



REPORTS | **PV INVERTER MANUFACTURER RANKING**

EDITION 1/2025





Welcome to this Edition 1 - 2025 version of the **SINOVOLTAICS Inverter Manufacturer Ranking Report.**

The Altman-Z Scores in this report has been calculated from March 2022 until December 2024, and provide detailed insight how the financial strength of inverter manufacturers has evolved over the past 3 years.

What's the value of Altman-Z Scores?

Altman-Z Scores are calculated to understand which **inverter manufacturers are financially stable**, and which players are **at risk of going bankrupt**.

For any stakeholder involved in solar projects, the financial stability of the manufacturer is of crucial importance.

Employing inverters from financially stable manufacturers provides for a better hedge against the potential risks of collapsing return of investment (ROI) of any PV project.

Why is financial stability important?

Ultimately, the **financial stability of an inverter manufacturer is geared to the validity and enforceability of the warranty policies** on its portfolio of central, string or micro inverters. Most people realize that today's inverter manufacturers will probably not be around in 5 to 10 years. However for the short to medium term, you want to be sure that warranties are in place.

In many years to come, lots of PV projects will likely face this tough question: whom to contact with performance complaints and replacement requests regarding a malfunctioning inverter after 2, 5 or 10 years?

2022 - 2024: rating of inverter manufacturers worldwide

In this report we present you the **Altman Z-Scores of 30+ inverter manufacturers**. This report can be used to see how one manufacturer matches up to the other, and can be an important indicator when selecting your inverter manufacturer.

The Altman Z-Scores show you which inverter manufacturers are **financially strong**, and which manufacturers are in the **risk zone of going bankrupt within the coming 2 years**.

On the following pages you find the full table showing the Altman Z-Scores of the major, publicly listed Asian, European and American manufacturers.

The scores have been calculated by team Sinovoltaics with the use of publicly available financial data.

MANUFACTURERS	RANKING	TREND	MAR22	JUL22	SEP22	DEC22	MAR23	JUN23	SEP23	DEC23	MAR24	JUN24	SEP24	DEC24	LISTING
HOYMILES POWER ELECTRONICS	1	↓	40.97	83.09	87.07	49.21	27.13	21.11	19.83	20.32	19.46	10.71	9.77	5.68	SHSE:688032
EATON	2	↓	3.32	2.8	2.84	3.3	3.62	3.99	4.12	4.47	5.31	5.39	5.44	5.43	NYSE:ETN
APSYSTEMS (YUNENG TECHNOLOGY CO)	3	↓			37.43	23.68	11.36	9	6.92	9.27	6.55	4.23	6.29	5.36	SHSE:688348
KSTAR	4	↑	5.98	7.37	10.89	11.15	7.19	6.38	5.32	5.83	5.47	4.94	4.98	5.09	SZSE:002518
SINEXCEL	5	↑	6.6	7.26	6.92	8.03	5.23	6.55	5.57	4.87	4.86	4.28	4.9	5.08	SZSE:300693
EMERSON	6	↑	4.88	4.08	3.2	3.81	3.62	3.66	4.17	4.21	3.71	3.68	3.8	4.51	NYSE:EMR
DELTA ELECTRONICS	7	↑	4.02	3.7	3.69	3.84	4.31	4.7	4.03	4.01	4.27	4.63	4.18	4.4	TPE:2308
ABB	8	↓	3.18		2.99	3.18	3.26	3.56	3.53	3.79	3.89	4.19	4.62	4.37	OTCPK:ABBNY
SCHNEIDER ELECTRIC	9	↓				2.18				2.69	3.7	3.88	4.09	3.94	OTCPK:SBGSY
JIUZHOU ELECTRIC	10	↑	1.38	1.12	1.3	1.23	3.03	3.05	2.94	2.98	3.77	3.16	3.29	3.81	SZSE:000801
ENPHASE	11	↓	10.83	9.58	13.19	12.1	9.21	7.46	6.09	6.32	5.9	4.98	5.24	3.46	NAS:ENPH
INVT SOLAR	12	↑	3.55	3.39	3.67	3.66	3.9	4.19	3.86	3.61	3.53	3.22	3.41	3.42	SZSE:002334
SUNGROW	13	↓	6.02	4.48	4.29	3.93	3.8	4.04	3.42	3.35	3.71	3.53	3.98	3.13	SZSE:300274
HOPEWIND ELECTRIC	14	↑	5.73	6.16	4.5	4.59	4.54	4.82	3.97	4.19	4.02	2.94	2.77	3.13	SHSE:603063
SINENG ELECTRIC	15	↓	4.39		3.15	3.31	3.33	3.13	2.84	2.76	2.67	2.5	3.13	2.95	SZSE:300827
OMRON	16	↓	6.64	4.59	5.07	4.56	4.87	5.4	4.88	4.7	2.87	3.2	3.27	2.93	TSE:6645
CLENERGY	17	↓	3.28	3.09	3.25	3.54	3.77	3.89	3.71	4.43	4.12	3.47	3.11	2.84	SHSE:603628
GENERAL ELECTRIC	18	↓	1.43	1.29	1.32	1.42	1.48	1.53	2.05	2.3	2.31	2.16	2.78	2.73	NYSE:GE
GOODWE	19	↓	12.74	11.71	9.02	9.4	7.66	6.5	5.52	5.64	5.01	4.16	3.42	2.6	SHSE:688390
SMA	20	↓	3.23	2.82	3.18	3.74	4.55	4.87	3.55	3.7	3.79	3.13	2.81	2.31	XTER:S92

MANUFACTURERS	RANKING	TREND	MAR22	JUL22	SEP22	DEC22	MAR23	JUN23	SEP23	DEC23	MAR24	JUN24	SEP24	DEC24	LISTING
SIEMENS	21	↑	1.88	1.64	1.58	1.77	2	2	2	2.18	2.22	2.18	2.25	2.31	XTER:SIE
EAST GROUP	22	↑	2.56	2.62	2.46	2.48	2.97	2.68	2.69	2.75	2.72	2.23	2.02	2.3	SZSE:300376
HITE (SHANGHAI HI-TECH CONTROL SYSTEM CO)	23	↓	3.6	3.96	3.44	3.33	3.53	3.85	3.27	2.7	2.53	2.15	2.38	2.18	SZSE:002184
KEHUA HENGSHENG	24	↑	2.14	2.53	3.01	3.41	3	2.49	2.52	2.18	2.29	2.13	2.11	2.15	SZSE:002335
ABLEREX	25	↑	2.09	1.97	1.77	1.68	2.07	2.14	2.1	2.02	2.16	2.04	1.8	1.95	ROCO:3628
GINLONG (SOLIS)	26	↓	10.98	8.7	7.75	5.3	3.46	2.8	2.3	1.99	1.87	1.33	2.01	1.74	SZSE:300763
SENYUAN	27	↑	0.57	0.76	0.83	1.14	1.49	1.45	1.38	1.46	1.42	1.35	1.41	1.55	SZSE:002358
CHINT POWER (CHINT ELECTRICS)	28	↑	2.17	1.98	1.65	1.77	1.96	1.95	1.65	1.59	1.58	1.53	1.48	1.52	SHSE:601877
TBEA	29	↓	1.79	2.19	2.1	2.06	2.09	2.1	1.88	1.66	1.71	1.49	1.42	1.3	SHSE:600089
CLOU ELECTRONICS	30	↓	0.14	0.1	0.13	0.33	0.54	0.44	0.36	0.6	0.01	-0.03	0.01	-0.22	SZSE:002121
WILLINGS (CARRY CO)	31	↑	3.21	3.3	1.71	2.44	1.75	2.67	1.68	0.06	-0.37	0.19	-1.1	-1.07	XKRX:313760
SOLAREEDGE	32	↓	8.28	7.15	6.38	6.82	6.7	5.91	4.1	3.47	2.7	1.64	1.24	-1.1	NAS:SEDG
SOLARBRIDGE (SUNPOWER)	33		1.23	0.45	1.19	1.41	1.14	0.69	0.37	-0.52	-1.42	-1.44	-1.71	-1.71	NAS:SPWR

Graph overview

Graph #1 - The latest inverter manufacturers ranking, recorded December 2024

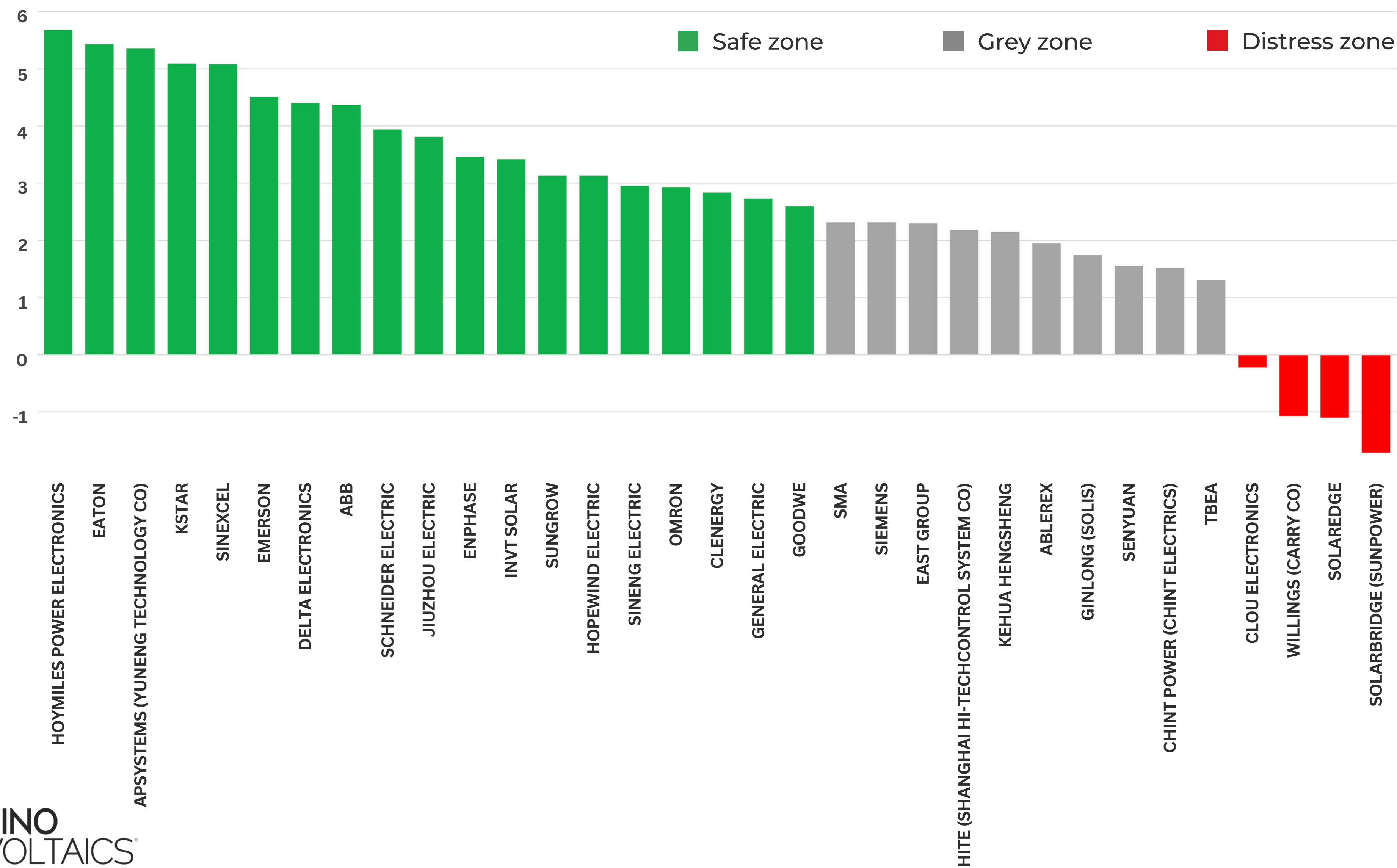
Graph #2 - Inverter manufacturers that are currently in the Safe Zone

Graph #3 - Inverter manufacturers that are currently in the Grey Zone

Graph #4 - Inverter manufacturers that are currently in the Distress Zone

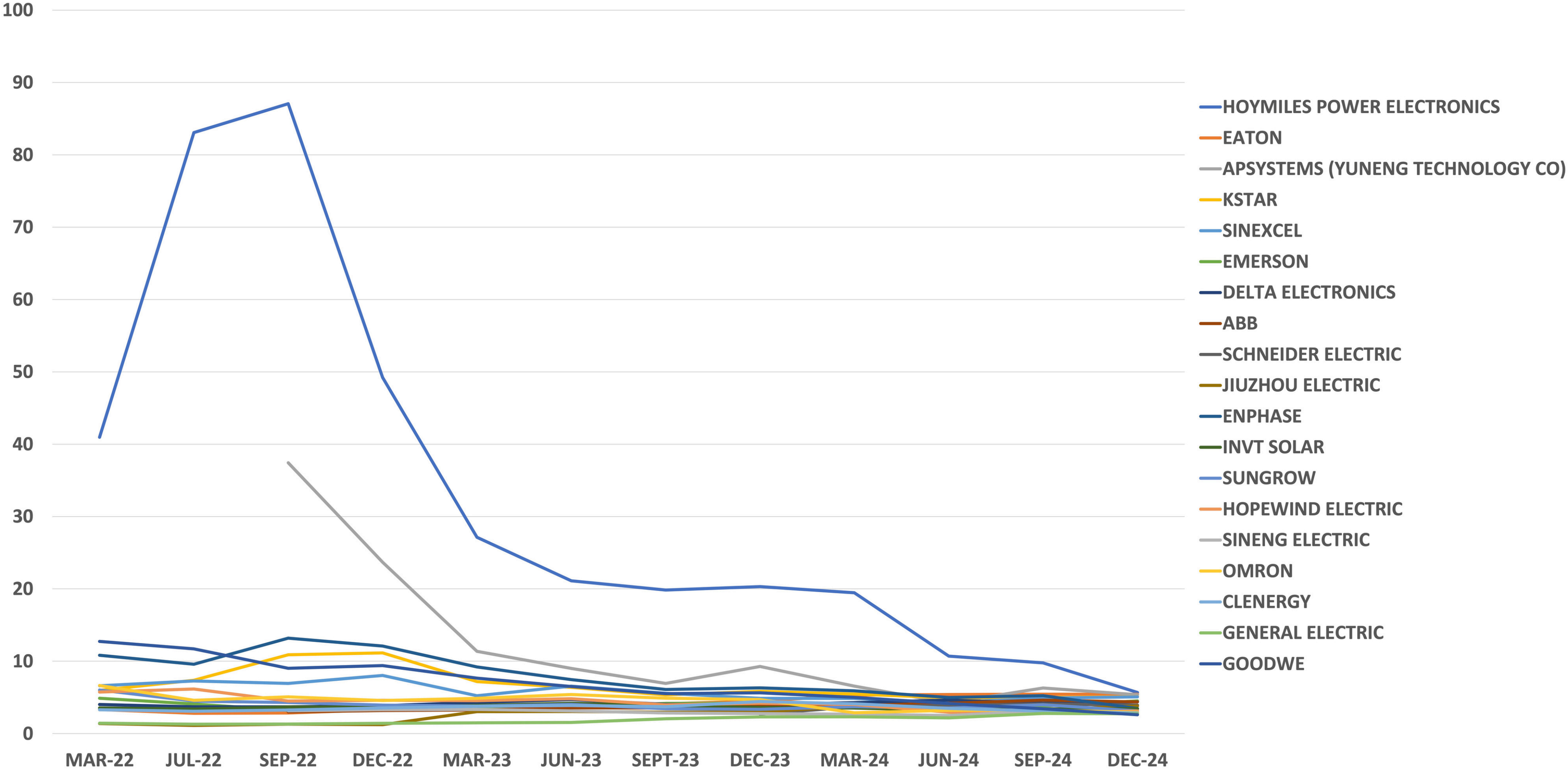
Graph #1 - Full ranking overview of inverter manufacturers

Sinovoltaics PV inverter ranking - Edition #1 - 2025



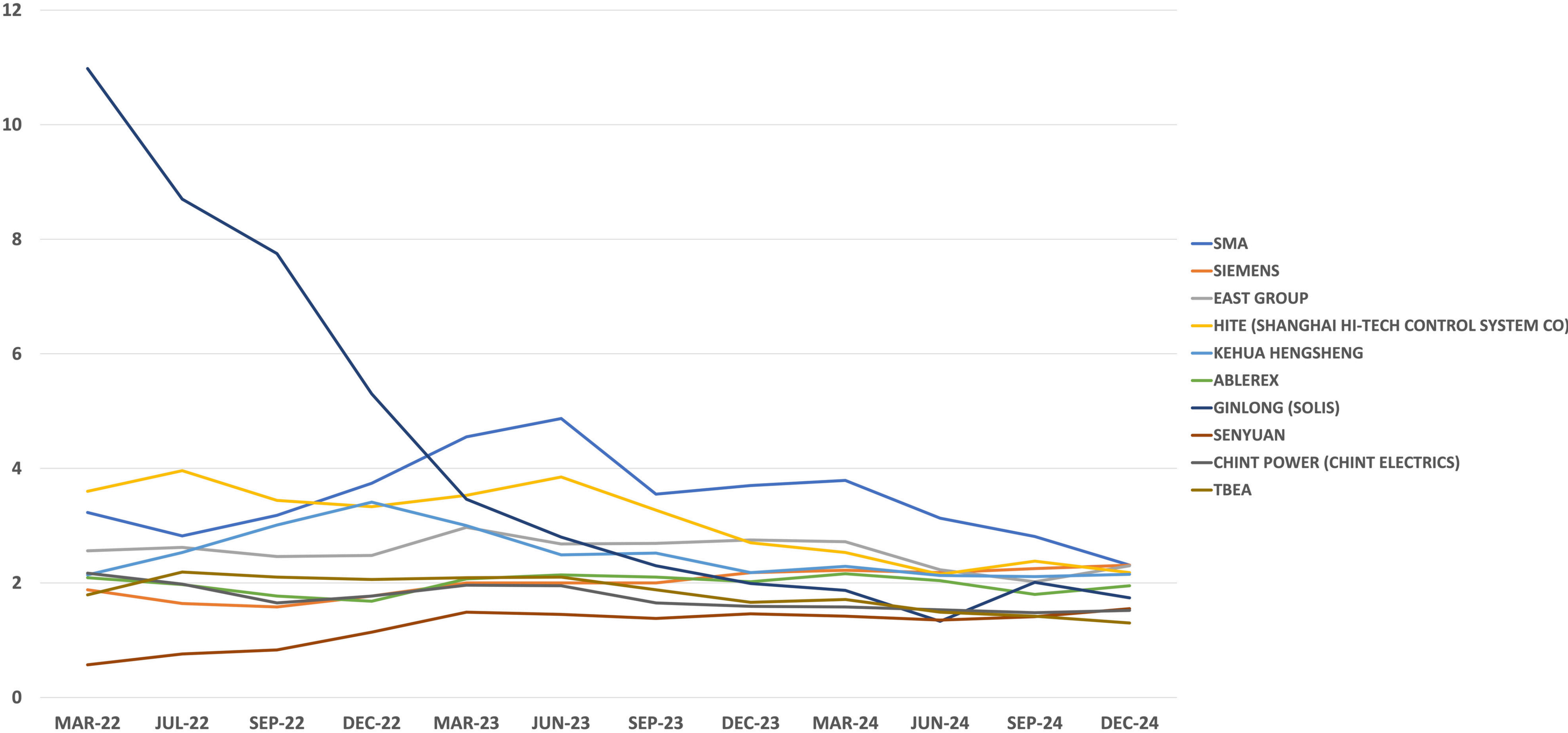
Graph #2 - Inverter manufacturers – Safe Zone

Sinovoltaics PV manufacturer ranking - Edition #1 - 2025 - Safe Zone



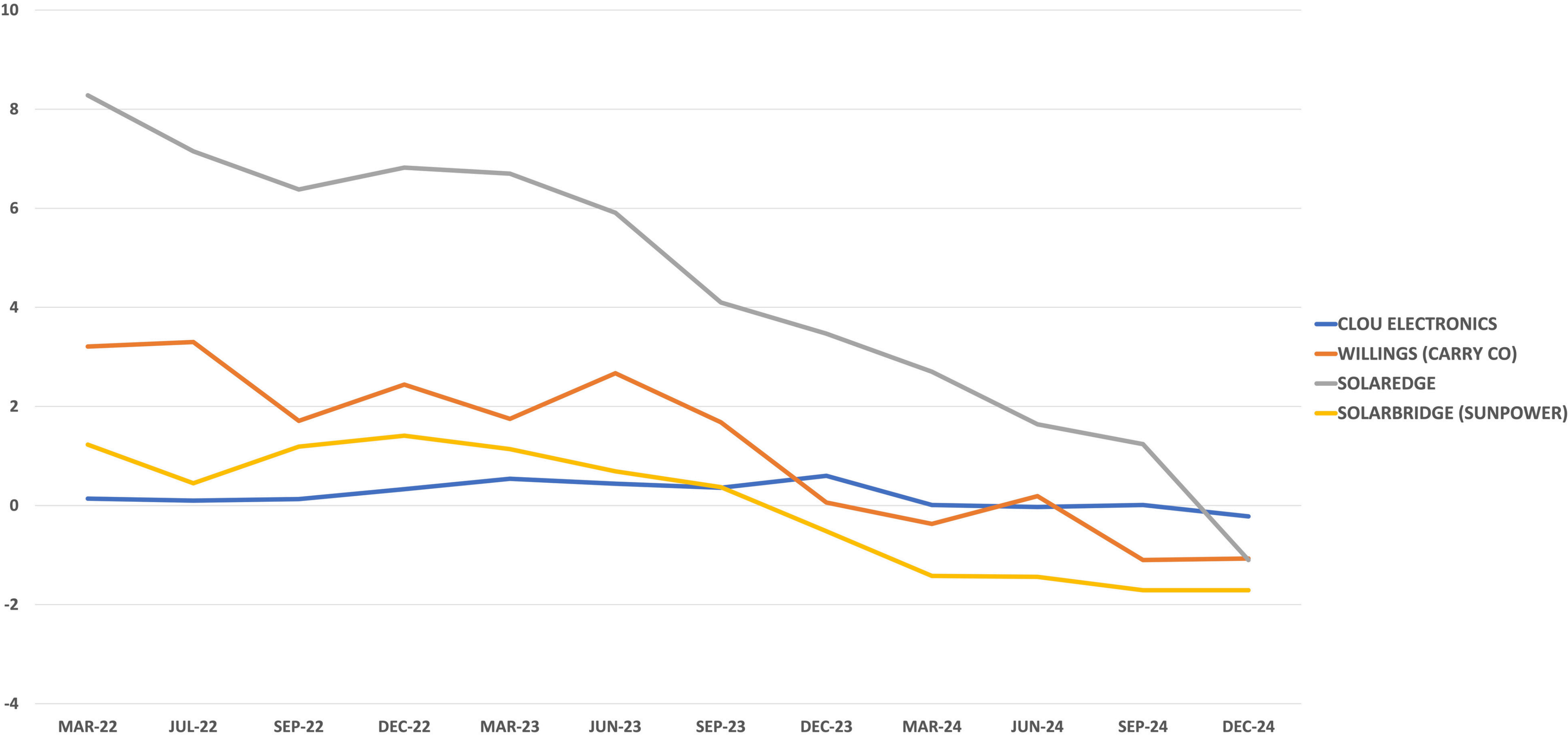
Graph #3 - Inverter manufacturers – Grey Zone

Sinovoltaics PV manufacturer ranking - Edition #1 - 2025 - Grey Zone



Graph #4 - Inverter manufacturers – Distress Zone

Sinovoltaics PV manufacturer ranking - Edition #1 - 2025 - Distress Zone



How is the Sinovoltaics Ranking Score calculated?

The Sinovoltaics Inverter Manufacturer Ranking Score is based on the Altman Z-Score

$$\text{Altman Z-Score} = 1.2A + 1.4B + 3.3C + 0.6D + 1.0E$$

The original formula is broken down as following:

A	Working Capital/Total Assets: measures liquid assets in relation to the size of the company.
B	Retained Earnings/Total Assets: measures profitability that reflects the company's age and earning power.
C	Earnings Before Interest & Tax/Total Assets: measures operating efficiency apart from tax and leveraging factors. It recognizes operative earnings as being important to long-term viability.
D	Market Value of Equity/Total Liabilities: adds market dimension that can show up security price fluctuation as a possible red flag.
E	Sales/Total Assets: a standard measure for total asset turnover.

How are the Altman Z-Scores interpreted?

The scores are categorized into 3 zones called the Safe Zone, Grey Zone and Distress Zone:

$Z > 2.6$	Safe Zone
$1.1 < Z < 2.6$	Grey Zone
$Z < 1.1$	Distress Zone

How to interpret companies in the ‘GREY ZONE’?

With a large number of companies in the 'Grey Zone', how to interpret these scores when selecting a manufacturer?

While ideally, a manufacturer is in the 'Safe Zone', some companies have been consistently in the 'Grey Zone' for years.

Take for instance **INVT SOLAR**. Here’s a number of Altman Z-Scores over the years:

3.55 on Q1 2022

4.19 on Q2 2023

3.61 on Q4 2023

3.42 on Q4 2024

Currently stands at 3.42 (December '24)

These numbers show that **INVT SOLAR** has been stable for years. Add the fact that **INVT SOLAR AZ** score has seen a gradual improvement since 2022 and they may just as well be one of the most solid companies on the list.

You could argue the same for known players such as **DELTA ELECTRONICS** and **CLENERGY**. As you can see each of these companies has shown a rather stable score since 2022:

DELTA ELECTRONICS	CLENERGY
4.02 Q1 2022	3.28 Q1 2022
4.7 Q2 2023	3.89 Q2 2023
4.01 Q4 2023	4.43 Q4 2023
4.4 Q4 2024	2.84 Q4 2024



SINOVOLTAICS INVERTER MANUFACTURER RANKING

CONTACT US: contact@sinovoltaics.com

Discover our **ZERO RISK SOLAR & BESS SERVICES**

QUALITY ASSURANCE



PV QUALITY INSPECTIONS

Hire our **PV specialized quality engineers** to inspect your PV components on-site at the factories in Asia.

TEST ALL PV COMPONENTS, INCLUDING:

- Solar modules
- Inverters
- BOS components
- Solar cells
- Energy Storage



FACTORY AUDITS

Make a **fully informed decision** on the factories you're procuring from. Our accredited auditors provide you with **full insights** in the manufacturing capabilities of any PV factory worldwide. Use our **audit scoring card** system to manage and compare your factory selection.

FACTORY AUDITS INCLUDE:

- Pre-manufacturing audit
- General qualification audit
- Factory benchmark
- Factory background check
- Financial audit



LABORATORY TESTING

Thoroughly test your solar PV components at our **accredited PV lab**. Inform about country and climate specific test procedures for your region

A SELECTION OF LAB TESTS:

- Potential Induced Degradation (PID) test
- Light Induced Degradation (LID) test
- EVA gel content test
- Damp heat testing
- Thermal cycling testing



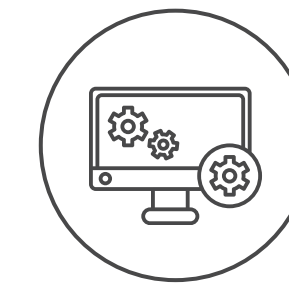
SOLAR FARM INSPECTIONS

On-site solar farm **inspections** and **troubleshooting** worldwide. Assess your existing solar farms and optimize performance.

SOLAR FARM INSPECTIONS INCLUDE:

- Drone infrared thermography
- I-V measurement
- Electroluminescence imaging
- Electrical safety tests
- Commissioning checks

SINOVOLTAICS EL MASS ANALYSIS (SELMA)



Eliminate **micro-cracks** and other cell-inherent defects and boost your solar power plant performance with **Sinovoltaics EL Mass Analysis (SELMA)**, our AI-driven electroluminescence Testing Software.

WHY CHOOSE SELMA FOR EL TESTING?

- Up to 99.9% accuracy
- Inspection of ALL modules (no sampling!)
- High-speed and on-the-fly analysis: avoid delays and easily keep up with the factory's production speed
- Identification and classification of up to 15 cell-inherent defect types
- Replace defective PV modules before shipment

QUALITY GUARANTEE

QUALITY ASSURANCE MEETS INSURANCE:

- With our Quality Guarantee, Sinovoltaics becomes a shared risk partner in our clients' PV projects.
- The Quality Guarantee enables the client to claim Liquidated Damages in case of a valid Warranty Claim with the factory.
- Eligibility: after performing our regular, 100% pre-shipment inspection on the client's PV modules at the factory, the client will be eligible for our Quality Guarantee for 3 years.
- Industry-wide unique protection and based on Sinovoltaics' Zero Risk Solar® framework the Quality Guarantee is backstopped by Munich Re.