Equity Research I China I Solar

18 October 2016

China PV glass sector

Market leaders to better navigate industry headwinds

			Mkt cap			EPS growth (%)		ROE (%)		PER (%)		PBR (%)	
	Ticker	Rec	(USD mn)	Ccy	Price	2016E	2017E	2016E	2017E	2016E	2017E	2016E	2017E
Xinyi Solar	968 HK	Buy	2,453	HKD	2.82	54.2	30.1	27.6	30.2	9.9	7.6	2.2	1.9
Flat Glass	6865 HK	NR	392	HKD	1.69	-11.9	6.8	19.1	17.0	5.0	4.6	0.7	0.7

Source: Bloomberg, CSCI Research estimates for Xinyi Solar, price as of 18 Oct 2016

- **We initiate coverage on China PV glass sector with a cautious view, and suggest investors to watch out for a possible down cycle in the solar industry due to policy overhangs and absent momentum from China beyond Jun 2017.**
- **While PV glass prices may continue on a downward trend in the short term, we see alleviating overcapacity issues, in light of a pick-up in demand during 4Q16-1H17 and capacity expansions digested by overhauls and furnace upgrade.**
- **We initiate coverage on Xinyi Solar (968 HK) with a Buy rating. It is our top pick among our coverage in the solar space, given its resilient growth prospectus, solid fundamentals to navigate through cycles and undemanding valuation.**

Policy overhangs overshadow industry outlook. The potential harsher-than-expected 2017 tariff cuts as suggested in the NDRC draft would trigger another round of front-loaded installations (over 18GW in our estimates) in China by Jun-17. Should the aggressive tariff cut materialise, global installations beyond mid-2017 might enter another down cycle in the worst case scenario, as other emerging markets are unlikely to offset a significant decline in China, in our view.

Oversupply alleviated on capacity overhauls and furnace upgrade. In spite of the fact that several leading players have recently announced capacity expansion plans of large-scale furnaces (800-1000ton daily melting capacity) in 2016-18, we see industry overcapacity to be largely relieved, in view of the expected overhauls of over a quarter of existing capacities in 2017, and the exit of inefficient furnaces of 250ton daily melting capacity (c.40% of existing total capacity) in the medium term.

Market leaders likely to be better off amid industry downtrends. PV glass ASPs are likely to continue –on a downward trend in the short term, given the low utilization and high inventory levels of downstream module suppliers, as well as possible overhaul overcasting visibility in demand by Jun-17. Nonetheless, we believe leading players would be able to weather the market downturns and continue their track records in achieving outstanding profitability among glass makers and solar components suppliers.

Initiate coverage on Xinyi Solar (968 HK) with a BUY rating. We like Xinyi Solar for its resilient growth prospects and capabilities to navigate industry headwinds. Xinyi is well poised to strengthen its leading position with capacity expansion and solar power developments. Xinyi trades at forward PER and PBR of 8.0x and 1.9x respectively (over 1SD below its historical average), which looks attractive. Our DCF-based PT of HKD3.61 implies 25% potential upside.

ZHU Kexin
(CE No.: BEZ998)
zhukexin@csci.hk
+852 3465 5653

Table of Contents

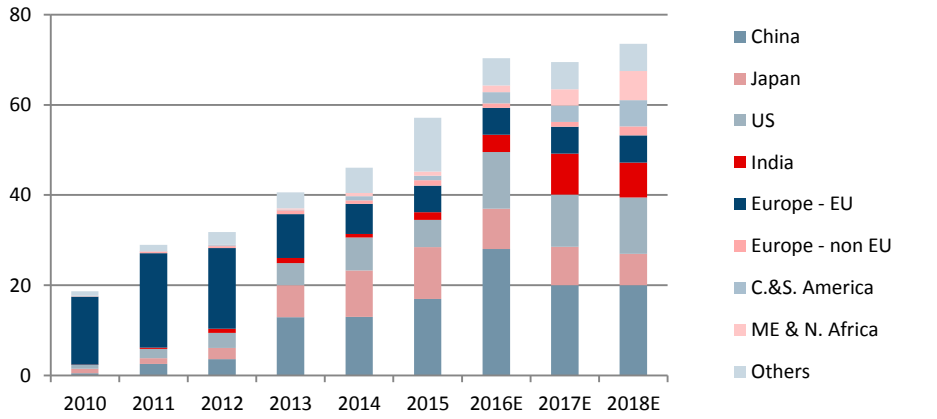
PV glass industry

Demand: potential downturn seeking new momentum

2H16-2017 installations likely no growth, but remain strong in scale

1H16 saw an unprecedented growth led by China and the US; accordingly, global solar installations are expected to grow 23% YoY from 57GW in 2015 to reach 70GW in 2016, which includes 28GW and 13GW net additions in China and US respectively. For 2017, we expect global installations to be largely flat. Demands from the two growth engines, China and US, would normalise to 18-20GW and 10-12GW respectively, though the shortfall would be offset by emerging markets, in particular, India, the Middle East and Latin American. In addition, the sharp declines in global module ASP would benefit the solar farm developers and drive a faster adoption of solar power.

Figure 1: Global solar installation, 2010 – 2018E



Source: BNEF, IHS, CSCI Research

Installations beyond June 2017 hinge on China's FiT cuts

Considering the demand in China, which would constitute 40% of global installation in 2016E, with a significant slowdown in project development in 3Q16, a demand pick-up in 4Q16 has been guided by the majority of domestic solar players. Nonetheless, in light of recent price drop of solar components and project bidding results, we find some downside risks that installations towards year-end might be spilled over to 2017. With the next tariff deadline expected in Jun-2017 and in anticipation of further decline in module prices, solar farm operators would have the incentives to delay new investments to enjoy lower construction costs.

The NDRC has recently issued a draft notice on renewable power tariff adjustment which proposed to substantially cut solar tariff from 2017, according to news reports on Sep 29. In particularly, as per the news reports, solar tariff for utility-scale projects in tier I/II/III regions would be reduced to Rmb0.55/0.65/0.75/kWh, representing reductions of 31%/26%/24% respectively, and the subsidy for self-used distributed projects would become subject to geographical allocation as well, with tariff cuts of 52%/41%/29% respectively. The draft cuts significantly exceeded the market and industry's expectations, squeezing investment returns on solar farms even with the previously projected further decline in module costs.

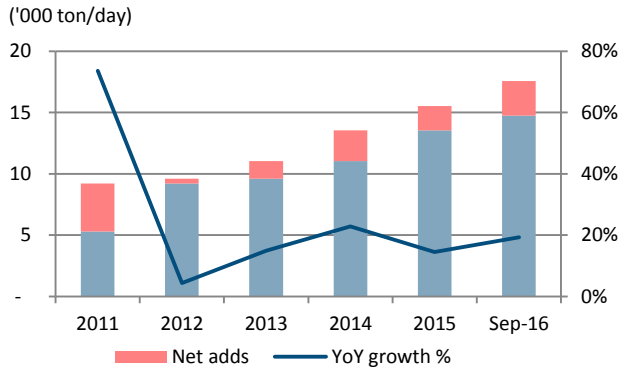
This draft might trigger another front-loaded rush installations in 2017 with no change in cut-off date; the 2017 tariff would apply to projects which 1) are approved after Jan 1, 2017, or 2) received approval before 2017 but fail to connect to grid by Jun 30, 2017. In other words, the 18.1GW installations quota for 2016 (plus Poverty Alleviation Programs and distributed projects approved in 2016) would very likely meet the June deadline to avoid the tariff cuts. The final circular would be published by NDRC only after the tariff amendment receives assessment and approval from NEA, and is expected in Nov according to past experience.

Supply: concentrated and consolidating

Concentrated market dominated by Chinese suppliers

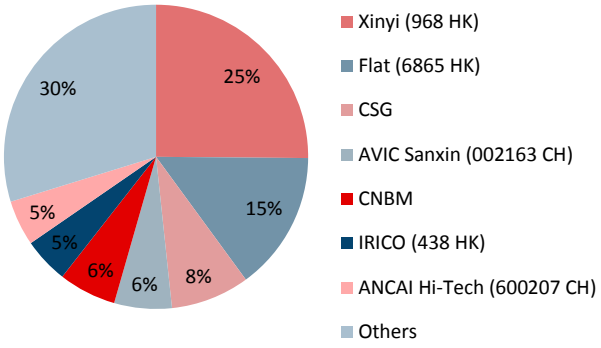
The robust growth in solar installation globally has led to resurgence in PV glass consumption and thus manufacturing. Prior to 2006, PV glass manufacturing was dominated by foreign manufacturers, but with China's booming solar industry, China has become the world's largest producer and exporter of modules as well as PV glass. Daily melting capacity for ultra-clear PV raw glass in China accounted for c.77% of the global capacity as at the end of 2015 (vs. 49% in 2010), and the domestic capacity achieved 24% CAGR growth over the past five years. The Chinese PV glass market enjoys a high concentration ratio, with CR7 of 70% in 2015. Among them, Xinyi Solar (968 HK, BUY) has occupied the leading position with a 25% share, followed by Flat Glass (6865 HK, NR).

Figure 2: China's PV glass production capacity



Source: Company, SCI99, CSCI Research

Figure 3: Domestic market share, 2015



Source: Company, CSCI Research

Capacity expansion digested by overhauls and exit of inefficient furnaces

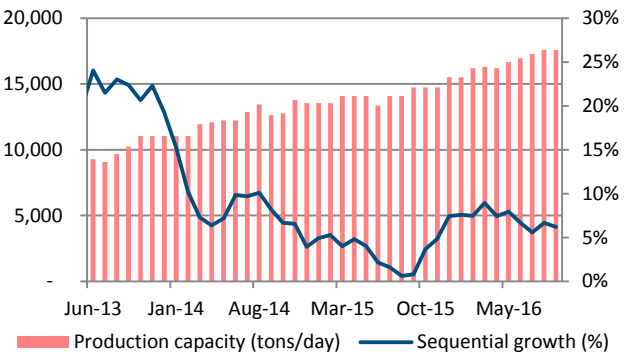
While several leading PV glass manufacturers have capacity expansion plans in 4Q16-2017, we expect the expansion to be digested by overhauls and replace low-efficient small furnaces. Normally the furnaces operate on a cycle of 5-6 years between two full-scale overhauls (the overhaul would take 6-7 months); considering the massive capacity commenced operation in 2011, over a quarter of the existing capacities are expected to undertake the overhaul in the coming years. In the medium-term, the industry expects the exit of inefficient furnaces with daily melting capacity of 250ton, which constitute c.40% of the current domestic capacities. With the increasing adoption of large-scale furnaces, we find limited risks of reckless expansion from small players.

Figure 4: Major capacity expansion plan announced

(Tons/day)		2016E	2017E	2018E
Xinyi Solar		**5,800**	**6,800**	**6,800**
(968 HK)	Anhui	+1,000 (4Q16)	+1,000 (1Q17)	-
	Malaysia	+900 (4Q16)	-	-
Flat Glass		**2,290**	**3,450**	**4,250**
(6865 HK)	Anhui	-	+1,000 (4Q17)	-
	Vietnam	-	-	+800 (mid-18)
IRICO		**1,500**	**2,300**	**2,300**
(438 HK)	Shaanxi	-	+800 (2Q)	-
	Anhui	+750 (2Q16)	-	-
CNBM		**950**	**1,950**	**1,950**
	Anhui	-	+1,000 (3Q17)	-

Source: SCI99, Company, CSCI Research

Figure 5: Daily melting capacity of PV raw glass



Source: SCI99, CSCI Research

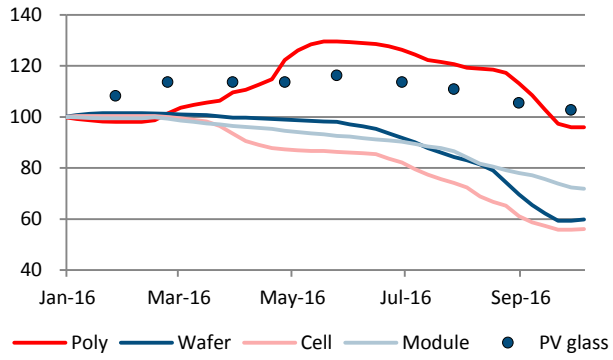
ASP and margins: cyclical pricing but superb profitability

PV glass has more resilient pricing along the solar value chain

Along the solar value chain, we find PV glass pricing relatively resilient and less fluctuating. Caused by the downturn in demand since June, solar components along the value chain have suffered a downward pricing trend, with the least ASP reduction in PV glass. The average ASPs of polysilicon, wafer, cell, and module have declined by 24%, 35%, 32%, and 20% since June-end while the average ASPs of ultra-clear patterned PV raw glass and processed glass have reduced by 9.5% and 7.9% during the same period respectively, which we attribute to the high concentration and more rational pricing of the PV glass market.

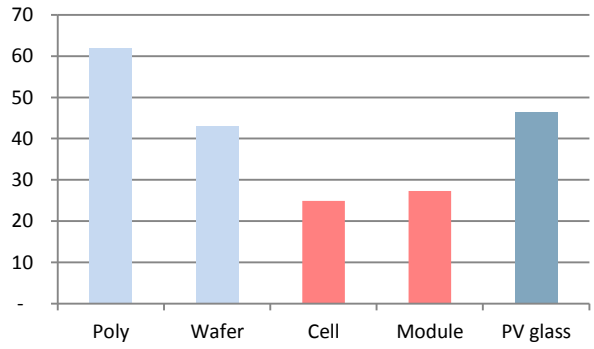
Furthermore, compared with the polysilicon market, which has an even higher concentration rate, we think PV glass face less pressure in a market downturn thanks to 1) better protected from plunging downstream pricing as PV glass only accounts for c.5% of total module production costs (polysilicon accounts for c.20%), 2) the market is dominated by Chinese suppliers, thus more rational competition without import threats, and 3) more moderate reduction of production costs which relies on economies of scale, operational efficiency and technical know-how; in contrast, there is cost reduction roadmap for polysilicon driven by technology advancement and renovation.

Figure 6:YTD price movement of solar components



Source: BNEF, Company, Bloomberg, CSCI Research

Figure 7: Market share of Top 5 suppliers (%)



Source: PV Insight, SCI99, Bloomberg, CSCI Research

ASP sees short-term pressure and uncertainties beyond June 2017

After the past cycle in 2009-12, PV glass ASP has normalized and only fluctuate within a range, that is, Rmb16.0-21.5/sqm for raw glass and Rmb28.5-33.0/sqm for processed glass. The mainstream domestic ASP has rebounded since mid-2015 and peak by Jun-end 2016; for Sep 2016, the average ASP for PV raw glass and processed glass were settled at Rmb19.0/sqm and Rmb29.0/sqm respectively. Heading into 4Q16, we see short-term pressure and key positive catalysts would be the pick-up in installations, decreasing inventory level among module suppliers, and then demand for PV glass from module manufacturing; on the bright side, currently the PV glass industry only holds a few weeks of inventory.

In the medium-term, we forecast strong installations to continue during 4Q16-1H17 for reasons as mentioned above; and during the same period, effective capacity expansion would only come from Xinyi Solar (it takes a number of months for new capacity to ramp up). The net adds of 2,900ton/day melting capacity represents 16% growth from the current level, and would possibly be offset by the massive overhauls in the industry. Notably, risks exist of further ASP decline if a majority of overhauls are delayed to the back end of 2017.

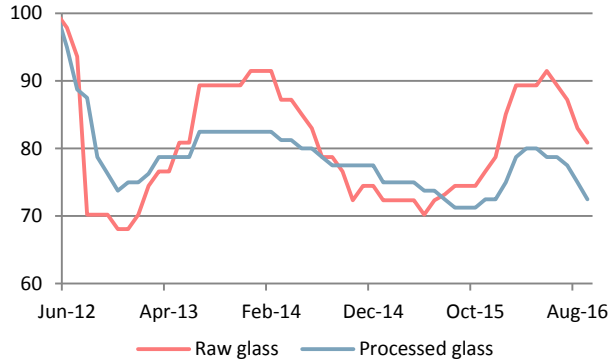
And for June 2017 and beyond, there are many uncertainties at the current stage arising from new capacity additions and demand. In particularly, should NDRC's draft on aggressive tariff cuts be approved, installations would see a significant drop and

another global downturn in solar industry might occur in the worst case scenario as emerging markets fail to offset the decline. Recalling the last downcycle, installations in European declined by 45% in 2013 due to their subsidies cuts and emergence of structural overcapacity whilst emerging demand from Asia could not mitigate the supply-demand imbalance.

Leaders demonstrated track record in weathering market downturns

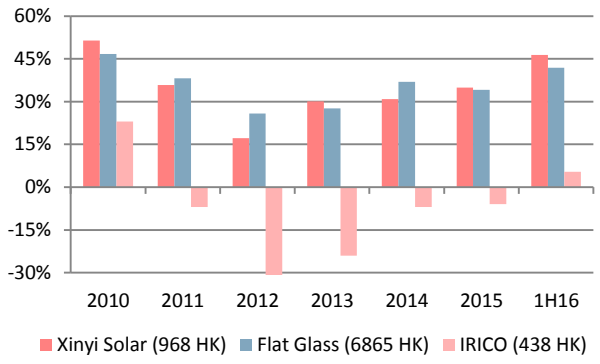
Regardless of the highly competitive market and cyclical pricing, leading PV glass manufacturers managed to deliver solid financial performance leveraging on their superb cost advantages; meanwhile, there was also an apparent gap in terms of performance between the leading players and smaller players. For instance, despite the difficult environment in 2012, Xinyi Solar and Flat Glass achieved gross margin of 17% and 26% in their PV glass segment, and recorded net margin of 8% and 4% respectively. In contrast, the third largest supplier, Dongguan CSG Solar Glass (the subsidiary of China Southern Glass Holdings, 000012 CH) reported more volatile earnings during the past cycles and was loss making in 2012. Meanwhile, thanks to the more favourable industry fundamentals, the leading PV glass manufacturers demonstrated outstanding profitability among the top suppliers of other glass and solar components.

Figure 8: Ultra-clear PV glass ASP (Rebased Jun-2012=100)



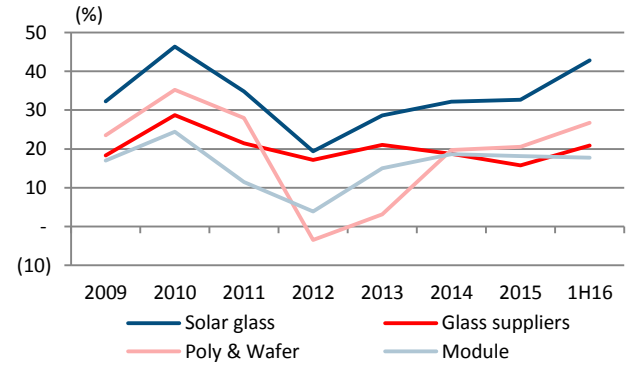
Source: SCI99, CSCI Research

Figure 9: Gross margin of PV glass segment, 2010-1H16



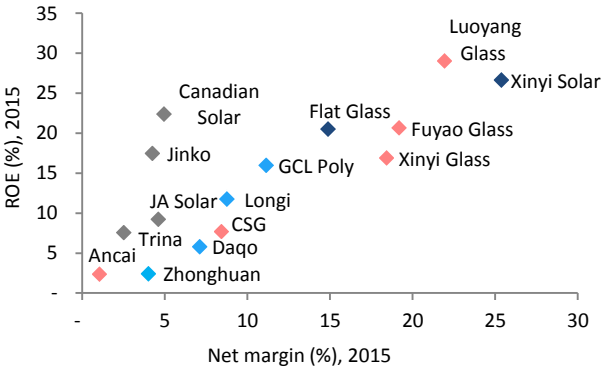
Source: Company, CSCI Research

Figure 10:GPM of glass and solar suppliers, 2009-1H16



Source: Company, Bloomberg, CSCI Research

Figure 11: Profitability and ROE



Source: Company, Bloomberg, CSCI Research

Appendix – PV glass basics

Value chain positioning

Production dominated by ultra-clear PV patterned glass

Solar glass is used as the front cover of solar modules to protect the cell, and has superior quality over ordinary glass with high light transmission rate in order to increase the conversion efficiency of solar modules. Solar glass manufacturers produce four types of products:

1) ***Ultra-clear PV patterned glass*** includes ultra-clear PV raw glass and ultra-clear PV processed glass. The raw glass is produced using low-iron silica sand (low iron content crucial to increase glass transparency), and further processed through tempering and optional anti-reflective coating into the finished patterned glass. The typical solar transmittance of ultra-clear PV processed glass is 91-92%, and would be increased by c.2.5% by anti-reflective coating.

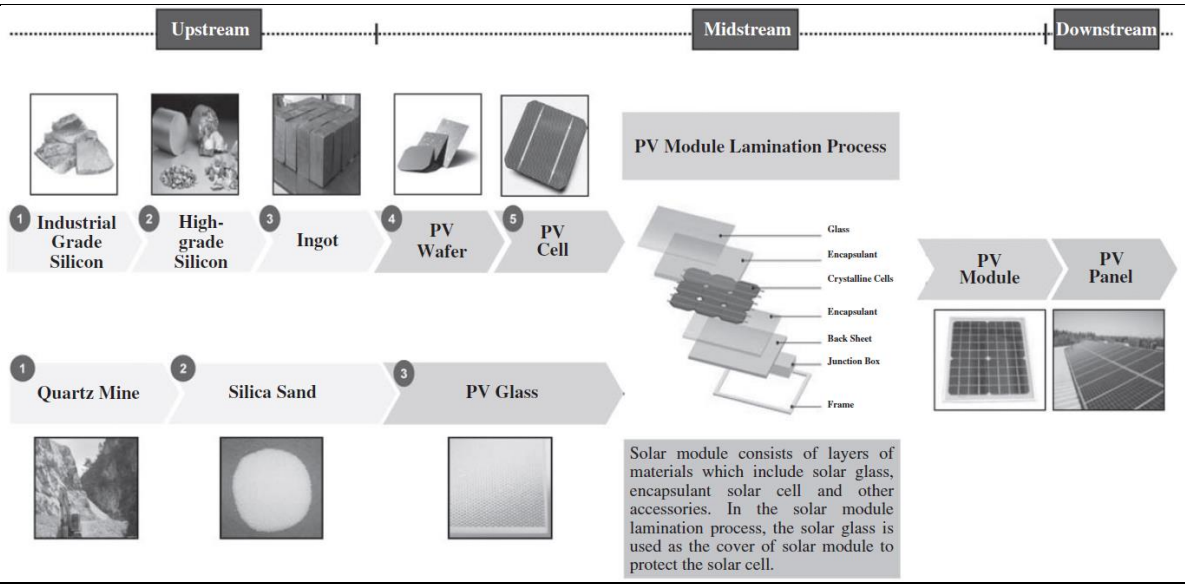
2) ***TCO (transparent conductive oxide) glass*** is manufactured using ultra-clear processed float glass with a TCO coating which creates electrical conductivity, and is used for thin-film modules.

3) ***Ultra-clear PV float glass*** is the float glass used by crystalline silicon modules and the production costs is less expensive than ultra-clear PV patterned glass. However, its solar transmittance is typically 88-91%, thus becoming less common.

4) ***Back glass*** is the piece of glass used as the back sheet of solar modules, and it currently deploys common float glass. Manufacturers expect a medium-term growth from back glass driven by surging usage of dual-glass modules.

Currently, solar glass production is dominated by ultra-clear PV patterned glass for crystalline silicon modules. Manufacturers could either sell the semi-finished raw glass to third-party glass processing companies or may choose to process the raw glass themselves. Leading manufacturers in China use majority of their produced raw glass internally to enjoy the higher selling price of processed glasses, and they have established relationships with top solar module manufacturers in China and overseas.

Figure 12: Positioning of solar glass in PV value chain



Source: Company

Limited short-term impacts from plunging module ASP

Despite module ASPs have slumped by over 20% YTD, solar glass ASP is highly elastic to its own supply-demand dynamics in the short-run without being significantly affected by fluctuations in module ASP, as solar glass account for only c.5% of total module

production costs. Nonetheless, should module manufacturers face severe financial difficulties caused by a steep price decline, they would not be able to satisfy their payment obligations, which would result in extended receivable days and even doubtful debts to solar glass suppliers.

Production and costs

Economies of scale raises entry barrier with higher investments

PV glass manufacturing has witnessed the trend of employing large-scale furnaces with a daily melting capacity of 900-1,000 tons. Subject to location and availability of infrastructure facilities, initial investment capital of such large-scale furnaces would amount to RMB500-700mn. The economies of scale arising from the significantly higher melting volume would help reduce fuel and raw material consumption, which usually constitutes over 50% of the total cost of production; for example, the unit energy consumption by a 500ton/day furnace (the mainstream of current operating production lines) would be c.20% lower than smaller furnaces of 300ton/day capacity, according to manufacturers' operating experience.

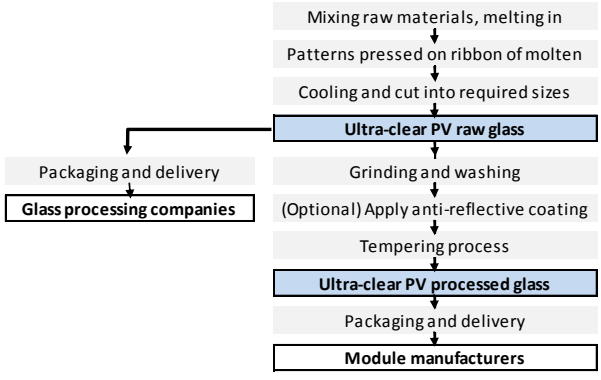
Features of glass production lead to gradual supply change

Capacity expansion of domestic solar glass production normally takes 1-1.5 years while overseas production would usually take 2 years. After the construction is completed, manufacturers would decide on the timing to fire up the furnace depending on market conditions, after which furnaces would deploy non-stop manufacturing (24 hours, seven days). Once commenced operation, it would take 1-2 months to achieve mass production, and would take another few months to adjust to optimal yield rate. Also, continuous efforts are required to streamline the production process. Accordingly, in case of short-term oversupply, manufacturers tend to maintain their production level until cash flow turns negative (instead of incurring loss), as resumption of suspended furnaces would take 3-6 months and results in significant re-starting costs such as re-hiring of workers.

Production costs mainly affected by fuel and raw materials

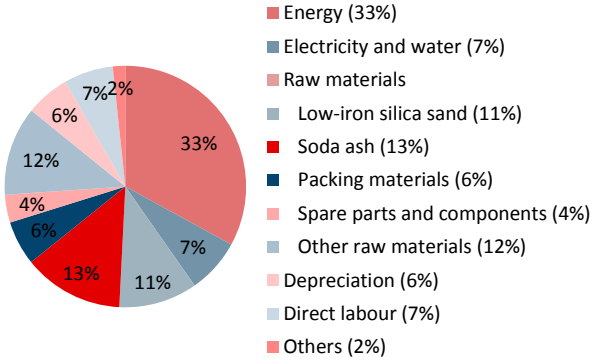
The major cost components of PV glass production consist of: ***1) Fuel and energy***, which account for 40%-50%, with natural gas or heavy oil being the principal fuel for furnaces. The natural gas tariff is subject to national regulations in China, and the tariff cuts, which became effective in Nov 2015, have been favourable to the manufacturers in terms of costs reduction this year. And although the prices of heavy oil have come down recently, additional expenses would be incurred for emission controls. For electricity, manufacturers may make use of their own residual heat generation system and roof-top solar power; ***2) Raw materials***, which account for 35%-45%, with soda ash and silica sand being the major inputs, while the quality of low iron content of silica sand is crucial for solar transmittance of the glass; and ***3) other expenses*** on manufacturing, packaging and transportation.

Figure 13: Ultra-clear PV glass production process



Source: CSCI Research

Figure 14: Cost structure of PV glass production



Source: Company, CSCI Research

Research

LIU Taisheng, Steven
TMT
(852) 3465 5652
stevenliu@csci.hk

SO Lai Shan, Jennifer
Consumer
(852) 3465 5781
jenniferso@csci.hk

CHAN Ka Yeung, Duncan
Commodity
(852) 3465 5654
duncanchan@csci.hk

TIAN Yang
Automotive
(852) 3465 5775
tianyang@csci.hk

SUN Lingxiao, Roger
Industrials
(852) 3465 5785
rogersun@csci.hk

XU Bo, Albert
Financials
(852) 3465 5789
albertxu@csci.hk

ZHU Kexin
Renewable energy
(852) 3465 5653
zhukexin@csci.hk

Institutional Sales & Trading

XIANG Xinrong, Ron
(852) 3465 5633
ronxiang@csci.hk

CAO Xiaogang, Glen
(852) 3465 5658
caoxiaogang@csci.hk

ZHANG Meng, Maurice
(852) 3465 5656
mauricezhang@csci.hk

HO Wen Hao, Jack
(852) 3465 5685
jackho@csci.hk

WANG Zhuo, Gary
(852) 3465 8655
wangzhuo@csci.hk

HO Hung Wei
(852) 3465 5687
hohungwei@csci.hk

LEE Ying Ju, Rose
(852) 3465 5707
roselee@csci.hk

LI Jiageng, Mike
(852) 3465 5636
mikeli@csci.hk

XIA Tian
(852) 3465 5670
xiatian@csci.hk

XU Xiaowei, Vincent
(852) 3465 5795
vincentxu@csci.hk

LI Tianyi, Miranda
(852) 3465 8653
mirandali@csci.hk

Company Rating Definition

The Benchmark: Hong Kong Hang Seng Index; Time Horizon: 12 months

Buy	12-month absolute total return: >=10%
Hold	12-month absolute total return: >-10% but <10%
Sell	12-month absolute total return: <=-10%

Disclosure of Interests

As of the date of this report,

1. The research analysts primarily responsible for the preparation of all or part of this report hereby certify that:
   (i) the views expressed in this research report accurately reflect the personal views of each such analyst about the subject securities and issuers; and
   (ii) no part of the analyst's compensation was, is, or will be directly or indirectly, related to the specific recommendations or views expressed in this research report.
2. The research analysts primarily responsible for the preparation of all or part of this report, or his/her associate(s), do not have any interest (including any direct or indirect ownership of securities, arrangement for financial accommodation or serving as an officer) in any company mentioned in this report,
3. This report has been produced in its entirety by China Securities (International) Brokerage Company Limited ("China Securities (International)") (CE Number: BAU373, regulated by the Securities and Futures Commission in Hong Kong)
4. China Securities (International) and each of its group companies that carry on a business in Hong Kong in investment banking, proprietary trading or agency broking in relation to securities have no financial interest, in aggregate, equal to or more than 1% of the market capitalization in the stocks reviewed in this report.
5. China Securities (International) and each of its group companies that carry on a business in Hong Kong in investment banking, proprietary trading or agency broking in relation to securities may receive compensation from or mandates for investment banking services in the past 12 months from listed corporations whose stocks are being reviewed by China Securities (International) in this report.
6. China Securities (International) and each of its group companies that carry on a business in Hong Kong in investment banking, proprietary trading or agency broking in relation to securities do not have any individual employed by or associated with them serving as an officer of a listed corporation whose stocks are being reviewed by China Securities (International) in this report.
7. China Securities (International) and each of its group companies that carry on a business in Hong Kong in investment banking, proprietary trading or agency broking in relation to securities may act as the market markers in the stocks reviewed by China Securities (International) in this report.

Disclaimer

China Securities (International) Research

18/F, Two Exchange Square, Central, Hong Kong

Tel: (852) 34655600 Fax: (852)21809495

Bloomberg: CSCR <Go>