



We Do Quality

SH: 601877

A **CHNT** COMPANY



ASTRONERGY

About Astronergy

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 4.2GW.

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 4500MWp completed and under construction. In the overseas market Astronergy is strengthening its downstream activities globally and provides project development services, EPC services and project financing services in cooperation with strategic development partners. In 2016, Astronergy was listed in Shanghai Stock Exchange market and the code is 601877.

Facts and Figures (2019)

Revenue: **\$1.71 Billion** (2019)

Capacity: **4.5 GW**

Production sites: Hangzhou, Haining, Thailand

Subsidiaries: **10** subsidiaries around the world

Business Scope:



Project Investment



Total Solution Provider

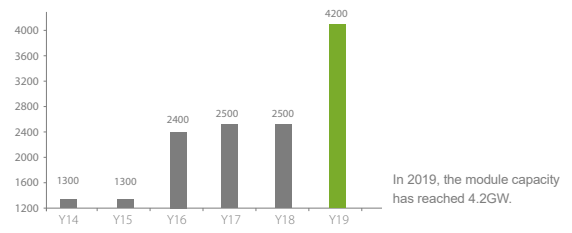


Module Production



EPC Services

Capacity Expansion (MW)



* China



HEADQUARTERS
Hangzhou

Production Sites
Hangzhou, Haining

* Asia



Korea
Astronergy Solar Korea Co, Ltd.

Thailand
Astronergy Solar Thailand Co, Ltd.

Japan
Astronergy Solar Japan Co., Ltd.

India
Astronergy Solar Company Co., Ltd.

Production Sites
Thailand

* Europe



Germany
Astronergy GmbH.

Spain
Chint Energy S.L.U.

Turkey
Astronergy solar turkiye anonim şirketi.

* North America



North America
Astronergy Solar, Inc.

Chint Group

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.

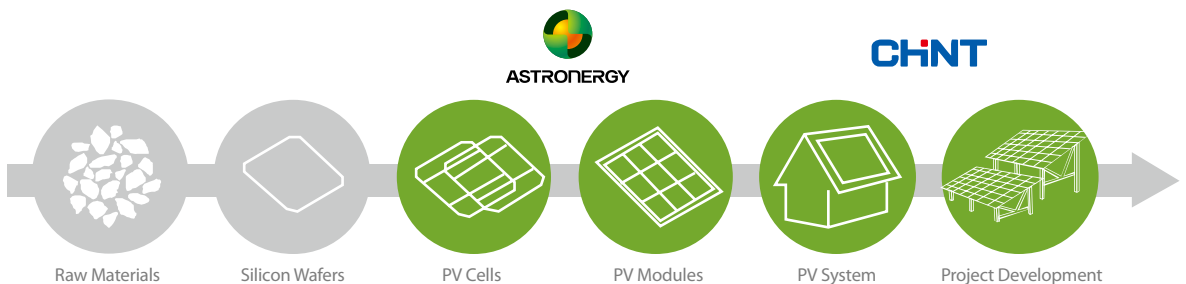
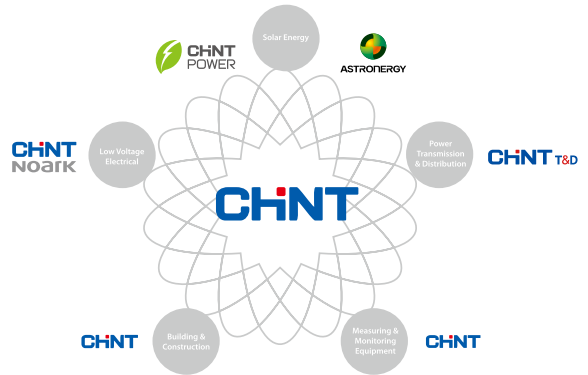
Facts and Figures (2019)

Revenue: **\$7.92 Billion**

Employees: **30,000 +**

History: **36 Years**

Chint is the leader in Chinese industrial electrical equipment production and clean energy fields.



Technology

We offer a wide range of monocrystalline and polycrystalline PV modules with outputs ranging from 270W – 415W and applicable for a wide array of photovoltaic projects.

Efficiency

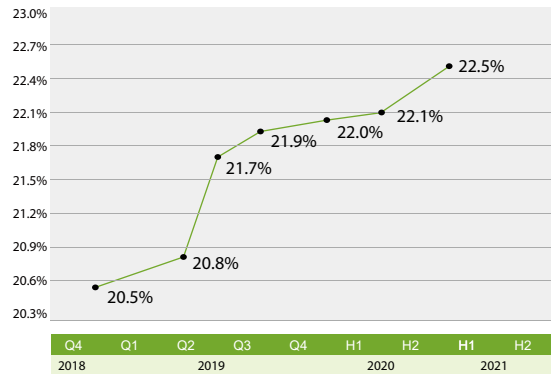
The continuous investment in research and development has kept Astronergy ahead in cell efficiency improvement. The average cell efficiency for mono reaches 22.2%, and 20.5% for poly .

We have made it our commitment to continue to enhance cell efficiency by adopting new technologies.

Mono-Technology Roadmap 2019-2021 (R&D)



Poly-Technology Roadmap 2019-2021 (R&D)



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.

Astronergy has successfully developed new technology and manufacturing processes 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 -1500 voltage condition with the temperature at 85°C and with relative humidity of 85% for 192 hours. The modules have achieved low degradation which is much below the IEC standard of not exceeding 5% under such stringent requirements.



● AstroNova ● AstroSmart ● AstroHalo ● AstroSemi ● AstroTwins ● AstroMAX

Quality

The commitment to quality enables us to deliver the best PV products to our clients.

We put the PV modules through extreme testing conditions which simulate real-world environments to ensure high performance.

- ⊙ UV Preconditioning
- ⊙ Outdoor Exposure
- ⊙ Light Soaking
- ⊙ Hot-spot
- ⊙ Thermal Cycling
- ⊙ Humidity-freeze
- ⊙ Damp-heat
- ⊙ Mechanical Load
- ⊙ Corrosive Atmosphere
- ⊙ Insulation
- ⊙ Wet Leakage
- ⊙ Highly Accelerated Stress

We also carefully test the components of our PV modules respectively to ensure the best performance. We are not only focused on the electrical output for 25 years, but also for the maximum durability for the entire life of the PV modules.

- ⊙ Bypass Diode Thermal Testing
- ⊙ Materials and Components Testing
- ⊙ Micro-crack Testing
- ⊙ NMOT Measurement
- ⊙ Electrical Component Testing
- ⊙ Flash Testing
- ⊙ Initial Stabilization
- ⊙ LID
- ⊙ LeTID
- ⊙ Hail test

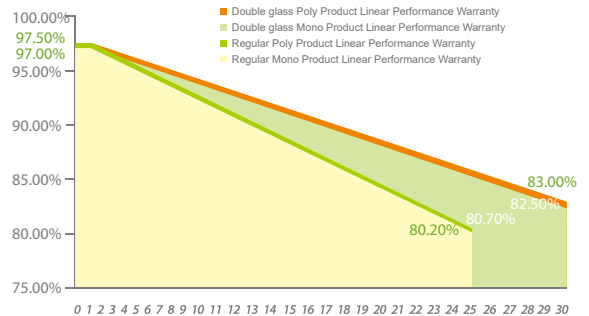
Reliability

Astronergy maintains close relationships with world-class international laboratories including TUV, CSA, JET and Intertek, etc. Gaining the applicable certifications from different countries attests to the reliability of our products.



Linear Warranty

- Poly: No less than 97.5% within 1st year
- Mono: No less than 97% within 1st year
- Decline rate: 2nd~25th years ≤0.7% / year for Regular module;
2nd~30th years ≤0.5% / year for Bifacial Double Glass module.

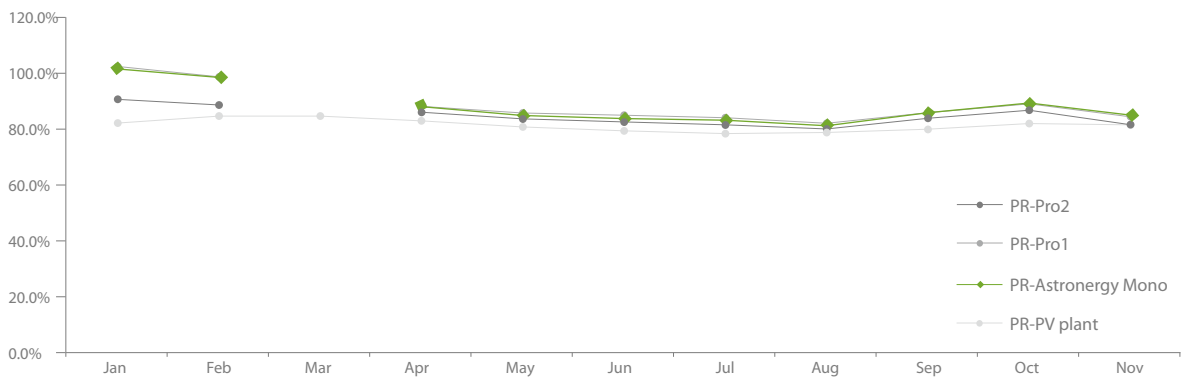


Performance

Astronergy has gained its reputation through the excellent performance of its PV modules that have been applied to both utility-scale PV projects and rooftop systems. In the 70MWp Rovigo Power Plant developed by SunEdison, a subsidiary of MEMC and a leading PV project developer, Astronergy supplied 15MWp of PV modules to the project and the tracking record reveals that our modules' performance has been quite outstanding relative to the other modules used in the project.

Month	Inverter	PR-Pro2	PR-Pro1	PR-Astronergy Mono	PR-PV Plant
Jan	Ingeteam	90.6%	102.4%	101.5%	82.1%
Feb	Ingeteam	88.6%	98.6%	98.4%	84.6%
Mar	Ingeteam	*	*	*	84.6%
Apr.	Ingeteam	86.0%	88.1%	88.0%	82.9%
May	Ingeteam	83.6%	85.7%	84.8%	80.7%
Jun	Ingeteam	82.5%	84.9%	83.8%	79.3%
Jul	Ingeteam	81.4%	84.0%	83.1%	78.3%
Aug	Ingeteam	80.0%	82.0%	81.1%	78.7%
Sep	Ingeteam	83.8%	85.8%	85.8%	79.8%
Oct	Ingeteam	86.7%	89.0%	89.3%	81.9%
Nov	Ingeteam	81.5%	84.4%	84.9%	81.4%

* Data in Mar. is missing. • All data is provided by Rovigo Project operating team.



System Size: 70 MW (14.522 MW using Astronergy Modules)
Modules Used: CHSM6610P-220\225\230W CHSM6610M230\235W
Location: Rovigo, Italy
Completed: 2010/11



Value-added Service

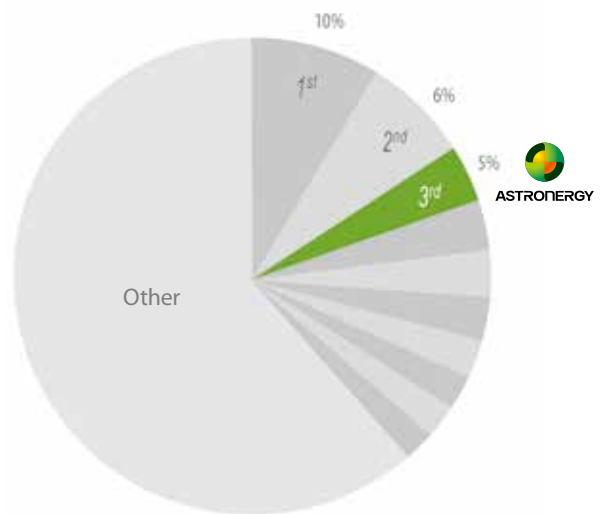
Total Solution Provider

Astronergy's easy access to the entire Chint Group product portfolio allows us to provide and support total system solutions to our clients all under a single warranty.



Project Financing

Astronergy started investing and developing in PV downstream projects in 2009. With the strong support of the Chint Group, Astronergy offers a wide range of options to our partners to develop projects together. We have successfully co-developed PV projects in Bulgaria, India, South Africa and Thailand. More projects are in the pipeline to be completed in the near future.



According to Solarbuzz's report, Astronergy is one of the biggest project developers in China.

Japan



China



Bulgaria



Consulting

Planning

Development

Financing

Construction

Management



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