



REPORTS | **ENERGY STORAGE** **MANUFACTURER RANKING**

EDITION 1/2025





Welcome to this Edition 1 - 2025 version of the **SINOVOLTAICS Energy Storage 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 energy storage manufacturers has evolved over the past 3 years.

What's the value of Altman-Z Scores?

Altman-Z Scores are calculated to understand which **energy storage 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 energy storage 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?

In this new emerging energy storage market, its grand variety of existing and research-in-progress technologies, purchasers face a grand and difficult choice of manufacturers, many of which only recently ventured into this market. In such a new market with average warranties that vary widely between 2-10 years, the financial stability of an energy storage manufacturer is crucial as it is geared to the validity and enforceability of the warranty policies on its products. Most people realize that today's energy storage manufacturers will probably not be around in 5 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 solar PV & energy storage projects will likely face this tough question: whom to contact with performance complaints and replacement requests regarding a malfunctioning battery after 2, 5 or 10 years?

2022 - 2024: rating of energy storage manufacturers worldwide

In this report we present you the **Altman Z-Scores of 50+ energy storage 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 energy storage manufacturer.

The Altman Z-Scores show you which energy storage 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
TESLA	1	↑	23.18	15.49	19.03	8.93	12.44	14.97	14.54	14.21	9.6	10.86	12.73	17.52	NAS:TSLA
KUNG LONG BATTERIES	2	↑	7.28	7.42	5.69	7.13	8	8	5.31	6.89	7.44	8.01	6.07	8.29	TPE:1537
MUSTANG BATTERY	3	↑	7.62	8.13	8.33	7.72	9.17	9.1	8.48	7.47	7.33	7.71	7.15	7.36	SHSE:605378
HYUNDAI ELECTRIC	4	↑	0.84	1.16	1.21	1.66	1.85	1.83	2.11	2.31	3.83	5	5.57	6.44	XKRX:267260
SOLID POWER	5	↑		10.74	14.26	6.86	9.95	8.46	7.75	5.99	7.12	4.41	3.52	5.82	NAS:SLDP
EATON	6	↓	3.32	2.8	2.84	3.3	3.62	3.99	4.13	4.47	5.31	5.39	5.44	5.43	NYSE:ETN
SINEXCEL (SHENZHEN SINEXCEL ELECTRIC)	7	↑	5.11		4.6	5.41	5.23	7.37	5.57	4.9	4.86	4.28	4.9	5.08	SZSE:300693
YUASA BATTERY	8	↓	4.81	5.55	4.7	4.51	5.23	5.04	4.98	4.57	4.63	4.79	4.66	4.38	BKK:YUASA
SANYO	9	↓	4.84	4.35	4.09	4.36	4.47	4.62	4.69	4.39	4.38	4.43	4.36	3.93	TSE:3176
SIMPLO TECHNOLOGY	10	↑	3.51	3.1	2.98	3.33	3.44	3.52	3.34	3.53	3.62	3.62	3.42	3.7	ROCO:6121
SACRED SUN (SHANDONG SACRED SUN POWER SOURCES CO LTD)	11	↓	4.49	4.92	5.48	4.58	4.35	4.25	4.25	4.08	3.8	3.36	3.65	3.59	SZSE:002580
ENERSYS	12	↓	3.1	2.8	2.85	3.12	3.47	3.72	3.87	3.93	3.88	4.03	3.99	3.46	NYSE:ENS
SEBANG GLOBAL BATTERY	13	↑	3.58	3.21	3	2.88	3.38	3.23	3.45	3.3	3.77	3.79	3.39	3.45	XKRX:004490
ZHONGTIAN TECHNOLOGY	14	↓	3.52	4.27	4.32	3.55	3.96	3.81	3.66	3.2	3.34	3.64	3.36	3.21	SHSE:600522
NIDEC CORPORATION	15	↓	5.32	4.17		3.56	3.39	3.26	3.44	3.21	3	3.14	3.16	3.09	OTCPK:NJDCY
CAMEL GROUP	16	↓	3.98	3.7	3.27	3.11	3.57	3.45	3.31	3.19	3.21	3.21	3.19	3.08	SHSE:601311
GREENSMITH ENERGY (WÄRTSILÄ)	17	↓	2.28	2.03	2.01	1.62	2.14	2.26	2.28	2.62	2.73	2.88	3.01	2.92	OHEL:WRTIV
FLUENCE ENERGY INC	18	↑	2.09	1.02		1.3	1.25	1.75	2.96	3.68	2.64	2.72	2.49	2.87	NAS:FLNC
NIDEC CORPORATION	19	↓	4.17		3.56	3.39	3.26	3.44	3.21	3	3.14	3.16	3.09	2.85	OTCPK:NJDCY
CATL (CONTEMPORARY AMPEREX TECHNOLOGY CO)	20	↑	5.07	3.51	2.71	2.49	1.93	2.53	2.48	2.23	2.36	2.24	2.65	2.8	SZSE:300750

*The trend column in the table reflects a comparison of the current quarter score to the previous one.

MANUFACTURERS	RANKING	TREND	MAR22	JUL22	SEP22	DEC22	MAR23	JUN23	SEP23	DEC23	MAR24	JUN24	SEP24	DEC24	LISTING
DMEGC SOLAR (DMEGC MAGNETICS GROUP)	21	↓	4.03	5.01	4.31	4.11	3.88	3.64	3.4	2.84	3.07	2.75	2.85	2.73	SZSE:002056
FLUENCE ENERGY INC	22	↓	1.02		1.3	1.25	1.75	2.96	3.68	2.64	2.72	2.49	2.87	2.6	NAS:FLNC
LG ENERGY SOLUTION	23	↓	4.92	3.96	4.09	4.49	5.51	5.26	4.71	4.13	3.47	3.17	3.26	2.47	XKRX:373220
DESAY BATTERY	24	↓	3.78	4.26	4.14	3.68	4	3.77	3.44	3.02	2.63	2.7	2.78	2.46	SZSE:000049
CENTER POWER	25	↑	2.29	1.88	1.98	2.14	2.91	2.78	2.59	2.97	2.95	2.46	2.37	2.39	SZSE:002733
EAST GROUP	26	↑	2.57	2.62	2.46	2.48	2.97	2.68	2.69	2.77	2.72	2.23	2.02	2.3	SZSE:300376
SONNEN (SHELL PLC)	27	↓	2.1	2.05	2.22	2.48	2.65	2.65	2.54	2.54	2.36	2.37	2.34	2.26	NYSE:SHEL
BASF	28	↑	2.73	2.42	2.37	2.5	2.51	2.46	2.3	2.28	2.52	2.31	2.15	2.23	XTER:BAS
JOHNSON CONTROLS	29	↓	2.05	1.59	1.58	1.87	1.71	1.82	1.7	1.74	1.84	1.71	1.99	1.93	NYSE:JCI
FARADION (RELIANCE INDUSTRIES)	30	↓	2.7	2.75	2.08	2.19	1.98	2.07	1.97	2.1	2.31	2.33	2.53	1.91	NSE:RELIANCE
EVE ENERGY	31	↓	6.35	4.59	3.22	3.23	2.56	2.26	1.95	1.85	1.83	1.73	1.87	1.79	SZSE:300014
BYD	32	↓	2.52	2.99	2.19	1.82	1.95	1.85	1.79	1.74	1.61	1.75	2	1.76	HKSE:01211
SAMSUNG SDI	33	↓	3.34	3.09	3.14	3.13	3.53	3.32	2.91	2.81	2.74	2.35	2.13	1.73	XKRX:006400
JINKOSOLAR	34	↓	1.87		2.17	1.92	2.21	2.21	2.02	2.07	2.03	1.85	1.91	1.73	SHSE:688223
CHANGHONG	35	↑	1.63	1.55	1.42	1.36	1.51	1.51	1.47	1.55	1.56	1.46	1.53	1.7	SHSE:600839
FESE (FAR EAST SMARTER ENERGY)	36	↑	1.37	1.91	1.9	1.86	1.85	1.84	1.69	1.68	1.67	1.66	1.63	1.68	SHSE:600869
CSSC (CHINA SHIPBUILDING INDUSTRY GROUP POWER CO)	37	↑	1.98	1.9	1.82	1.41	1.51	1.72	1.55	1.49	1.56	1.53	1.6	1.62	SHSE:600482
ALBEMARLE	38	↑	3.81	3.53	4.02	3.64	3.82	3.8	3.15	2.83	2.29	1.97	1.81	1.5	NYSE:ALB
GREAT POWER (GUANGZHOU GREAT POWER ENERGY&TECHNOLOGY CO LTD)	39	↓	2.96		4.77	3.93	3	2.24	1.9	1.56	1.37	1.12	1.51	1.38	SZSE:300438
GENERAL MOTORS	40	↑	1.18	1.12	1.13	1.18	1.23	1.23	1.25	1.25	1.24	1.29	1.29	1.33	NYSE:GM

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MANUFACTURERS	RANKING	TREND	MAR22	JUL22	SEP22	DEC22	MAR23	JUN23	SEP23	DEC23	MAR24	JUN24	SEP24	DEC24	LISTING
ENERGIZER HOLDINGS	41	↑	1.19	1.27	1.28	1.03	1.08	1.24	1.02	1.39	1.32	1.35	1.29	1.32	NYSE:ENR
GANFENG LITHIUM	42	↓	11.3	9	5.98	5.34	4.94	4.44	3.39	2.79	2.25	1.67	1.46	1.3	HKSE:01772
SUNWODA	43	↓	2.2	2.18	1.92	1.6	1.35	1.26	1.36	1.26	1.26	1.22	1.36	1.3	SZSE:300207
NARADA	44	↓	1.63	1.65	1.99	1.82	1.95	1.76	1.56	1.5	1.46	1.1	1.29	1.26	SZSE:300068
TRINA SOLAR	45	↓	2.66	2.62	2.65	2.61	2.2	2.03	1.83	1.75	1.69	1.51	1.4	1.24	SHSE:688599
SK INNOVATION	46	↓	1.83	1.89	1.78	1.78	1.49	1.69	1.58	1.47	1.43	1.32	1.28	1.23	XKRX:096770
Energy Absolute PCL (EA)	47	↓	5.02		4.43	4.46	3.48	2.84	2.48	2.47	2.12	1.3	1.21	1.08	OTCPK:EAPBF
VOLKSWAGEN	48	↓	1.18	1.17	1.16	1.23	1.17	1.16	1.13	1.17	1.18	1.12	1.1	1.07	OTCPK:VWAPY
FORD	49	↓	1.2	1.13	1.23	1.2	1.16	1.19	1.18	1.15	1.09	1.07	1.06	1.01	NYSE:F
FARASIS ENERGY (GAN ZHOU)	50	↑	1.23	1.39	1.35	1.32	1.33	1.24	1.2	0.85	0.71	0.67	0.96	0.97	SHSE:688567
LIVENT	51	↓	7	7.02	8.6	4.49	5.36	6.25	4.74	4.66	4.33	4.33	1	0.93	HAM:8LV
CORUN NEW ENERGY	52	↓	2.1	2.94	2.61	3.29	2.13	1.83	1.54	1.24	1.16	0.85	0.93	0.9	SHSE:600478
GOTION HIGH-TECH CO	53	↓	1.74	1.85	1.37	1.12	1.08	1.02	0.96	0.88	0.88	0.71	0.77	0.73	SZSE:002074
JIawei	54	↓	2.04	1.95	2.74	2.99	4.14	3.01	2.48	1.74	1.48	1.27	1.08	0.65	SZSE:300317
CB&K ENERGY	55	↓	1.14	0.59	0.86	0.74	0.3	0.44	0.02	0.15	0.19	0.53	0.78	0.49	NAS:CBAT
VARTA	56		4	3.45	2.21	1.54	0.26	0.09	0.12	0.3	0.14	-0.02	-0.21	-0.21	XTER:VAR1
MICROVAST	57	↑	2.6	0.22	-0.09	-0.24	-0.56	-0.38	-0.37	-0.61	-0.85	-1.06	-1.42	-0.43	NAS:MVST
DRAGONFLY ENERGY	58	↓				3.5	1.28	0.75	0.34	-0.48	-0.52	-0.02	-0.8	-0.95	NAS:DFLI
ROMEO POWER (NIKOLA)	59	↓	4.88	-1.5	-2.32	-3.26	-3.98	-3.8	-3.23	-4.65	-3.61	-5.59	-6.15	-6.52	NAS:NKLA

**The trend column in the table reflects a comparison of the current quarter score to the previous one.*

Graph overview

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

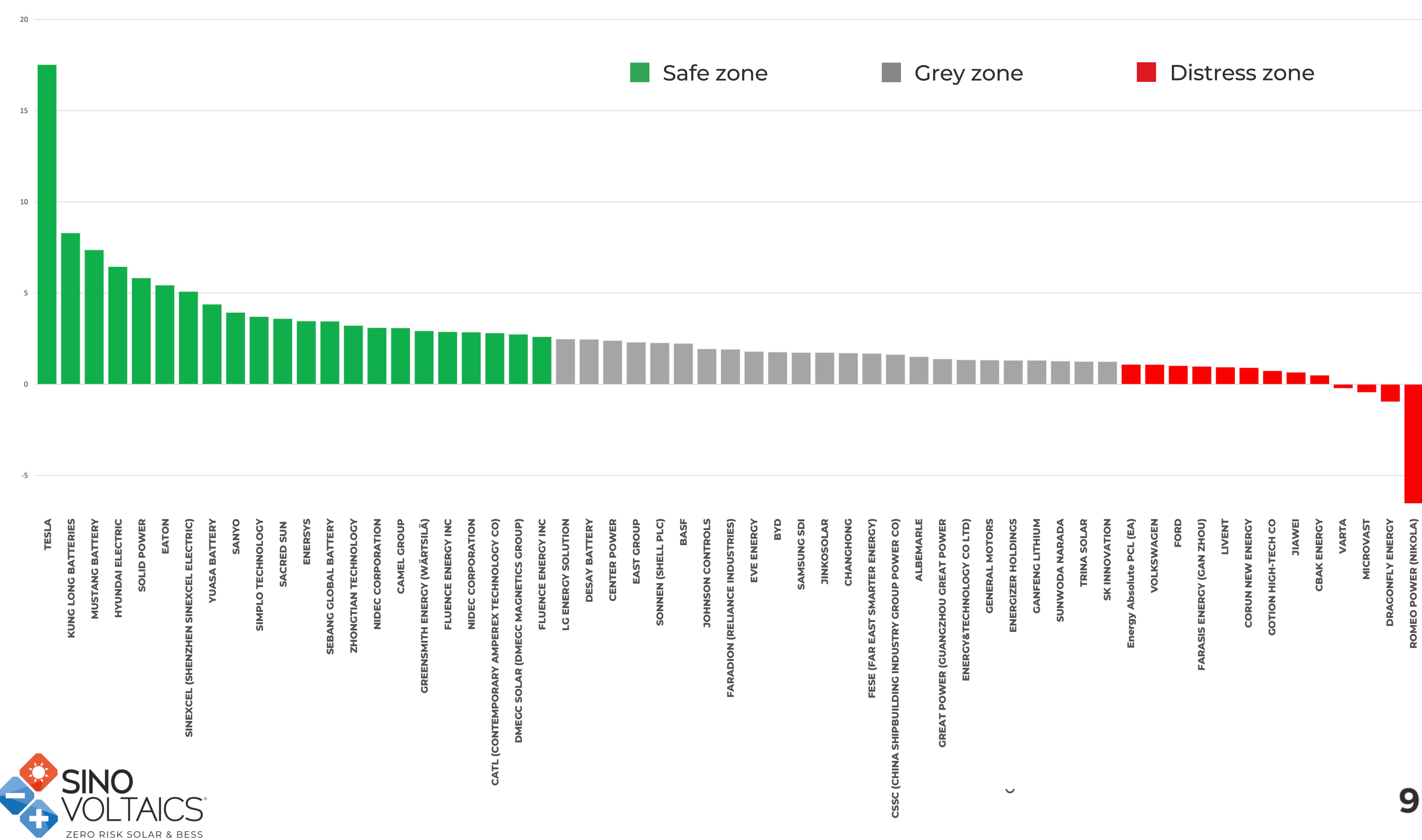
Graph #2 - Energy storage manufacturers that are currently in the Safe Zone

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

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

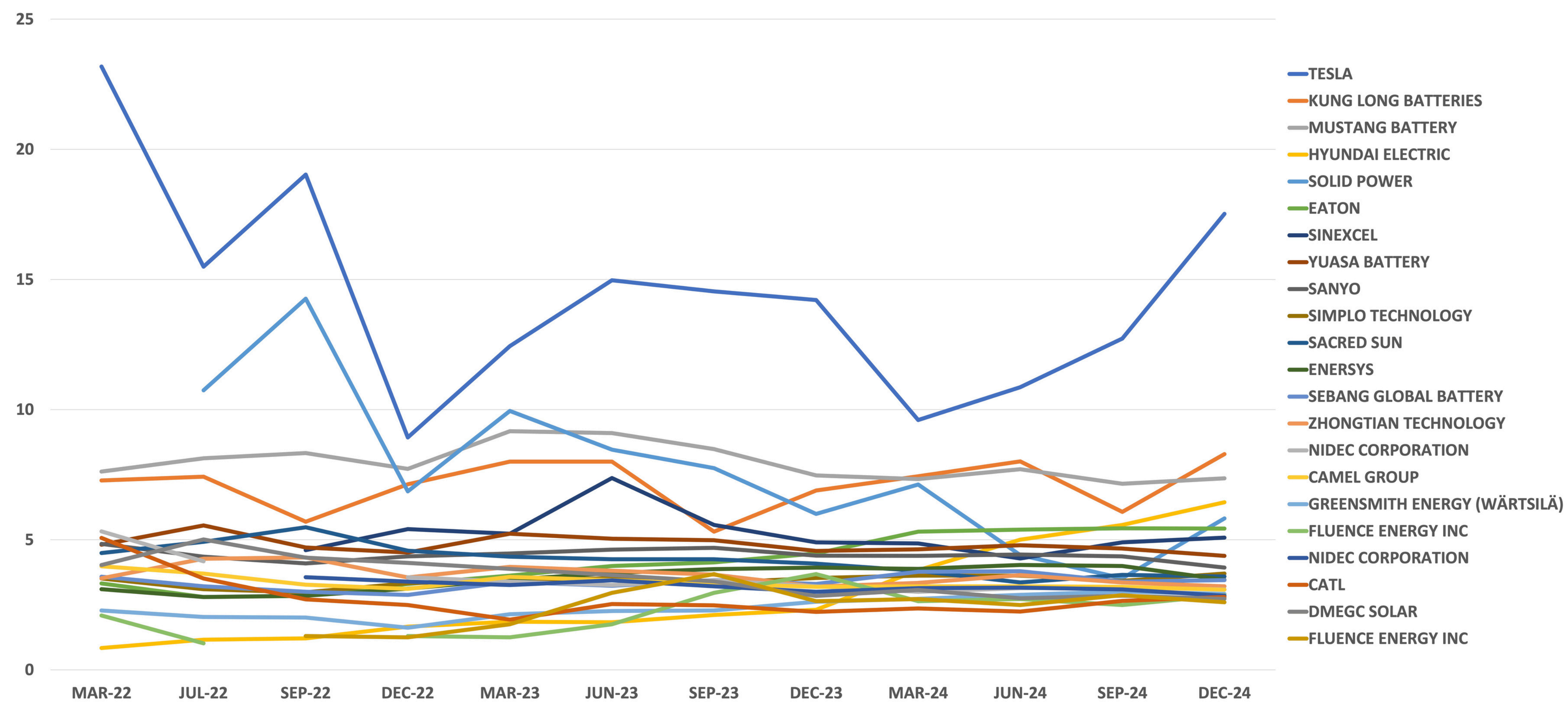
Graph #1 - Full ranking overview of energy storage manufacturers

Sinovoltaics Energy Storage manufacturer ranking - Edition #1 - 2025

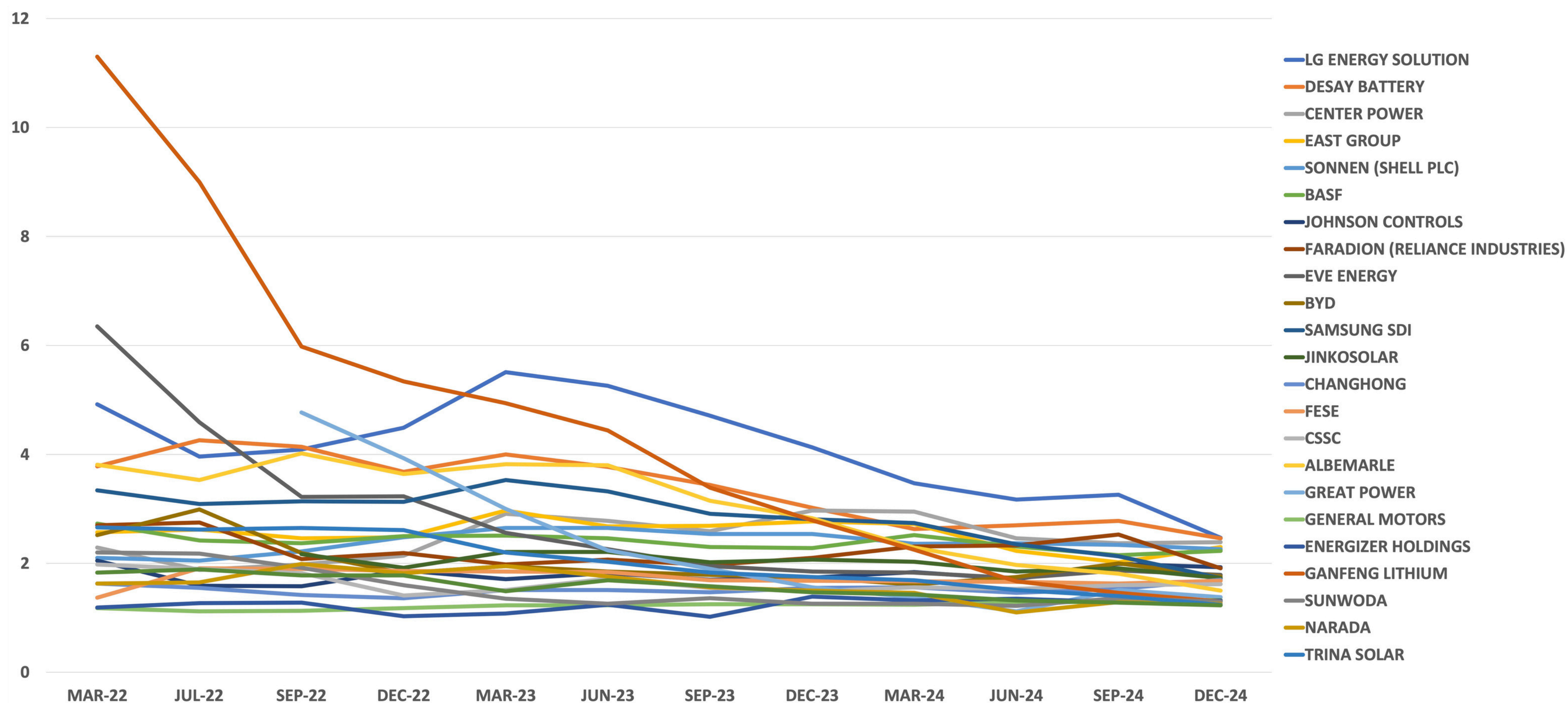


Graph #2 - Energy storage manufacturers – Safe Zone

Sinovoltaics Energy Storage manufacturer ranking - Edition #1 - 2025 - Safe Zone

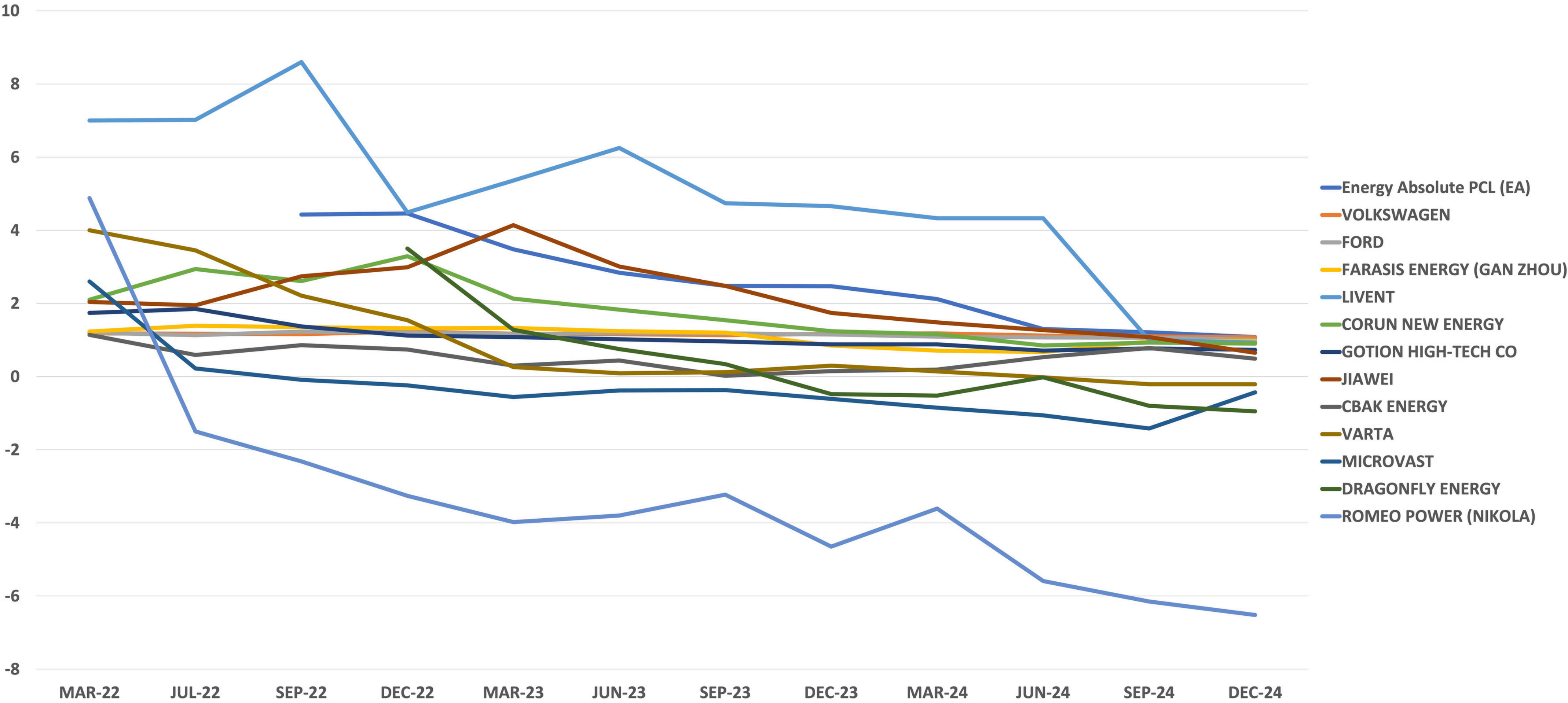


Sinovoltaics Energy Storage manufacturer ranking - Edition #1 - 2025 - Grey Zone



Graph #4 - Energy storage manufacturers – Distress Zone

Sinovoltaics Energy Storage manufacturer ranking - Edition #1 - 2025 - Distress Zone



How is the Sinovoltaics Ranking Score calculated?

The Sinovoltaics Energy Storage 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 **CAMEL GROUP**. Here’s a number of Altman Z-Scores over the years:

3.98 on Q1 2022

3.45 on Q2 2023

3.19 on Q4 2023

3.08 on Q4 2024

Currently stands at 3.08 (December '24)

These numbers show that the **CAMEL GROUP** has been stable for years. Add the fact that **CAMEL GROUP** 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 **SANYO** and **SEBANG GLOBAL BATTERY**. As you can see each of these companies has shown stable scores since 2022:

SANYO	SEBANG GLOBAL BATTERY
4.84 Q1 2022	3.58 Q1 2022
4.62 Q2 2023	3.23 Q2 2023
4.39 Q4 2023	3.3 Q4 2023
3.93 Q4 2024	3.45 Q4 2024



SINOVOLTAICS ENERGY STORAGE 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



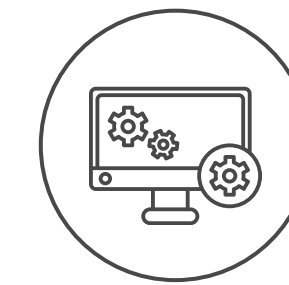
SOLAR FARM INSPECTIONS

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.