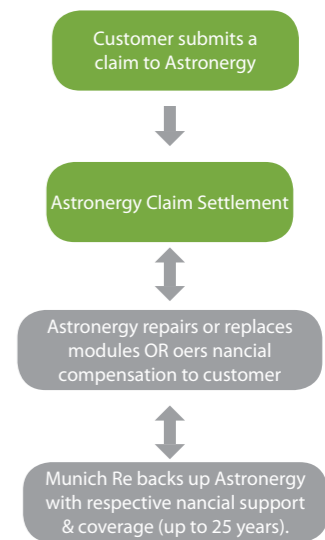
Monocrystalline modules use single-crystal silicon cells to achieve maximum solar efficiency. Modules created in 2011 or 2012 are guaranteed for 25 years from their customer invoice date.

- CHSM5409M
- CHSM5611M
- CHSM5612M
- CHSM5612M (BL)
- CHSM6609M
- CHSM6609M (BF)
- CHSM6610M
- CHSM6610M (BL)



Polycrystalline modules use a simpler raw material manufacturing process, achieving a cost optimized performance/cost level having the same guarantees as monocrystalline cells.

- CHSM6609P
- CHSM6610P
- CHSM6611P
- CHSM6612P





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