



Sector Report: New Energy Sector

行业报告：新能源行业

Jun Zhu 朱俊杰

(852) 2509 7592

junjie.zhu@gtjas.com.hk

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Global Solar Installations Set To Further Rise in 2023

全球太阳能装机将于2023年进一步上升

- We expect global solar installations to reach 250 GW in 2022 and further jump to 380 GW in 2023, representing YoY growth of 52%.** According to SolarPower Europe, global newly installed solar capacity in 2021 reached approximately 168 GW, up 21.4% YoY. The top five markets in the world collectively contributed 128.7 GW of new solar installations in 2021, accounting for about 76.7% of global installations. With the successful commission of polysilicon new production capacity in 2H2022 and onwards, we estimate newly installed solar capacity globally to reach 250 GW/ 380 GW/ 485 GW in 2022/2023/ 2024, respectively, representing YoY increase of 49.0%/ 52.0%/ 27.6%. Domestically, we expect the China market to contribute new installations of 90 GW/ 120 GW/ 150 GW in 2022-2024, respectively.
- The rise in polysilicon supply is set to increase downstream capacity utilization, boosting solar module output.** Due to shortages, polysilicon price spiked to a 10-year high in 2022. Polysilicon supply is estimated to jump from 0.9 million tons in 2022 to 1.5 million tons in 2023, up 64% YoY. The surge in the supply of polysilicon from 4Q2022 is expected to boost the production capacity utilization in the downstream. With an overproduction rate of 125%, we estimate solar module output in 2022-2024 to be 313 GW/ 475 GW/ 606 GW, respectively. The strong solar module production output expected for 2023 and 2024 is certain to drive up the demand for solar module accessories such as EVA, back boards, aluminum frames and solar glass.
- We are bullish on solar module accessory makers.** Due to the projected rise in the output of solar modules from 2023-2024, we favor the tier-1 solar glass makers in the market given their competitive cost advantage. We expect that supply and demand of solar glass will maintain a healthy relationship in both 2023 and 2024, with solar glass price expected to remain stable. We recommend solar glass industry leaders and we favor Flat Glass Group (06865 HK; rating: "Buy") as we believe the expected surge in solar glass shipment will speed up its growth in 2023-2024.
- Risk:** Global solar installations may miss expectation; overcapacity of solar glass; raw materials and energy price hikes.
- 我们预计 2022 年的全球太阳能装机量将达到 250 吉瓦，并于 2023 年进一步上升至 380 吉瓦，同比增长 52%。**根据 SolarPower Europe 的数据，2021 年全球太阳能新增装机容量达到约 168 吉瓦，同比增长 21.4%。2021 年全球前五大市场合计贡献了 128.7 吉瓦的太阳能新增装机量，约占全球新增装机量的 76.7%。随着 2022 年下半年及往后多晶硅新产能的成功投放，我们预计 2022/2023/2024 年全球太阳能新增装机容量将分别达到 250 吉瓦/380 吉瓦/485 吉瓦，同比增长 49.0%/52.0%/27.6%。国内方面，我们预计中国市场将在 2022-2024 年贡献 90 吉瓦/120 吉瓦 /150 吉瓦的新增装机量。
- 多晶硅供应的增加将提高下游产能利用率，并推升太阳能组件的产量。**受供应短缺的影响，多晶硅的价格在 2022 年飙升至 10 年的高位。预计多晶硅供应量将从 2022 年的 90 万吨跃升至 2023 年的 150 万吨，同比增长 64%。预计 2022 年四季度多晶硅供应激增将提振下游产能利用率。以 125% 的超产率计，我们估计 2022-2024 年太阳能组件产量分别将达到 313 吉瓦/ 475 吉瓦/ 606 吉瓦。预计 2023 年和 2024 年强劲的太阳能组件产量必将带动市场对 EVA、背板、铝框和太阳能玻璃等太阳能组件辅料的需求。
- 我们推荐太阳能组件辅料制造商。**由于预计 2023-2024 年太阳能组件产量将上升，我们推荐市场上具有成本竞争优势的龙头太阳能玻璃制造商。我们预计 2023 年和 2024 年太阳能玻璃的供需关系将保持健康，而太阳能玻璃价格有望保持稳定。我们推荐太阳能玻璃行业龙头，重点推荐福莱特玻璃（06865 HK；评级：买入），因为我们认为太阳能玻璃的出货量预期激增将加速公司在 2023 -2024 年的增长。
- 风险：**全球太阳能装机量低于预期，太阳能玻璃产能过剩，原材料和能源价格上涨。

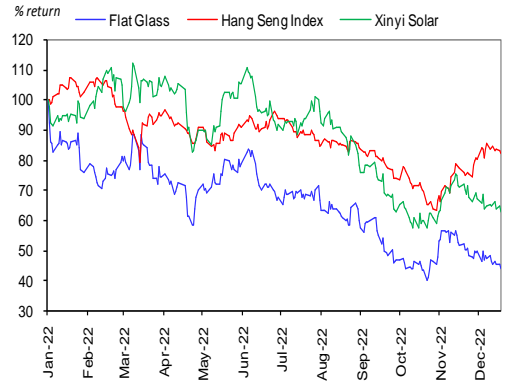
Rating:

Outperform

评级:

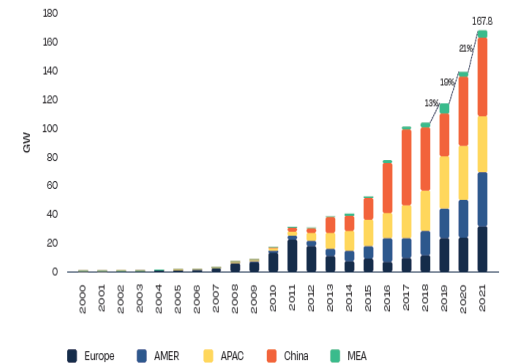
跑赢大市

Hang Seng Index vs. Solar Glass 恒生指数 vs. 光伏玻璃



Source: S&P Capital IQ.

Historical global solar installations 历史全球光伏装机容量



Source: Solar Power Europe.

We expect global solar installations to reach 250 GW in 2022 and further jump to 380 GW in 2023, representing YoY growth of 52%. According to data from SolarPower Europe (SPE), the world's total newly installed solar capacity in 2021 reached approximately 168 GW, representing a year-on-year increase of 21.4%. The top five global markets in 2021 were: China (added 54.9 GW, up 14.0% YoY), the United States (added 27.3 GW, up 42.2% YoY), the European Union (added 25.9 GW, up 34.2% YoY), India (14.2 GW added, up 264.1% YoY), and Japan (6.4 GW added, down 22.0% YoY). The top five markets in the world collectively contributed 128.7 GW of new solar installations in 2021, accounting for about 76.7% of the global total during the year. We expect China, US and EU markets to continue to be the world's largest solar markets over the next few years, accounting for more than 55% of the global annual solar capacity additions from 2022 to 2024. As countries are rolling out ambitious renewable energy investment plans to meet their obligations under the Paris climate agreement, overseas markets are expected to play a more important role as a major growth engine for global solar energy investment. Shortages in polysilicon supply in 2021 led to a spike in selling price and also restrained global growth of solar installations during the year. With the successful commission of polysilicon new production capacity in 2H2022 and onwards, we estimate newly installed solar capacity globally to reach 250 GW/ 380 GW/ 485 GW in 2022/2023/ 2024, respectively, representing YoY increase of 49.0%/ 52.0%/ 27.6%. We believe that overseas markets will be an important growth driver of global solar installations in the next few years. Domestically, we expect the China market to contribute new installations of 90 GW/ 120 GW/ 150 GW in 2022-2024, respectively.

Figure-1: Global solar installations forecast in 2022

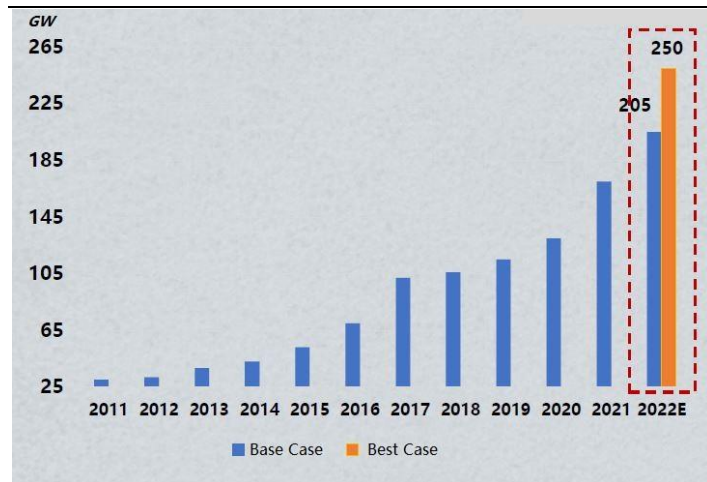
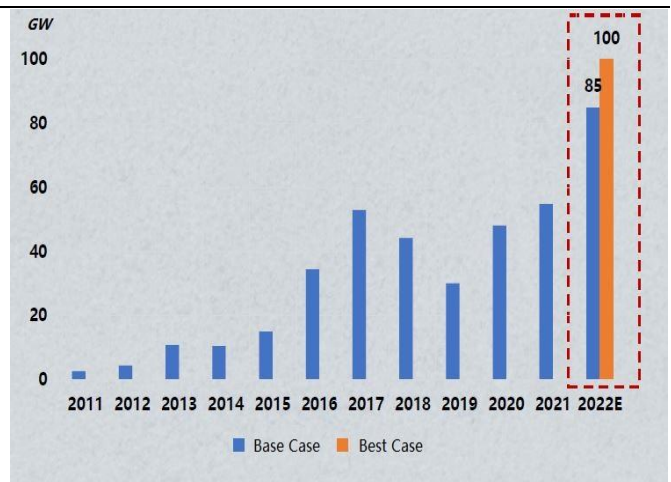


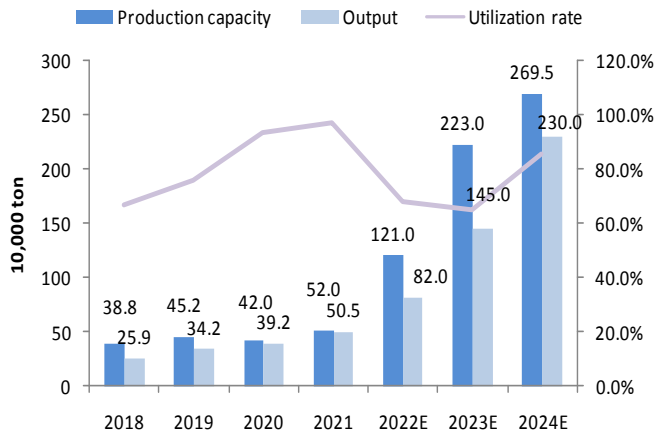
Figure-2: China solar installations forecast in 2022



Source: CPIA (China Photovoltaic Industry Association), Guotai Junan International. Source: CPIA, Guotai Junan International.

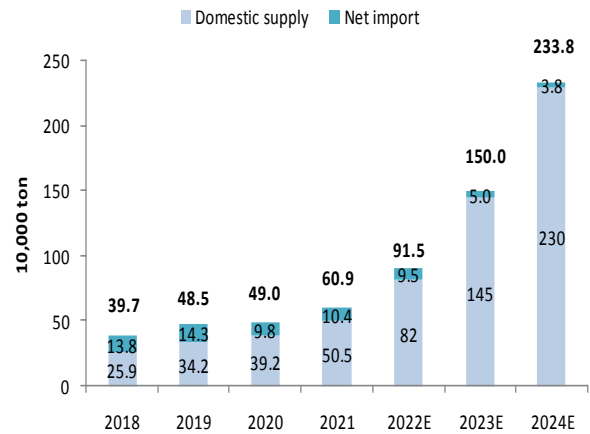
The rise in polysilicon supply in the market is set to boost solar module output, which is to drive the growth of solar energy investment. The supply shortages of polysilicon is the core factor suppressing growth of solar installations globally, and the growth rate of newly installed solar capacity globally will depend on the pace at which new polysilicon production capacity is put into operation. The solar industry is currently in a state that supply (the upstream polysilicon) determines the demand (module production and global solar installations). At present, the profit of the entire solar industry value chain is centered around the upstream polysilicon segment, and the high profitability is attracting many new market entrants to the polysilicon market (approximately 8 new players/ market entrants are set to enter the market in late 2023 and 2024, bringing with them at least 500,000 tons in new production capacity). Global solar installations are reliant on the supply of solar modules, and output of solar modules is largely dependent on the supply of upstream solar materials (i.e. polysilicon, wafer and cell). Polysilicon requires an expansion cycle of approximately 24 months. The short supply of polysilicon since 2H2020 has sent selling price spiking to a 10-year high, seen in most of 2022. The gradual ramp-up in the supply of polysilicon from 2H2022 and onwards will certainly boost the production capacity utilizations in the downstream. The current market consensus is that the polysilicon price will fall sharply in 2023 as a result of dramatic surge in its supply. The cheaper upstream raw materials will lead to less expensive solar modules and may stimulate more of its demand.

Figure-3: Capacity and output of polysilicon in China



Source: CPIA, Guotai Junan International estimates.

Figure-4: Total polysilicon supply in the China market

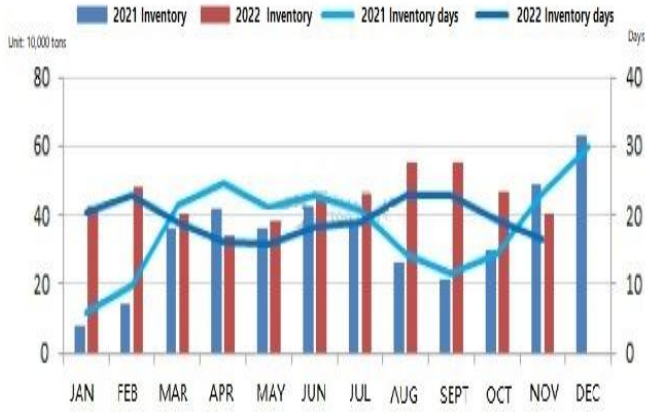


Source: CPIA, Silicon Industry of CNMIA, China Customs, Guotai Junan International estimates.

Domestic production capacity of polysilicon is estimated to reach 1.2 million tons per annum by end of 2022 and further to above 2 million tons per annum by the end of 2023. Domestic production capacity of polysilicon was approximately 520,000 tons in 2021, up 23.8% YoY. Polysilicon production volume amounted to 505,000 tons in 2021, up 28.8% YoY. Taking into consideration the 104,000 tons of net polysilicon imports, total supply of polysilicon in the China market reached approximately 609,000 in 2021, up 24.3% YoY. As domestic polysilicon capacity is poised to hit 1.2 million tons by end of 2022 and above 2.2 million tons by the end of 2023 according to the Silicon Industry of China Nonferrous Metals Industry Association, we estimate domestic polysilicon production output to be 820,000 tons in 2022 and 1.45 million ton in 2023. Taking into consideration polysilicon imports (net), domestic polysilicon supply is projected to be 915,000 tons in 2022 and 1.5 million tons in 2023, sufficient to produce approximately 320 GW and 540 GW of solar modules in 2022 and 2023, respectively. The dramatic rise in the supply of polysilicon in 2023 and onwards will clear the current hindrance and accelerate growth of global solar installations. Price of polysilicon has begun to drop in early December 2022 and the downtrend is expected to continue throughout 2023. We expect the average price of Polysilicon to be RMB135/kilogram, which is less than half of the more than RMB300/kilogram seen in 2022.

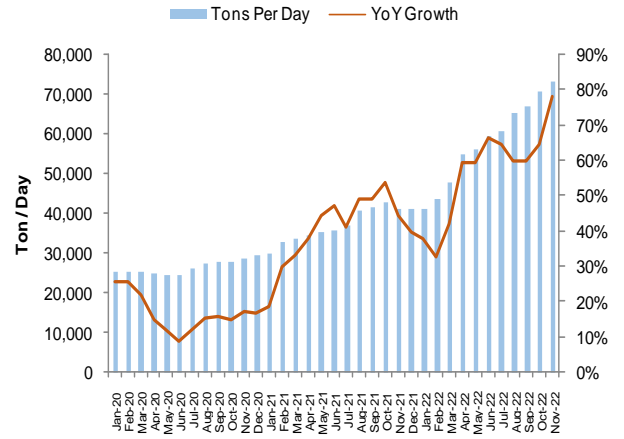
The production output for solar modules will hit 475 GW and 606 GW in 2023-2024, respectively. The entry of new production capacity of polysilicon into the market will bring down the price of polysilicon from 2023 onwards further stimulating demand for solar materials. Due to its supply shortage, polysilicon price jumped from US\$8.3/kilogram quoted in mid-2020 to US\$45.0/kilogram in mid-August 2022. However, the price of polysilicon has started to show signs of weakness with its latest quotation of US\$43.1/kilogram in early December 2022. We believe that with the dramatic surge in the supply of polysilicon in the market, its price will continue to fall in 2023 and 2024. The decline in polysilicon price will further stimulate downstream demand and increase the production output of wafer, cell and module. The fall in the polysilicon selling price is set to bring down the price of downstream solar materials, especially the price of solar module. The market is expecting the solar module price to drop by between 20% and 30% in 2023, thanks to a cheaper polysilicon price. The cheaper solar module is also projected to stimulate downstream solar system installation in 2023 onwards. With an overproduction rate of 125%, we estimate that solar module output in 2022-2024 to be 313 GW/ 475 GW/ 606 GW, respectively. The strong solar module production output expected for 2023 and 2024 is set to drive up demand for solar module accessories/ auxiliary materials such as EVA, back boards, aluminum frames and solar glass. We are thus bullish on the outlook of solar module accessories makers due to the projected rise in the output of solar modules from 2023-2024.

Figure-5: Historical solar glass inventory in China



Source: SCI, Guotai Junan International.

Figure-6: Historical solar glass production capacity



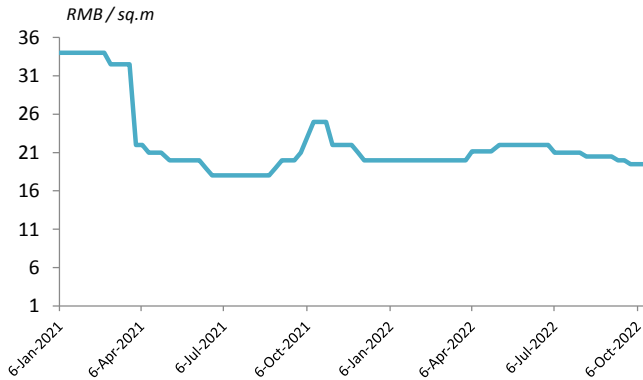
Source: SCI, Guotai Junan International.

Table-1: Supply and demand analysis of solar glass

	2020	2021	2022E	2023E	2024E
Global solar installations (GW)	138.2	167.8	250.0	380.0	485.0
Solar module production / demand (GW)	124.6	182.0	312.5	475.0	606.3
Overproduction ratio (%)	90%	108%	125%	125%	125%
Solar glass capacity at year end (tpd)	29,540	41,260	78,180	110,880	133,880
Newly added capacity for the year (tpd)	4,180	11,720	36,920	32,700	23,000
Average solar glass capacity of the year (tpd)	27,450	35,400	59,720	94,530	122,380
3.2 mm glass (7.01 GW / 1,000 tpd) - module equivalent (GW)	192.6	248.3	418.9	663.1	858.5
2.0 mm glass (5.61 GW / 1,000 tpd)- module equivalent (GW)	154.0	198.7	335.1	530.5	686.8
3.2 mm glass penetration (%)	80%	70%	60%	48%	45%
2.0 mm glass penetration (%)	20%	30%	40%	52%	55%
Demand for solar glass (capacity tpd)	18,651	27,891	49,003	76,516	98,307
Capacity demand /average capacity ratio (%)	67.9%	78.8%	82.1%	80.9%	80.3%

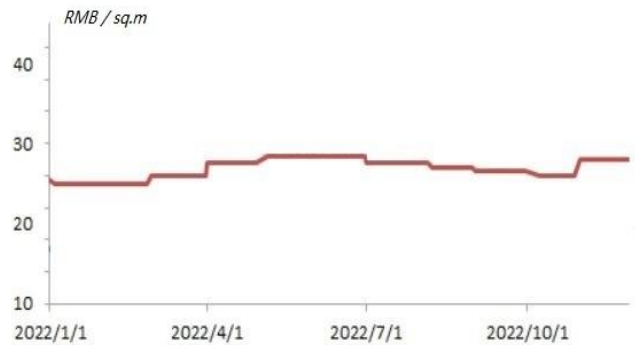
Source: CPIA, SPE, Guotai Junan International estimates. *Note: assume glass output rate of 75% and module conversion rate of 20.5% for 3.2mm and 2.0mm glass production.

Figure-7: Price of 2.0mm processed PV glass in China



Source: Solarzoom, Guotai Junan International.

Figure-8: Price of 3.2mm processed PV glass in China



Source: SCI, Guotai Junan International.

Investment logic and investment suggestion: We favor the tier-1 solar glass makers in the market given the projected rise in the module production from 2023 and onwards. The market is concerned that solar glass industry might experience overcapacity in 2023 and 2024, but we believe that the risk warning mechanism in the solar glass industry (in which, public hearings need to be conducted by industry associations approved by government authorities for all the new solar glass projects planning to be constructed or commissioned; non-efficient capacities or capacities deemed to cause solar glass industry overcapacity will not be permitted to enter the market) will play the critical role in protecting the market from entering into overcapacity. From the information we have gathered from the market, certain new solar glass projects either failed to pass the hearings or their production line commissioning dates were postponed by 6 to 12 months. We believe the said risk warning mechanism will protect the industry from the potential risk of overcapacity. Based on our analysis, the supply and demand of solar glass will maintain a healthy relationship in both 2023 and 2024 (see Table-1), and solar glass price is expected to remain stable going forward. Scale of new solar glass capacity addition in 2024 is projected to fall in an effort for the industry to digest the 69.6 kilotons in new capacity added between 2022 and 2023. We expect the industry-leading glass makers to benefit from a surge in glass shipments and realize earnings growth. Although low glass price is expected to become a new normal from 2023 onwards, the leaders in the industry are still expected to achieve a gross margin of between 20% and 25%, in our analysis. In fact, we've noticed that the nationwide solar glass inventory level of solar glass has been experiencing a decline since October 2022 and the price of solar glass has been picking up. By and large, we recommend solar glass industry leaders and we favor Flat Glass (06865HK; rating: "Buy") as we believe the expected surge in solar glass shipments is set to speedup growth of both companies in 2023-2024.

Risk factors: Rise in solar glass raw materials as well as energy cost; global solar installations may miss expectation; solar glass overcapacity could lead to a fall price.

Table-2: Peers comparison

Company	Stock Code	Currency	Last price (in local \$)	PER				PBR				ROE(%)	EV/EBITDA(x)	Market Cap HK\$ mn
				21A	22F	23F	24F	21A	22F	23F	24F	22F	22F	
Solar Cell & Module														
Canadian Solar Inc	CSIQ US	USD	34.11	22.0	13.2	7.2	6.2	1.2	0.9	0.9	0.8	8.3	7.3	17,021
Jinko Solar Holding Co-Adr	JKS US	USD	51.04	21.8	16.9	7.9	6.9	1.4	1.3	1.2	0.9	7.0	17.2	19,900
Renesola Ltd-Adr	SOL US	USD	4.68	46.8	46.8	14.2	8.6	8.3	n.a.	n.a.	n.a.	1.3	n.a.	2,444
Simple Average				30.2	25.7	9.8	7.3	3.6	1.1	1.0	0.8	5.5	12.3	
Weighted Average				23.4	17.2	8.0	6.7	1.7	1.2	1.0	0.8	7.2	12.7	
Solar Glass - A Share Peers														
Almaden Stock Co-A	002623 CH	CNY	29.30	97.7	41.8	21.2	14.4	1.8	1.7	1.6	1.4	4.0	n.a.	6,506
Ancai Hi-Tech Co-A	600207 CH	CNY	6.13	25.2	26.9	14.3	9.5	2.8	2.5	1.9	1.6	9.5	n.a.	5,900
Csg Holding Co Ltd- A	000012 CH	CNY	6.93	13.9	9.9	8.3	7.2	1.9	1.7	1.5	1.3	16.5	n.a.	18,522
Flat Glass Group Co Ltd-A	601865 CH	CNY	33.20	33.5	29.8	21.1	16.1	6.0	5.1	4.2	3.4	18.1	19.8	71,100
Simple Average				42.6	27.1	16.2	11.8	3.1	2.8	2.3	1.9	12.0	19.8	
Weighted Average				33.6	26.8	18.4	14.0	4.8	4.1	3.4	2.8	16.4	19.8	
Solar Glass - H Share Peers														
Flat Glass Group Co Ltd-H	06865 HK	HKD	17.86	15.4	16.1	11.6	9.1	2.7	2.6	2.2	1.8	16.4	19.4	71,100
Irico Group New Energy Com-H	00438 HK	HKD	9.31	6.4	n.a.	n.a.	n.a.	0.7	n.a.	n.a.	n.a.	n.a.	n.a.	1,666
Luoyang Glass Company Ltd-H	01108 HK	HKD	7.46	13.9	12.8	8.0	4.8	1.1	1.1	1.0	0.8	8.4	10.3	10,716
Xinyi Solar Holdings Ltd	00968 HK	HKD	8.28	15.4	16.8	12.6	10.0	2.5	2.3	2.1	1.8	14.0	11.8	76,061
Simple Average				12.8	15.2	10.7	7.9	1.7	2.0	1.7	1.5	12.9	13.8	
Weighted Average				31.2	25.7	22.2	16.8	2.5	2.3	2.0	1.8	14.7	15.1	

Source: Bloomberg, Guotai Junan International. Updated as of December 20th 2022.

Company Rating Definition

The Benchmark: Hong Kong Hang Seng Index

Time Horizon: 6 to 18 months

Rating		Definition
Buy	买入	Relative Performance >15%; or the fundamental outlook of the company or sector is favorable.
Accumulate	收集	Relative Performance is 5% to 15%; or the fundamental outlook of the company or sector is favorable.
Neutral	中性	Relative Performance is -5% to 5%; or the fundamental outlook of the company or sector is neutral.
Reduce	减持	Relative Performance is -5% to -15%; or the fundamental outlook of the company or sector is unfavorable.
Sell	卖出	Relative Performance <-15%; or the fundamental outlook of the company or sector is unfavorable.

Sector Rating Definition

The Benchmark: Hong Kong Hang Seng Index

Time Horizon: 6 to 18 months

Rating		Definition
Outperform	跑赢大市	Relative Performance >5%; or the fundamental outlook of the sector is favorable.
Neutral	中性	Relative Performance is -5% to 5%; or the fundamental outlook of the sector is neutral.
Underperform	跑输大市	Relative Performance <-5%; or the fundamental outlook of the sector is unfavorable.

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 27/F., Low Block, Grand Millennium Plaza, 181 Queens' Road Central, Hong Kong.
 Tel.: (852) 2509-9118 Fax: (852) 2509-7793 Website: www.gtja.com.hk