Equity Research l China l Solar Power 29 September 2016

China Solar Sector

Shifting dynamics, follow the leaders

			Mkt cap			EPS growth (%)		ROE (%)		PER (x)		PBR (x)	
	Ticker	Rec	(US$m)	Ccy	Price	2016E	2017E	2016E	2017E	2016E	2017E	2016E	2017E
Xinyi Solar	968 HK	NR	2,768	HKD	3.18	60%	28%	29.9	31.4	10.7	8.4	2.8	2.3
GCL Poly	3800 HK	BUY	2,589	HKD	1.08	-8%	4%	12.7	11.7	7.0	6.8	0.8	0.7
GCLNE	451 HK	BUY	1,218	HKD	0.50	n.a.	221%	6.0	16.0	26.6	8.3	1.6	1.3
United PV	686 HK	NR	474	HKD	0.76	-77%	57%	3.1	5.6	35.9	22.9	1.3	1.3

Source: Bloomberg, CSCI Research estimates for GCLNE, prices as of 27 Sep 2016

- **China announced the 6th batch FiT catalogue on Sep 23, which together with collection of accrued subsidy receivables widely expected by end-16 would improve solar farm operators' liquidity positions in our view.**
- **A downward trend in solar tariffs is inevitable in China, with signs of acceleration due to competitive biddings and Top Runner projects. All these developments have prompted solar farm developers to enhance project execution and cost control.**
- **Though global installations are likely to remain at a high level in 2H16-2017, solar manufacturers suffer from persisting industry glut. In the solar manufacturing space, we prefer PV glass plays given their more resilient prices and robust demand.**

Long-awaited announcement of the 6th batch of FiT catalogue was jointly made by the NDRC, MoF and NEA on Sep 23, and we view the related subsidy receivables on track to be collected by the end of this year, which will help improve the liquidity positions of solar farm operators.

Inevitable downward tariff trend alongside declining system costs. NDRC is reportedly considering cutting FiT subsidies by over Rmb0.05/kWh among all regions in 2017, which we think is inevitable, and provincial governments have started to adopt competitive bidding for project quota allocation. Notably, Top Runner projects are leading the downward trend with the latest bidding tariff reaching as low as Rmb0.52-0.63/kWh. The plunge in module prices is favourable, but we expect only the leading developers to achieve satisfying returns with effective project execution and cost controls.

2H16-2017 demand remains strong; prefer PV glass for more resilient pricing. After the unprecedented growth in 1H16, global installations are expected to reach 70GW in 2016 and to be largely flat in 2017. The anticipated demand pick-up in 4Q16 might be spilled over to 2017 without in sight tariff cuts or bottoming out in solar components prices. We believe the PV glass market shows better fundamentals fronting the pricing pressures, owing to high entry barriers, more prudent capacity expansion, and current low inventory level.

Investment ideas: We reiterate BUY on GNE (451 HK) on the back of its robust growth prospects, entrenched leading position along with improvement in industry developments. UPV (686 HK) would be the major beneficiary of the 6th batch of subsidies and its recent share placement would help improve its financial position. Among manufacturers, Xinyi Solar (968 HK) has a good track record in weathering market downturns.

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Solar power operators

Long-awaited announcement of the 6th batch catalogue

On Sep 23, NDRC, MoF and NEA jointly announced the registration results for the 6th batch of the renewable energy tariff subsidy catalogue, in line with market expectation of announcement in 3Q16, and the industry is expecting a collection of related FiT receivables by the end of this year, and at the same time the 7th patch would open for application. To recall, MoF opened the application for the 6th batch of subsidy on Jan 30, 2016, with application deadline on Feb 29, and eligible projects must achieve grid-connection by Feb-2015; the preliminary examination was completed in early May.

Projects registered in the catalogue would initially receive the delayed FiT receivables and collect future subsidies on a regular basis, which would improve the cash flow and liquidity positions of solar farm operators, especially pure operators. We view United PV (686 HK, NR) to be the biggest beneficiary among the HK-listed solar operators, as it has 630MW installed capacity included in the latest catalogue with accrued subsidy receivables amounting to c.Rmb1.3bn as of Aug 2016. Meanwhile, GNE (451 HK, BUY) has c.400-500MW registered projects with c. Rmb523mn receivables as of Jun, and Xinyi Solar (968 HK, NR) has c.250MW registered projects.

Continuous FiT cuts inevitable; cut-off date affects installations

According to local news report, the NDRC has been considering revising down the FiT subsidies in 2017 by over Rmb0.05/kWh among all regions, and the system costs used for project return calculation would be set at c.Rmb7.0/watt (vs. Rmb8.0/watt for 2016 and Rmb10.0/watt for 2014-15), resulting in a minimum 5.1%-6.3% tariff decline among all regions. We believe the Chinese government would follow the global practice of reducing the FiT subsidies for renewable energy. In addition, it faces significant shortage of renewable fund, which urges a change of the subsidy-driven growth model, and its long-term target of achieving grid-parity for solar power by 2020. While the actual cuts would affect the return on projects, the cut-off date might arouse another round of rush installations next year.

Figure 1: National FiT for utility-scale solar projects (Rmb/kWh, including tax)

Resources	Regions	2014-15	2016	YoY%	2017E	YoY%
Category I	Ningxia, Qinghai (Haixi), Gansu (Jiayuguan, Wuwei, Zhangye, Jiuquan, Dunhuang, Jinchang), Xinjiang (Hami, Tacheng, Alatai, Kelamayi), Inner Mongolia (except Chifeng, Tongliao, Hinggan, Hulun Buir)	0.90	0.80	-11.1%	< 0.75	-6.3%
Category II	Beijing, Tianjin, Heilongjiang, Jilin, Sichuan, Yunnan, Inner Mongolia (except Chifeng, Tongliao, Hinggan, Hulun Buir), Hebei (Chengde, Zhangjiakou, Tangshan, Qinhuangdao), Shanxi (Datong, Suzhou, Xinzhou), Shaanxii (Yulin, Yanan), and other regions in Qinghai, Gansu and Xinjiang	0.95	0.88	-7.4%	< 0.83	-5.7%
Category III	Other regions	1.00	0.98	-2.0%	< 0.93	-5.1%

Source: News, CSCI Research estimates

Spreading adoption of competitive bidding among provinces

In response to the draft guidance on competitive bidding released by NEA in Jan 2016, increasing numbers of provinces such as Hebei, Guangxi, Heilongjiang, and Inner Mongolia have published their competition mechanism on solar project quota allocation, with bidding tariff weighting of 20-30% in the selection criteria. Referring to the most recent open tender results in Anhui and Jiangsu, the bidding behaviours among solar farm developers were rather rational, as bidding tariffs have ranged from Rmb0.92/kWh to Rmb0.96/kWh, translating into 2-6% discount to the benchmark tariff of Rmb0.98/kWh. And based on our sensitivity analysis, projects could still deliver IRR returns of 8-19% with the tariff cuts, depending on their system costs (project assumptions: 1,100 utilization hours for Category III areas, 80% debt financing with 6.0% financing costs).

Figure 2: Tender results of Anhui and Jiangsu

Province	Developer		Bidding tariff (Rmb/kWh)	(MW)
Anhui	1	Xinyi Solar Anfeng fish-farming solar project	0.945	100
	2	Xinyi Solar Daxu East fish-farming solar project	0.945	100
	3	Xinyi Solar Niubu fish-farming solar project	0.945	50
	4	Xinyi Solar Wangjiang solar project	0.945	50
	5	SPIC Nanyao River fish-farming solar project	0.945	130
	6	SPIC Xiejiaji solar project	0.945	70
	7	Powerchina Tianchang fish-farming solar project	0.945	100
		Total		**600**
Jiangsu	1	Huadian Huaian Jinhu fishery PV project (first phase)	0.950	50
	2	Huadian Yizheng Dayi project (first phase)	0.955	50
	3	Linyang Miehuazhen fishery PV project	0.960	40
	4	CSIQ Suining Shuanggouzhen agricultural PV project	0.945	30
	5	Zhenfa New Energy Jinhu PV project	0.930	30
	6	Zhenghui Solar Jinhu Lvliangzheng fishery PV project	0.920	50
	7	Yaohui Solar Fengxian agricultural PV project	0.920	40
	8	Huaneng Dacang ash yard fishery PV project	0.954	40
		Total		**330**

Source: News, CSCI Research

Figure 3: Illustrative project IRR

Project Assumptions		
Installed capacity	50	MW
Utilisation hour	1,100	hours
System costs	7.0	Rmb/watt
Total investment	**350**	**Rmb mn**
On-grid tariff (incl. VAT)	0.95	Rmb/kWh
Operating period	20	years
O&M costs	0.08	Rmb/watt
Capital (20%)	70	Rmb mn
Bank loans (80%)	280	Rmb mn
Interest rate	6.0%	
Loan Term	15	years
Profitability		
IRR - Equity/Project	13% / 8%	
Payback year - Equity/Project	5 / 10	th year

Source: CSCI Research

Figure 4: Project sensitivity analysis

		Financing Cost				
		5.0%	**5.5%**	**6.0%**	**6.5%**	**7.0%**
On-grid Tariff (Rmb/kWh)	**0.920**	14%	13%	11%	10%	9%
	0.930	15%	13%	12%	11%	9%
	0.945	16%	15%	13%	12%	10%
	0.960	17%	16%	14%	13%	11%

		System Costs				
		8.0	**7.5**	**7.0**	**6.5**	**6.0**
On-grid Tariff (Rmb/kWh)	**0.920**	5%	8%	11%	16%	22%
	0.930	5%	8%	12%	17%	23%
	0.940	6%	9%	13%	18%	24%
	0.945	6%	9%	13%	18%	24%
	0.950	6%	10%	13%	18%	25%
	0.960	7%	10%	14%	19%	25%

Source: CSCI Research

Top Runner projects led the downward tariff trend

Top Runner projects are leading the downward tariff trend, but we think the return on projects would be cushioned by cost reductions. Among the 5.5GW Top Runner quota for 2016, Yangquan and Ruicheng bases in Shanxi were the first to complete the tendering process, and the Rmb0.61/kWh bidding tariff from GNE aroused heated market discussions, which translated into installation costs below Rmb6.0/watt. More recently, the Baotou project completed tendering with bidding tariff further declining to Rmb0.52-0.63/kWh. But both GNE and XTNY (1799 HK, NR) reassured a minimum project hurdle rate of 12%, and management of the companies saw favourable module prices (domestic module ASP has declined to below Rmb3.0/watt from c.Rmb3.7-3.8/watt in 1H16) and also the room to reduce other system costs.

Figure 5: Status of 2016 Top Runner projects

Province	Top Runner Base	GW	Status
Hebei	Winter Olympics PV Corridor	0.5	Tender under consideration since 19 Aug 2016
Shanxi	Yangquan City Coal Mining Subsidence Area	1.0	Tender completed
Shanxi	Ruicheng County	0.5	Tender completed
Inner Mongolia	Baotou City Coal Mining Subsidence Area	1.0	Tender completed
	Wuhai City Coal Mining Subsidence Area	0.5	Approved by NEA in June, bidding not yet start
Anhui	Lianghuai Area Coal Mining Subsidence Area	1.0	Bidding Plan will be compiled in 2H16
Shandong	Jining City Coal Mining Subsidence Area	0.5	Tender open (submission date: 27 Sep 2016)
	Xintai City Coal Mining Subsidence Area	0.5	Tender open (submission date: 27 Sep 2016)
Total		**5.5**	

Source: News, CSCI Research

Figure 6: Top Runner projects tender results

Top Runner	Developer	Developer	Bidding tariff (Rmb/kWh)
Shanxi Yangquan	1	协鑫新能源（451）	0.61
	2	特变电工新疆新能源（1799）	0.70
	3	中国三峡新能源	0.70
	4	晶科电力（JKS US）	0.71
	5	国家电投集团东方能源	0.75
	6	山西漳泽电力	0.78
	7	中广核太阳能	0.79
	8	中民新能投资	0.71
	9	中节能太阳能	0.77
	10	阳光电源（300274）	0.78
	11	常州天合能源（TSL US）	0.80
	12	航天机电（600151）	0.88
Shanxi Ruicheng	1	苏州协鑫新能源（451）	0.65
	2	特变电工新疆新能源	0.75
	3	晶科电力（JKS US）	0.79
	4	中节能太阳能	0.80
	5	华电福新能源控股（816）	0.83
	6	中国电力国际	0.83
IM Baotou	1	华电内蒙古能源有限公司	0.52
	2	青海昌盛日电太阳能科技	0.52
	3	北方联合电力	0.53
	4	英利能源（YGE US）	0.56
	5	常州天合能源（TSL US）	0.56
	6	国电投集团	0.57
	7	特变电工新疆新能源（1799）	0.59
	8	阿特斯（CSIQ US）	0.59
	9	浙江正泰新能源开发	0.59
	10	联合光伏（686 HK）	0.60
	11	北控清洁能源（1250 HK）	0.63
	12	内蒙古能源发电投资集团	平台项目

Source: News, CSCI Research

Solar components suppliers

2016 eyes on delivery of a 4Q16 demand pickup

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. Given their order book for 2H16, the leading Chinese module suppliers on aggregate are expecting a sequential growth of shipment volume in the second half of this year, and also expecting the geographic mix to be balanced towards overseas markets.

Considering the demand in China, which would constitute 40% of global installation in 2016, 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 believe the downside risks would be that installations towards year-end might be spilled over to 2017. Without another tariff deadline 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.

Figure 7: Shipment of leading Chinese module suppliers

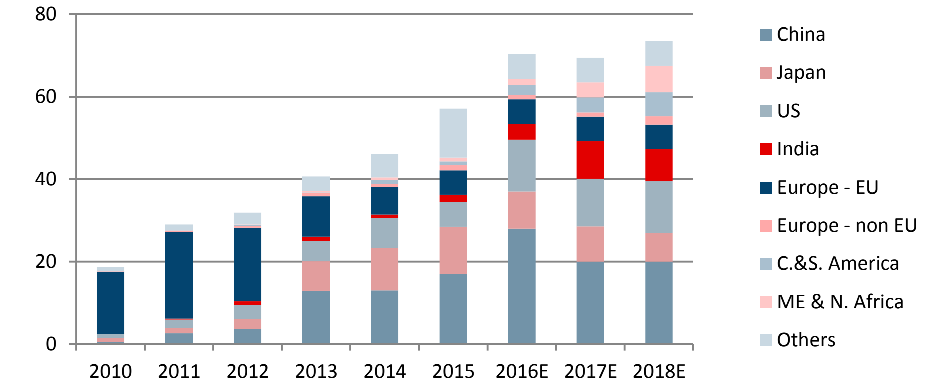
	2013	2014	2015	2016E		1H15	2H15	1H16	2H16E	
Module shipment (MW)				Low-end	High-end				Low-end	High-end
Trina (TSL US)	2,584	3,664	5,737	6,300	6,550	2,258	3,480	3,082	3,218	3,468
CSIQ (CSIQ US)	1,894	3,105	4,706	5,400	5,500	2,080	2,626	2,488	2,912	3,012
Jinko (JKS US)	1,765	2,943	4,512	6,000	6,500	1,667	2,845	3,316	2,684	3,184
JA Solar (JASO US)	1,174	2,407	3,726	5,200	5,500	1,302	2,425	2,295	2,905	3,205
Yingli (YGE US)	3,234	3,361	2,447	2,600	3,000	1,482	965	1,170	1,430	1,830
Total shipment (MW)	**10,651**	**15,480**	**21,129**	**25,500**	**27,050**	**8,789**	**12,340**	**12,351**	**13,149**	**14,699**
YoY growth (%)		*45%*	*36%*	*21%*	*28%*	*44%*	*32%*	*41%*	*7%*	*19%*
Global production (MW)	**42,000**	**52,000**	**60,000**							
% of total shipment	*25%*	*30%*	*35%*							

Source: Company, CSCI Research estimates

Demand in 2017 to remain strong in scale

We expect global installations to be largely flat in 2017. Demand from the two growth engines, China and US, would normalise to 18-20GW and 10-12GW respectively, but the shortfall would be offset by emerging markets, in particularly India, Middle East and Latin American. In addition, the sharp decline in global module ASP would benefit the solar farm developers and drive a faster adoption of solar power.

Figure 8: Global solar annual installations, 2010-2018E



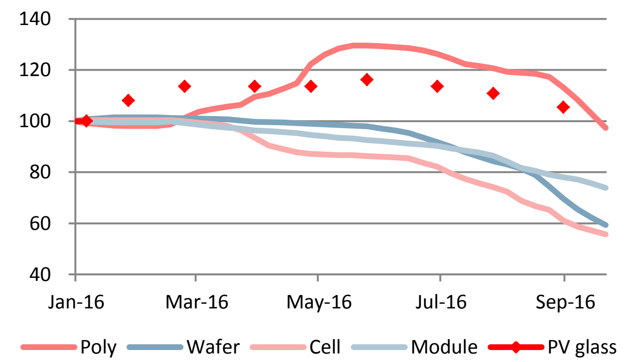
Source: BNEF, IHS, CSCI Research estimates, Bloomberg

PV glass to be most defensive in current downturn

Caused by the downturn in demand since June, solar components along the value chain have suffered a downward pricing trend, with the only exception of PV glass. The average ASP of polysilicon, wafer, cell, and module has declined by 3%, 41%, 44%, and 26% YTD respectively. Meanwhile, the average ASP of ultra-clear patterned PV raw glass and processed glass have picked up slightly by 5% and 3% YTD respectively.

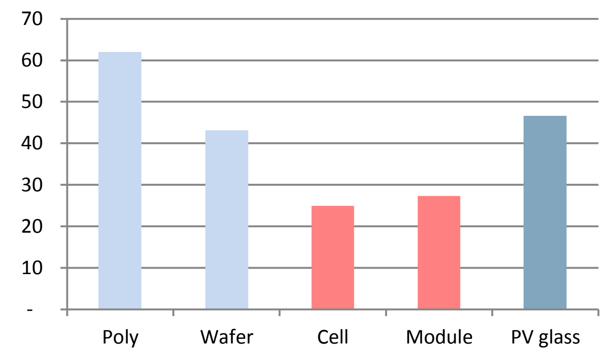
Looking forward, we view the midstream cell and module suppliers to be hardest hit owing to their most severe overcapacity and aggressive pricing behaviours. Upstream polysilicon and PV glass both are highly concentrated markets and entry barriers are raised by high fixed investment, economies of scale and technical know-how; accordingly, capacity expansion is more prudent and prices would become more resilient. Among these two, we further prefer PV glass which is better protected from impacts from plunging module prices. Solar glass only accounts for c.5% of total module production costs, thus less affected by depressed downstream pricing; and current trade inventory remains low at about 2-3 weeks.

Figure 9: YTD price movement of solar components



Source: BNEF, Company, CSCI Research, Bloomberg

Figure 10: Market share of Top 5 suppliers (%)



Source: PV Insight, SCI99, CSCI Research, Bloomberg

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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%

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