



SINOVOLTAICS INVERTER MANUFACTURER RANKING

EDITION 3/2020

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Welcome to this Edition 3 - 2020 version of the **SINOVOLTAICS Inverter Manufacturer Ranking Report**.

The Altman-Z Scores in this report have been calculated from June 2017 until June 2020, 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?"

2017 - 2020: 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	SEP17	DEC17	MAR18	JUN18	SEP18	DEC18	MAR19	JUN19	SEP19	DEC19	MAR20	JUN20	LISTING
SOLAREEDGE	1	↑	6,39	6,32	7,25	6,97	5,9	4,84	4,25	5,42	6,66	6,74	6,05	9,2	NAS:SEDG
ENPHASE	2	↓	-0,75	-0,52	0,09	0,64	0,53	0,59	1,85	3,75	5,47	6,48	6,98	6,55	NAS:ENPH
SINEXCEL	3	↑	17,51	10,57	12,22	12,66	6,53	6,39	7,16	1,56	4,98	4,55	4,38	5,84	SZSE: 300693
OMRON	4	↑	5,24	5,92	5,33	5,13	4,67	4,26	4,54	4,87	5,02	5,06	4,38	5,67	TSE:6645
KSTAR	5	↑	7,05	5,75	6,74	4,61	4,05	4,13	5,26	4,51	4,15	4,36	5,18	5,25	SZSE:002518
YASKAWA SOLECTRIA (YASKAWA)	6	↑	5,11	6,24							5,18	5,69	3,88	4,78	TSE:6506
EMERSON	7	↓	5,22	5,24	5,3	5,11	5,47	4,75	4,98	4,93	4,87	5,41	4,44	4,36	NYSE: EMR
DELTA ELECTRONICS	8	↑	3,6	3,73	3,82	3,12	3,5	3,54	3,82	3,04	2,76	3,14	2,97	3,61	TPE:2308
HITE	9	↑	3,49	3,6	4,44	3,13	2,67	2,24	2,93	2,74	2,71	2,74	3,29	3,51	SZSE: 002184
CRRC TIMES ELECTRIC	10	↓		5,69				5,21			4,35	4,13	3,79	3,32	HKSE: 03898
SCHNEIDER ELECTRIC	11	↑		2,63				2,46			2,75	3,00	2,67	2,86	XPAR:SU
SMA	12	↑	2,83	3,15	3,49	3,38	2,77	1,68	1,67	1,85	1,77	2,18	1,80	2,73	XTER:S92
EATON	13	↓	2,34	2,85	2,49	2,46	2,57	2,64	2,79	2,79	2,7	2,95	2,69	2,66	NYSE: ETN
INVT SOLAR	14	↓	5,66	4,65	4,7	3,74	3,15	2,98	3,76	3,35	3,04	2,90	3,17	2,6	SZSE: 002334
ALLIS ELECTRIC	15	↑	1,73	1,88	2,05	2,14	2,09	1,9	1,96	1,95	1,99	2,06	2,02	2,47	TPE: 1514
CHINT POWER (CHINT ELECTRICS)	16	↑	2,45	2,66	2,76	2,3	2,31	2,52	2,6	2,27	2,23	2,42	2,29	2,43	SHSE: 601877
HOPEWIND	17	↓	15,41	12,62	13,23	8,88	5,76	2,59	4,21	4,19	3,54	3,33	3,14	2,42	SHSE: 603063
SUNGROW	18	↓	3,19	3,15	3,62	2,32	1,98	2,02	2,17	2,11	2,27	2,33	2,34	2,23	SZSE:300274
ABB	19	↓	2,75	2,74	2,41	2,18	2,37	2,17	2,16	2,15	2,15	2,63	2,18	2,12	NYSE:ABB
PANASONIC	20	↑	2,25	2,28	2,33	2,32	2,26	2,23	2,31	2,05	2,04	2,13	2,04	2,11	TSE:6752
ABLEREX	21	↑	2,55	2,37	2,59	2,66	2,34	2,31	2,29	1,96	1,98	1,88	1,8	2,11	ROCO:3628
CLENERGY	22	↑	3,98	2,51	2,53	1,85	1,48	1,5	1,74	1,67	1,69	1,68	1,64	2,1	SHSE: 603628

MANUFACTURERS	RANKING	TREND	SEP17	DEC17	MAR18	JUN18	SEP18	DEC18	MAR19	JUN19	SEP19	DEC19	MAR20	JUN20	LISTING
TMEIC (MITSUBISHI)	23	↑	3,06	3,01	2,87	2,78	2,77	2,56	2,45	2,45	2,4	2,31	2,04	2,05	TSE:7211
TOSHIBA	24	↑	1	1,09	1,57	2,13	2,34	2,3	2,23	1,9	1,9	1,95	1,83	1,95	TSE:6502
EAST GROUP	25	↑	2,78	2,88	3,06	2,58	2,39	1,79	1,9	1,67	1,61	1,62	1,74	1,84	SZSE:300376
HITACHI HI-REL (HITACHI)	26	↑	1,92	1,98	1,99	2,07	2,07	1,94	2,08	2,08	2,09	2,14	1,72	1,78	TSE:6501
SIEMENS	27	↑	1,97	1,98	1,99	2,05	1,96	1,8	1,77	1,81	1,77	1,89	1,64	1,72	XTER:SIE
KEHUA HENGSHENG	28	↑	3,71	3,05	2,63	1,88	1,75	1,42	1,66	1,48	1,53	1,43	1,63	1,64	SZSE: 002335
SENYUAN	29	↓	3,67	3,59	3,9	3,53	3,22	3,41	3,01	2,52	1,95	1,75	1,75	1,49	SZSE: 002358
GENERAL ELECTRIC	30	↑	1,5	1,19	1,14	1,19	0,85	0,98	1,07	1,05	1,01	1,54	1,34	1,42	NYSE: GE
JIUZHOU ELECTRIC	31	↓	3,96	2,06	1,93	1,48	1,49	1,44	1,69	1,45	1,37	1,30	1,35	1,17	SHSE: 300040
TBEA	32	↓	1,46	1,42	1,32	1,24	1,21	1,2	1,29	1,2	1,17	1,17	1,22	1,07	SHSE:600089
SOLARBRIDGE (SUNPOWER)	33	↑	-0,19	-0,76	-0,77	-1,41	-1,48	-1,5	-1,59	-0,62	-0,65	-0,51	-0,10	0,15	NAS:SPWR
ELETTRONICA SATERNO (ENERTRONICA)	34	↑		1,52				0,13			0,12	0,12	0,08	0,11	MIL:ENT
CLOU ELECTRONICS	35	↓	1,52	1,31	1,25	1,08	1,07	0,41	0,64	0,4	0,39	0,37	0,31	-0,68	SZSE: 002121

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

Graph overview

Graph #1 - The latest inverter manufacturers ranking, recorded June 2020

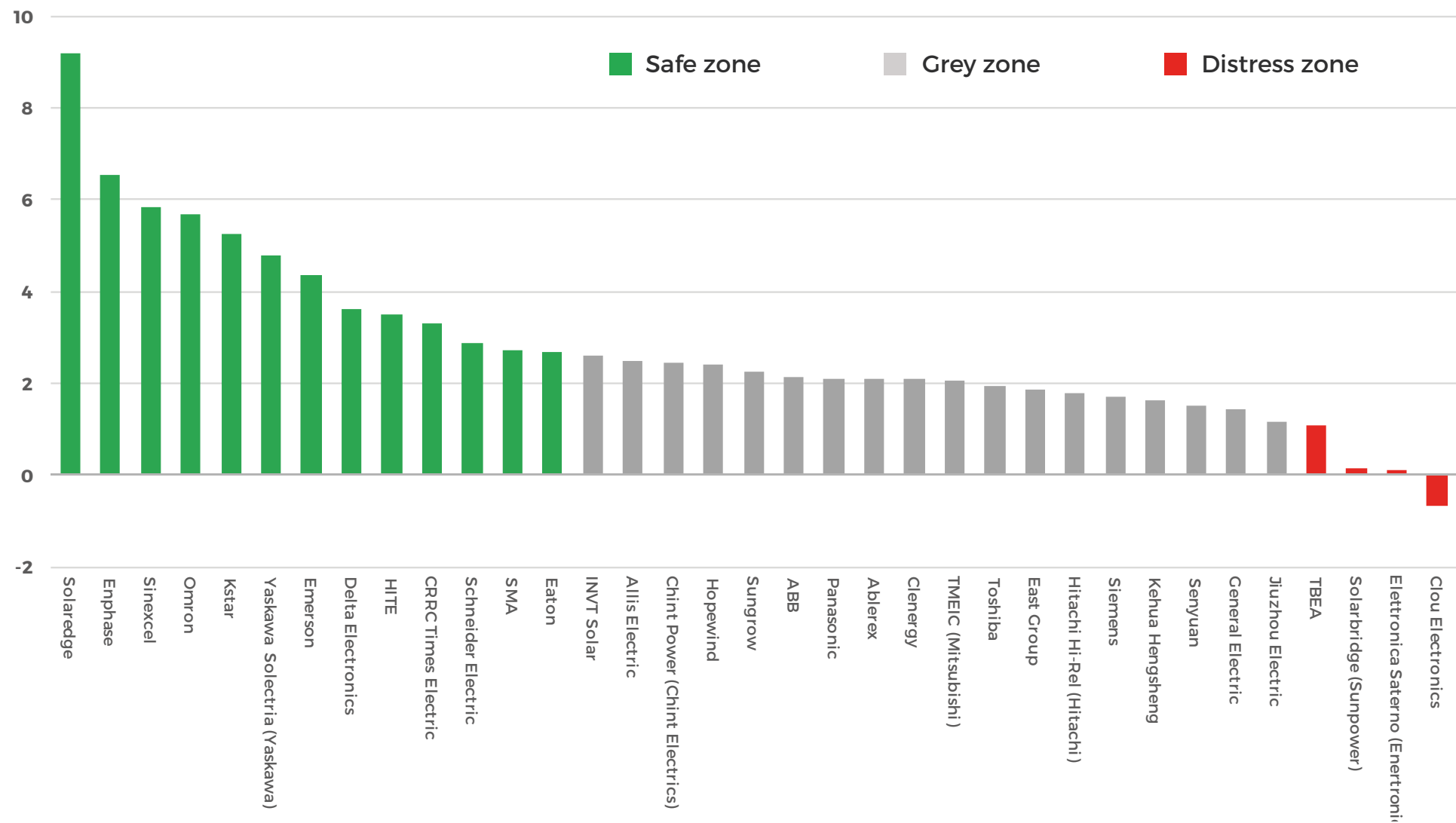
Graph #2 - Inverter manufacturers that are currently in the Safe Zone

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

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

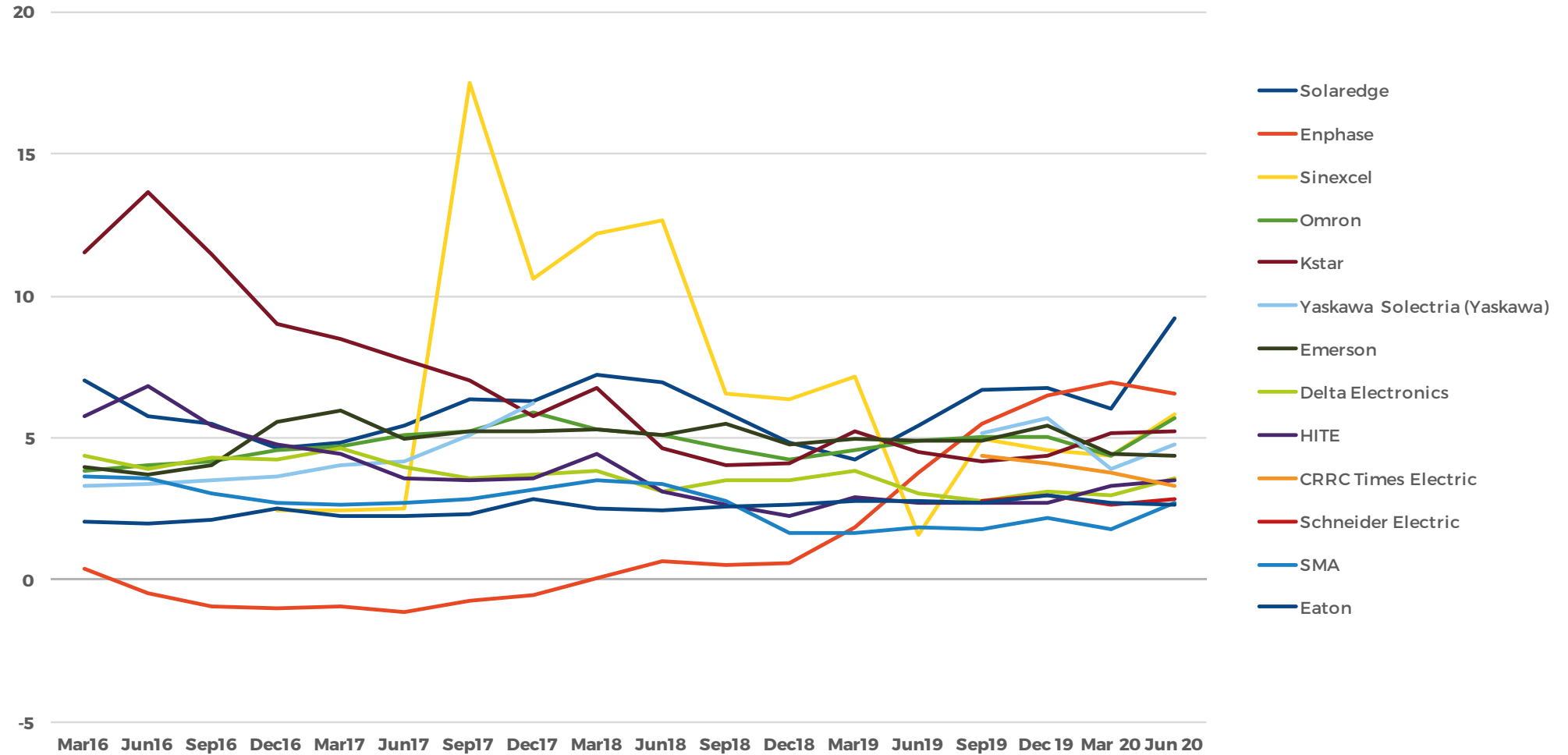
Graph #1 - Full ranking overview of inverter manufacturers

Sinovoltaics inverter manufacturer ranking - Edition #3 - 2020



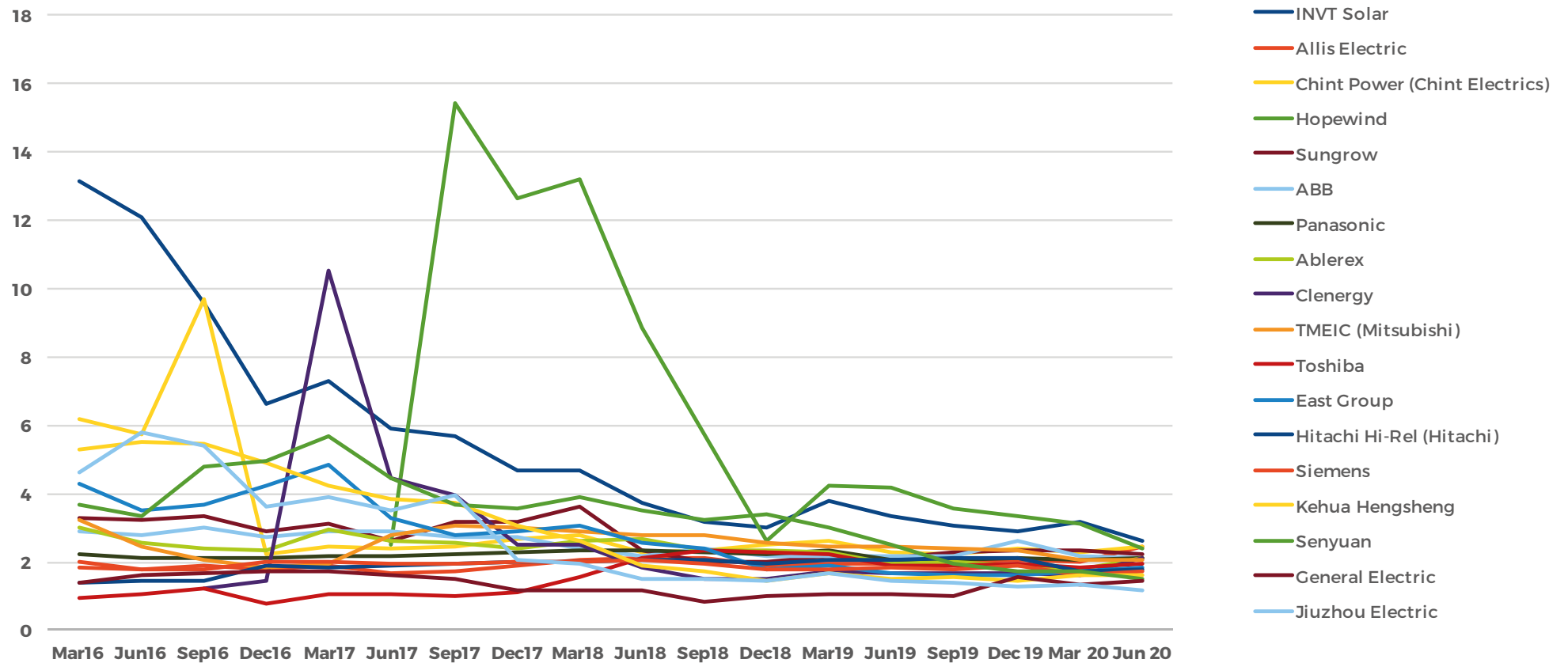
Graph #2 - Inverter manufacturers - Safety Zone

Sinovoltaics inverter manufacturer ranking - Edition #3 - 2020 - Safety Zone



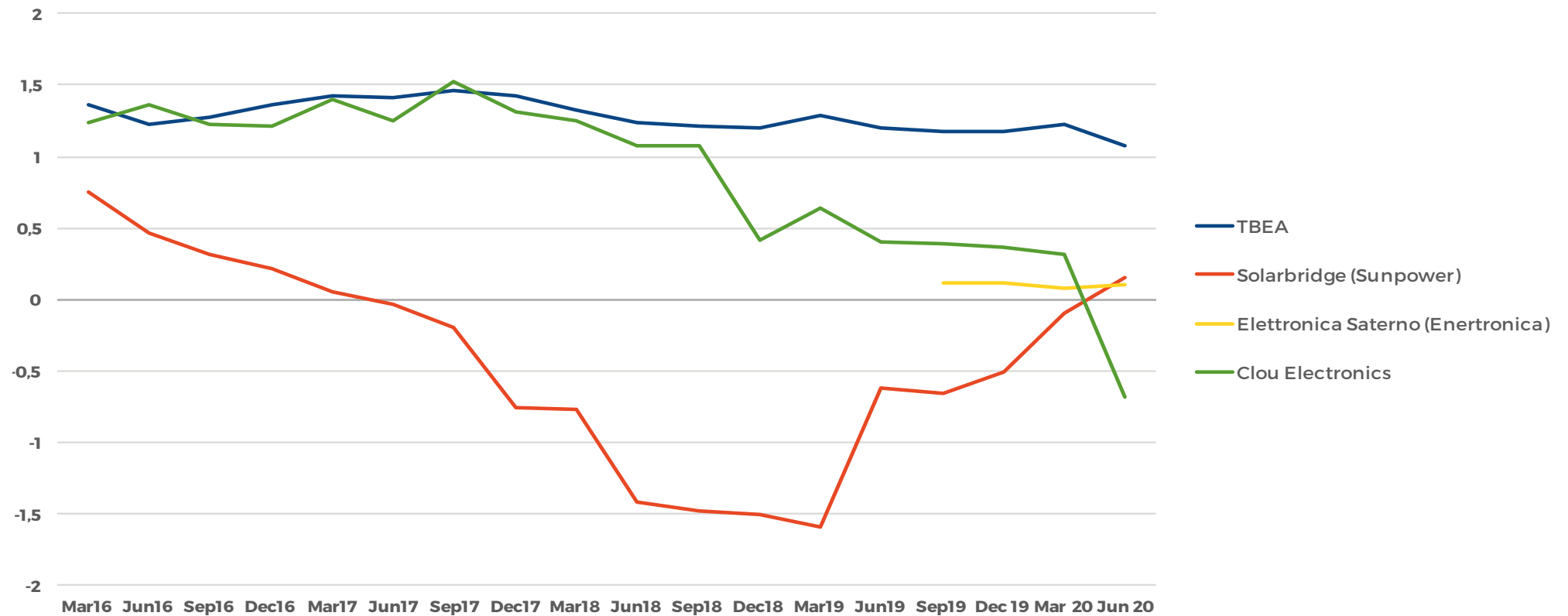
Graph #3 - Inverter manufacturers - Grey Zone

Sinovoltaics inverter manufacturer ranking - Edition #3 - 2020 - Grey Zone



Graph #4 - Inverter manufacturers - Distress Zone

Sinovoltaics inverter manufacturer ranking - Edition #3 - 2020 - 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 'Green Zone', some companies have been consistently in the Grey Zone for years.

Take for instance **Sungrow**. Here a number of Altman Z-Scores over the years:

3.09 on Q1-2017

2.02 on Q4-2018

2.33 on Q4 2019

2.23 on Q2 2020

Currently stands at 2.23 (June '20)

These numbers show that **Sungrow** has been stable for years. Add the fact that **Sungrow** AZ score has seen a gradual improvement since early 2018 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 **Panasonic, Siemens and Toshiba**. As you can see each of these companies show a rather stable score since early 2017:

Panasonic	Siemens	Toshiba
2.11 (Q2 2020)	1.72 (Q2 2020)	1.95 (Q2 2020)
2.13 (Q4 2019)	1.89 (Q4 2019)	1.95 (Q4 2019)
2.23 (Q4 2018)	1.8 (Q4 2018)	2.3 (Q4 2018)
2.25 (Q3 2017)	1.97 (Q3 2017)	1 (Q3 2017)
2.15 (Q1 2017)	1.99 (Q1 2017)	1.07 (Q1 2017)



SINOVOLTAICS INVERTER MANUFACTURER RANKING



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