

# Solar Power Equipment

## Picks and Shovels in the Solar Gold Rush

Backed by strong photovoltaics (PV) installation demand worldwide, solar component makers' ambitious capacity expansion plans and emerging disruptive technologies, Chinese solar power equipment suppliers are set to be the key beneficiaries of the downstream capex up-cycle. We rate solar power equipment sector **OUTPERFORM** and initiate coverage on two domestic leaders **Jingsheng (300316 CH)** and **S.C New Energy (300724 CH)** with **BUY**.

- **Global new PV installation embracing another boom.** The arrival of grid-parity era has become a key driver for major countries to boost the application of solar power. CMBI renewable team estimates that base-case global PV new installed capacity will surge 112% to 1,064GW in 2020E-25E vs. 503GW in 2014-19, setting the scene for a promising equipment demand growth.
- **Equipment suppliers to benefit from solar component makers' ambitious capacity expansion.** In order to gain market share and enhance cost competitiveness through economies of scale, Chinese solar component makers have lined up ambitious capacity expansion plans. Based on our project-by-project estimates, major domestic solar component makers have scheduled 221GW capacity additions for wafers and 320GW for PERC cells. We estimate, under the base-case scenario, the scheduled expansion plan will translate into RMB 34bn annual equipment demand during 2020E-22E, 32% higher than that in 2019. We expect further announcement of capacity expansion plan by solar component makers will offer additional upside to our estimates.
- **Further upside on demand driven by next-gen technologies.** For solar cells, we expect the potential wider application of HJT (Heterojunction Technology), in three to five years, to spur more equipment demand as it requires completely different set of equipment from current production lines at higher CAPEX per GW (~RMB 500mn vs. ~RMB 250mn of PERC). Chinese cell makers' scheduled new HJT capacity plan can spur 29% upside to our base-case scenario for solar cell production equipment demand. On the wafer side, the emerging ultra-large format (182mm and 210mm) will bring about upgrade and replacement of equipment along the whole industry chain.
- **The emerge of world class equipment players.** China has basically achieved self-sufficiency in solar power equipment production regarding current mainstream technologies, and is experiencing equipment localization for next-gen technologies. Jingsheng and S.C New Energy have established their leadership in silicon crystal growing equipment and solar cell equipment in China, with 11% and 9% shares in China PV equipment market in 2019, respectively. We believe both companies will become the key beneficiaries of the upcoming capex up-cycle.
- **Key risks:** 1) Weaker-than-expected downstream capacity expansion; 2) Technology risks; 3) Deterioration of customer relationship or clients' financial condition.

### Valuation Table

Name	Ticker	Rating	TP (RMB)	Price (RMB)	P/E (x)		ROE (%)	
					FY20E	FY21E	FY20E	FY21E
Jingsheng	300316 CH	BUY	40.20	32.12	50.9	35.7	17.1	21.2
S.C New Energy	300724 CH	BUY	138.00	100.99	56.6	36.0	20.4	26.0

Source: Company data, Bloomberg, CMBIS estimates

## OUTPERFORM

### China Capital Goods

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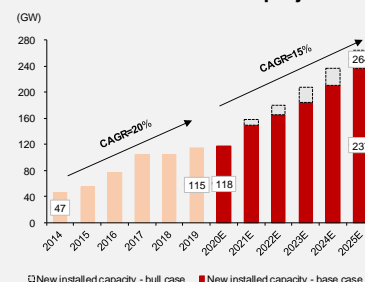
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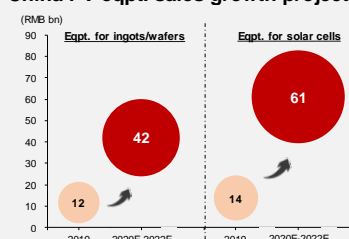
### Global new PV installation projection



Source: IEA PVPS, Solarpower Europe, CMBIS estimates

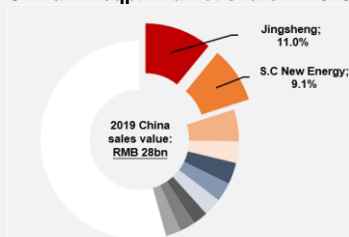
Note: CAGR under base-case scenario

### China PV eqpt. sales growth projection



Source: CPIA, CMBIS estimates

### China PV eqpt. market share in 2019



Source: CPIA, CMBIS estimates

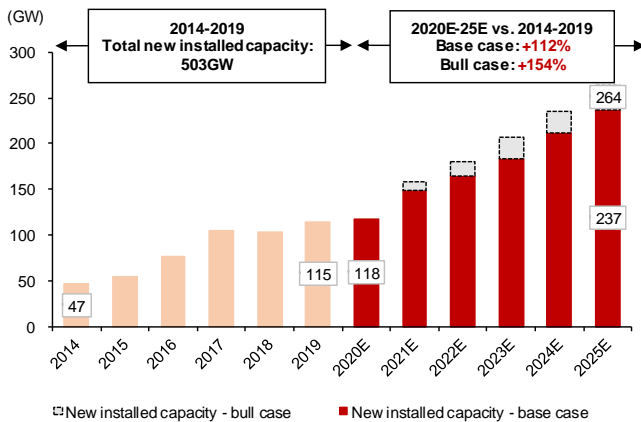
- **Initiate with BUY on Jingsheng.** We believe Jingsheng, as a dominant crystal growing equipment supplier, is set to capture the strong downstream demand by leveraging its solid relationship with PV wafer oligarch **Zhonghuan (002129 CH, NR)**, its diversified customer base and its leading-edge R&D capabilities. We project Jingsheng's net profit to grow at 34% CAGR over FY19-22E. Our TP of RMB 40.20 is based on 45x FY21E P/E, equivalent to its historical average plus 0.5SD, to reflect current up-cycle.
- **Initiate with BUY on S.C New Energy.** We like S.C for its market leadership, its broad product offerings that cover ~70% equipment CAPEX for mainstream PERC technology, as well as its early-mover advantage in developing HJT production equipment, that enables it to enjoy the uptrend of equipment demand regardless of potential change in technology. We project an impressive net profit CAGR of 47% in FY19-22E. We set our TP at RMB 138.00, implying 49x FY21E P/E.

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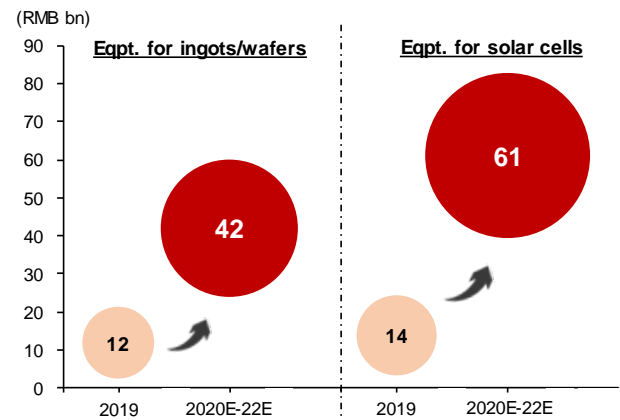
## Focus Charts

**Figure 1: CMBIS renewable team projects 2020E-25E total global new installed PV capacity to double that in last cycle**



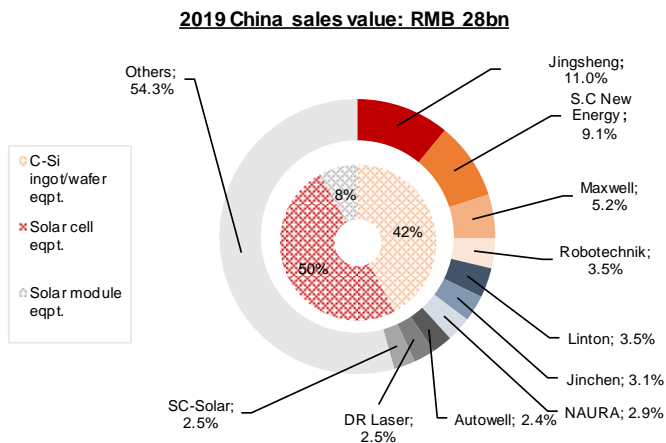
Source: IEA PVPS, Solarpower Europe, CMBIS estimates

**Figure 2: Our base-case scenario shows that China's eqpt. demand in below addressable markets could reach RMB 103bn during 2020E to 2022E**



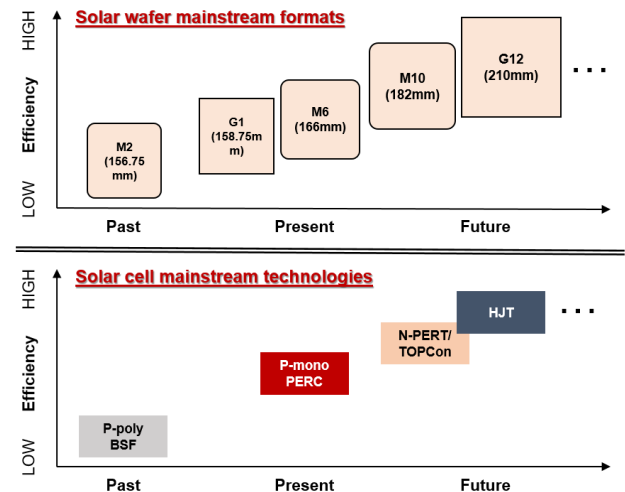
Source: CPIA, CMBIS estimates

**Figure 3: 2019 China solar power eqpt. sales value by product lines and suppliers' market share**



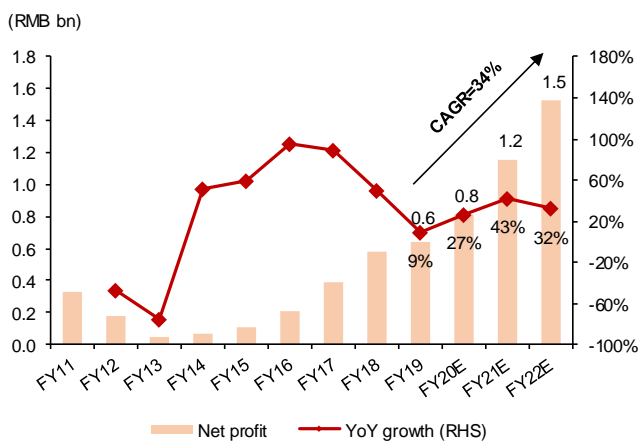
Source: CPIA, CMBIS estimates

**Figure 4: The evolution of mainstream solar power technologies mentioned in our report**



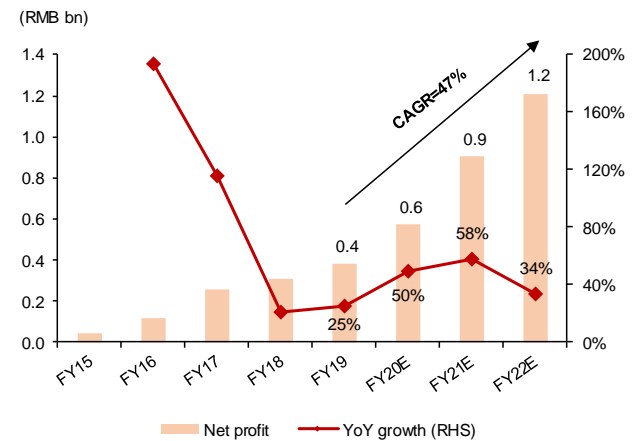
Source: CMBIS

**Figure 5: Jingsheng's net profit forecast**



Source: Company data, CMBIS estimates

**Figure 6: S.C New Energy's net profit forecast**



Source: Company data, CMBIS estimates

Figure 7: China and overseas peers' valuation comp

Company	Ticker	Rating	TP	Last price	Market cap	P/E (x)		P/B (x)		ROE (%)		EPS CAGR
			(Local ccy)	(US\$ mn)	FY20E	FY21E	FY20E	FY21E	FY20E	FY21E	FY19A-FY21E	
China Solar Power Eqpt. Suppliers												
Jingsheng	300316 CH	BUY	40.2	32.12	6,246	50.9	35.7	8.3	6.9	17.1	21.2	34.6%
S.C New Energy	300724 CH	BUY	138.0	100.99	4,911	56.6	36.0	10.7	8.3	20.4	26.0	53.6%
Suzhou Maxwell	300751 CH	NR	N/A	435.95	3,432	61.5	44.6	13.5	10.6	22.1	23.9	43.4%
Yingkou Jinchen	603396 CH	NR	N/A	34.25	548	38.8	28.5	3.6	3.3	10.6	12.6	45.1%
NAURA	002371 CH	NR	N/A	195.00	14,651	175.2	119.6	15.0	13.6	7.6	10.0	58.4%
Shangji Automation	603185 CH	NR	N/A	75.55	2,659	39.8	21.3	6.3	4.6	21.0	28.6	109.1%
Wuxi Autowell	688516 CH	NR	N/A	68.18	1,018	48.7	29.0	6.6	5.5	14.8	18.4	54.2%
Lead Intelligence	300450 CH	NR	N/A	68.17	9,091	66.1	46.9	10.7	8.9	17.6	20.0	26.4%
DR Laser	300776 CH	NR	N/A	118.13	1,892	32.0	22.5	N/A	N/A	20.7	23.7	191.3%
Qingdao Gaoce	688556 CH	NR	N/A	33.10	811	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Beijing Jingyuntong	601908 CH	NR	N/A	5.83	1,759	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Zhejiang Jinggong	002006 CH	NR	N/A	5.19	358	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Average						63.3	42.7	9.3	7.7	16.9	20.5	68.4%
Global Solar Power Eqpt. Suppliers												
Meyer Burger	MBTN SW	NR	N/A	0.27	735	N/A	N/A	2.5	3.3	N/A	N/A	N/A
Centrotherm	CTNK GR	NR	N/A	2.50	62	N/A	N/A	N/A	N/A	N/A	9.9	N/A
Manz	M5Z GR	NR	N/A	30.20	276	49.5	13.1	1.7	1.5	N/A	35.0	N/A
Singulus	SNG GR	NR	N/A	3.86	41	N/A	4.2	N/A	N/A	519.2	N/A	N/A

Source: Bloomberg, CMBIS estimates

## Industry Overview: Up-cycle to Begin

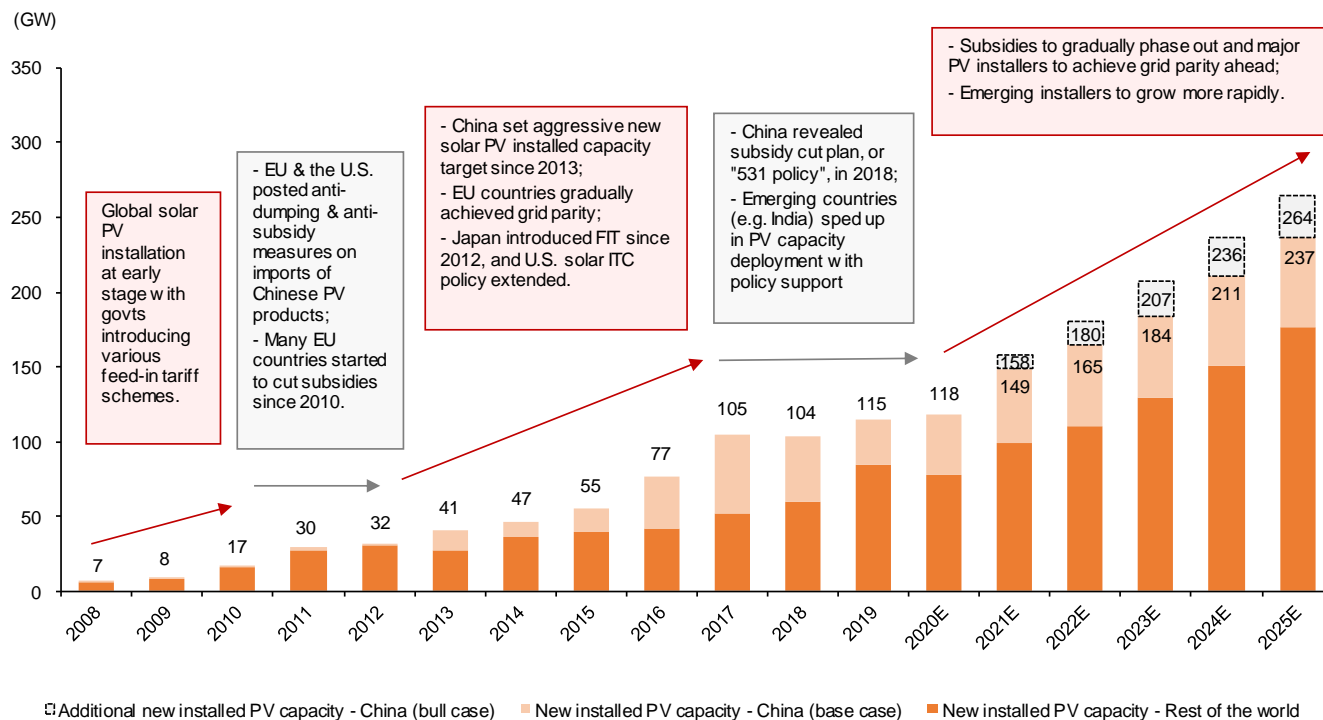
### End-market demand on the cusp of another boom

#### Global PV installed capacity additions will continue to expand towards 2025E.

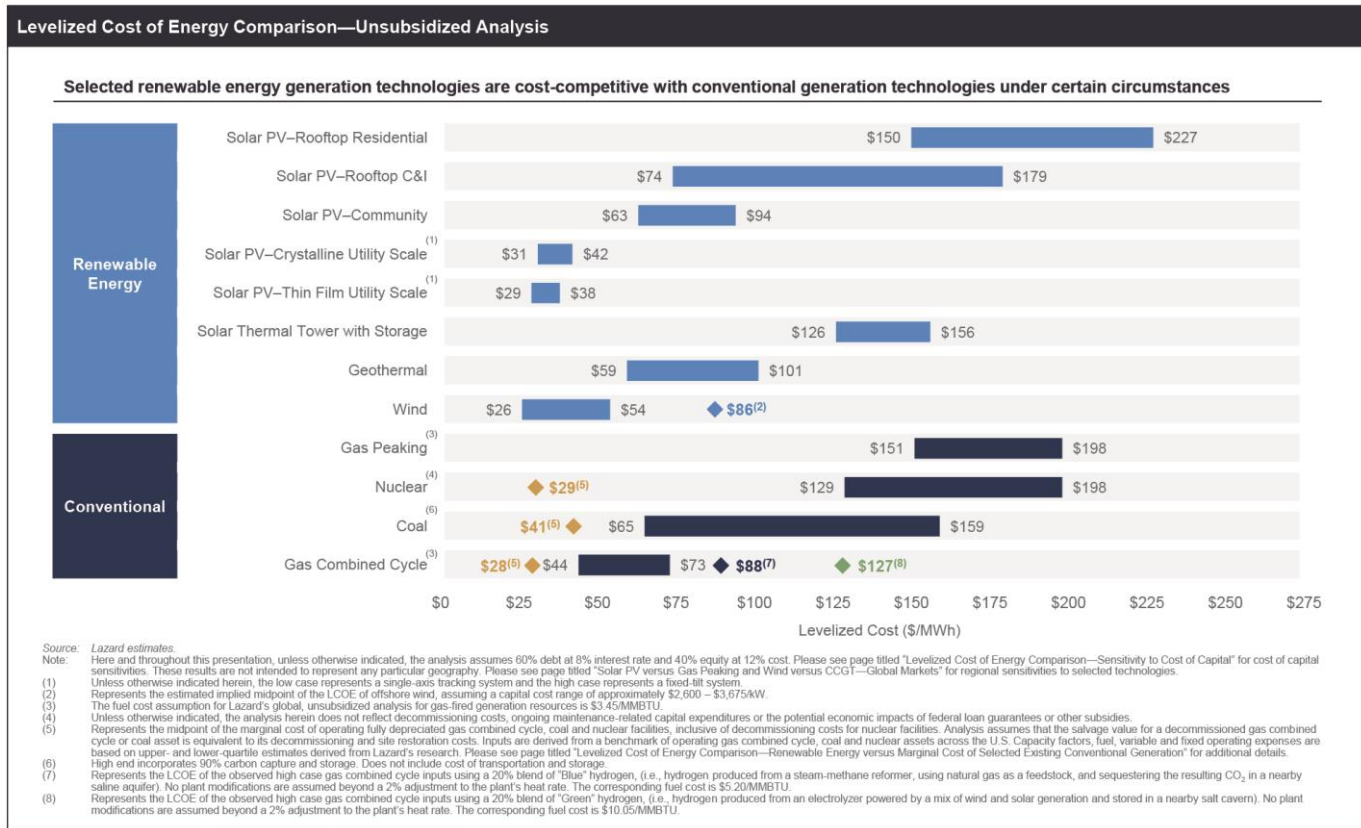
Thanks to technology-propelled cost competitiveness of solar power, major countries are able to gradually achieve grid-parity in the post-subsidy era. We expect global new PV installed capacity to enter into a new round of expansion from 2020E, which provides high visibility for the upstream equipment demand. Our renewable team estimates that, under the base case scenario, the global capacity additions in 2020E-25E will surge 112% to 1,064GW compared with the period during 2014 and 2019.

Specifically, we see further upside potential in China, the world's largest solar market, as China will potentially lift its non-fossil energy mix to 18%-20% by the end of 14th FYP (2025E, vs. est. 16% by 2020E). Under the bull-case scenario, lifting 2025E non-fossil energy mix assumption from 18.4% to 19.9%, will add another 214GW (or 20%) to the global new installation between 2021E and 2025E. (Read more in [China Solar Sector – 14th FYP preview: lifting non-fossil energy mix will boost 2021-25E PV installation.](#))

**Figure 8: CMBIS global new installed PV capacity projection**



Source: IEA PVPS, Solarpower Europe, CMBIS estimates

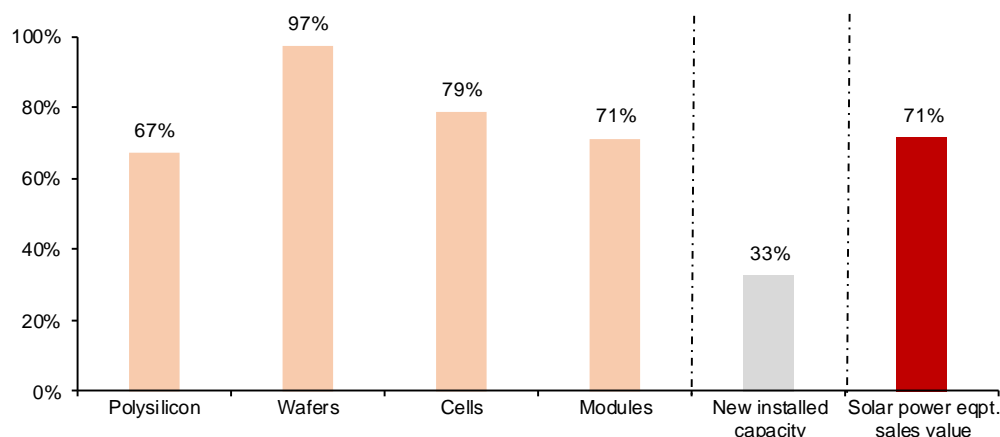
**Figure 9: Lazard's estimates show that solar power's LCOE is competitive with conventional energy generation**

Source: Lazard LCOE Analysis Version 14.0 (Oct 2020), CMBIS

**China is a dominant supplier of world-wide solar power industry, favoring domestic equipment manufacturers.** China accounted for 33% of the global new PV installed capacity in 2019 while fulfilled up to 67%-97% global demand of solar power components (i.e. polysilicon, wafers, solar cells and modules). Such landscape is favorable to the Chinese solar equipment manufacturers, as their key clients need "value for money" equipment supplies to reduce production costs and expect to achieve higher efficiency in R&D collaboration.

The share gain story already began. In 2019, despite a slowdown in new installed capacity, China's total sales value of solar power equipment outpaced that of the world (up 14% YoY vs. 5% YoY), reaching RMB 28bn, and comprised 79% of global sales value based on our estimates.

Global sales value of solar power equipment grows along with new capacity additions (Fig. 12). Though per GW equipment CAPEX should trend lower as efficiency of the equipment improves, replacement or upgrade demands driven by technology advancement will help hold up the margins of new equipment.

**Figure 10: China's market share in each segment of global PV industry in 2019**

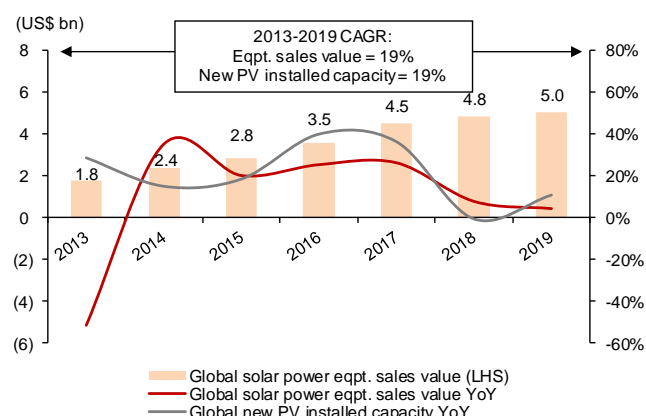
Source: CPIA, CMBIS estimates

Note: Polysilicon, wafers, cells and modules measured by output.

**Figure 11: Sales value of solar power eqpt. in China reached RMB 28bn in 2019, outpacing global avg.**

Sales value in 2019	(RMB bn)
Eqpt. for manufacturing:	
- Silicon ingots and wafers	11.7
- Solar cells	13.8
- Solar modules	2.2
<b>Total sales value in China</b>	<b>27.8</b>
Total sales value globally	35.0
<b>% of China/global</b>	<b>79%</b>
Sales value YoY growth in 2019	
- China	13.6%
- Global	4.8%

Source: CPIA, CMBIS estimates

**Figure 12: Global solar power eqpt. sales value moves along with end-market growth**

Source: CPIA, CMBIS

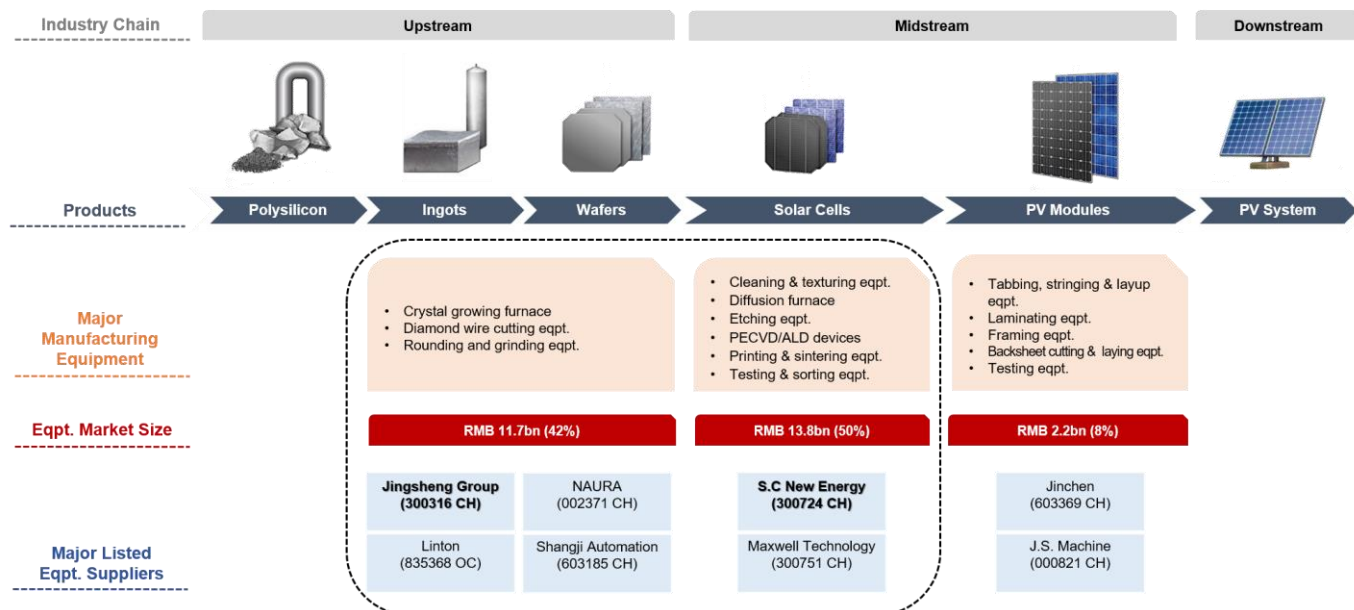


## Solar manufacturers' capacity expansion on the go

### ■ Equipment for solar cells and ingots/wafers made up >90% of market sales value

By types of downstream products, solar power equipment can be divided into three categories, i.e. equipment for manufacturing c-Si ingots/wafers, solar cells, and modules. According to 2019 industry sales value in China, solar cell production equipment comprised the largest proportion on the value chain (50%), followed by equipment for c-Si ingots/wafers (42%) and modules (8%). In this report, we will mainly address the market of c-Si ingots/wafers and solar cell production equipment.

**Figure 13: Overview of solar power equipment industry in China**



Source: CPIA, CMBIS estimates

Note: Eqpt. market size refers to 2019 sales value in China; major manufacturing eqpt. refers to those needed applying current mainstream technologies.

**Higher efficiency and lower costs** are the two main targets that the solar power industry has long been pursuing. These are **mainly achieved through economies of scale, improvement in technologies and policy stimulus**. China entered into subsidy-free era in 2020; solar wafer and cell makers, especially industry leaders, have rolled out vigorous expansion plans since 2H19, signaling the beginning of a new capacity up-cycle. We expect the trend to extend as ambitious renewable energy targets are set across the world to spur solar energy installation in coming years.

Solar manufacturers' spending on additional equipment for their expanding capacity will go to equipment suppliers' pockets as revenue. Hence, we are gauging major solar component makers' future capacity expansion plans that could provide us with higher visibility on future equipment market growth.

## ■ Bull-case PV ingot/wafer production equipment demand to reach RMB 51bn over 2020E-2022E

As mono-Si wafers are replacing poly-Si wafers, and wafer size going larger (e.g. **Zhonghuan [002129 CH, NR]** launched G12 in Sep 2019, **LONGi [601012 CH, BUY, covered by Robin XIAO]** with other six makers launched M10 in Aug 2020), solar wafer makers in China are expanding capacity to enhance their market share and achieve economies of scale. We calculated that eight major wafer makers (altogether accounting for >90% of China's mono-Si wafer capacity in 2019) planned a total of 221GW capacity expansion plan, a surge of 1.9 times from 2019 annual capacity.

Our base case scenario assumes 90% of these planned new capacities could be added during 2020E to 2022E representing 90% of China's total capacity additions, and per GW CAPEX for equipment will be at RMB 200mn. We project that the equipment demand will amount to RMB 42bn (Fig. 16), while bull-case scenario suggests a higher demand at RMB 51bn.

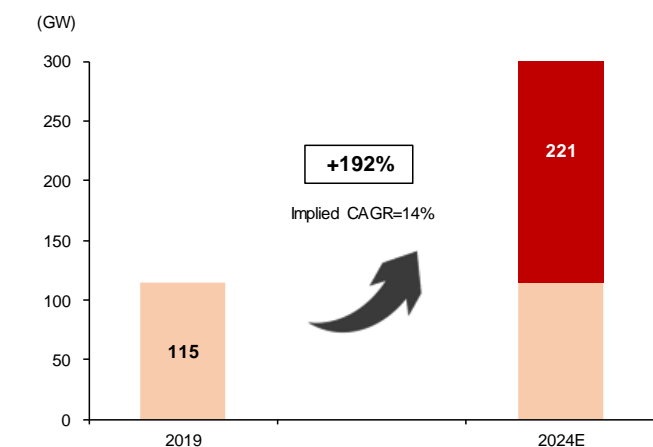
**Figure 14: Major wafer makers' expansion plan**

Company - ENG	Company - CHN	YE19 capacity (GW)	Capacity expansion plan for 2020E and beyond
LONGi	隆基股份	42.0	To add 29-60GW by 2023E
Zhonghuan	中环股份	33.0	To add 50GW by 2023E
Jinko Solar	晶科能源	11.5	To add 23.5GW
JA Solar	晶澳能源	11.5	To add 22.6GW
Jiangsu Huantai	江苏环太	10.0	To add 12GW by 2022E
Shangji Automation	上机数控	2.0	To add 11GW by 2022E
Jingyuntong	京运通	2.0	To add 38.5GW
Solargiga	阳光能源	N/A	To add 3.6GW by 2021E
<b>Total</b>		<b>115GW</b>	<b>Additions max. ~221GW</b>

Source: Listed companies' announcements, public information, CMBIS estimates

Note: Mainly mono-Si ingot/wafer capacity expansion plans are calculated here.

**Figure 15: Eight major cell makers' capacity expansion plans suggest 192% growth from YE19...**



Source: CMBIS estimates

**Figure 16: ... and implied new eqpt. demand could range RMB 34bn-51bn over 2020E-2022E**

Item	2020E-2022E		
	Bear	Base	Bull
% of completion of planned capacity expansion	85%	90%	95%
Implied capacity additions (GW)	188	199	210
Sample makers' capacity as % of China total	90%	90%	90%
<b>Est. China capacity addition (GW)</b>	199	211	222
Per GW CAPEX (RMB bn)	0.17	0.20	0.23
<b>Implied eqpt. Demand (RMB bn)</b>	<b>33.8</b>	<b>42.1</b>	<b>51.1</b>

Source: CMBIS estimates

Note: numbers in red are our assumptions.

## ■ Bull-case solar cell production equipment demand to reach RMB 76bn over 2020E-2022E

Solar cell manufacturing is undergoing a more aggressive capacity expansion cycle, as PERC became the mainstream cell technologies in 2019 and showed incomparable cost-effectiveness. Our calculation showed that 17 major solar cell makers were scheduling 320GW expansion in coming five years for PERC or PERC+ capacity. This will lead to an increase of 2.6 times compared with annual capacity in 2019.

In our base-case scenario, assuming that 80% of these scheduled capacity could be completed within 2020E to 2022E, they represent 95% of total market additions in China and per GW equipment CAPEX will be RMB 230mn (23% lower than that of RMB 300mn in 2019) as technology matures, we estimate the equipment demand will reach RMB 61bn (Fig. 19). Bull-case scenario will push the demand further up to RMB 76bn.

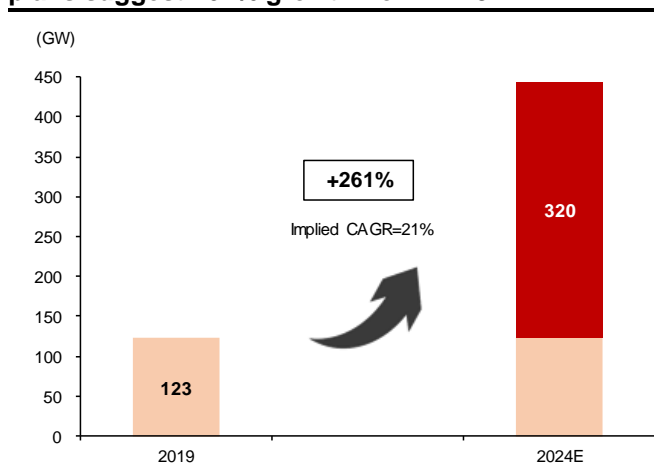
**Figure 17: Major solar cell makers' expansion plan**

Company - ENG	Company - CHN	YE19 capacity (GW)	Capacity expansion plan for 2020E and beyond
Tongwei	通威	20.0	To reach 80-100GW by 2023E
Aiko Solar	爱旭	9.2	To reach 45GW by 2022E
Trina Solar	天合光能	8.4	To reach 30GW by 2022E
LONGi	隆基	10.0	To reach 20GW by 2021E
Risen	东方日升	5.0	To add 20.5GW in 3-5 years
JA Solar	晶澳能源	11.0	To add 28.9GW by 2023E
CECEP Solar	中节能太阳能	2.0	To add 20GW
Runyang	润阳新能源	11.0	To add 20GW
Lu'an Solar	潞安太阳能	5.0	To add 13GW by 2023E
Jiangsu Solarspace	江苏中宇光伏	4.0	To add 13GW by 2021E
Sumin Energy	苏民科技	4.8	To reach 11.2GW by 2021E
Jinko	晶科能源	9.8	To add 10.6GW by 2021E
Canadian Solar	阿特斯	9.6	To add 10.4GW
Unix Solar	展宇光伏	3.0	To add 5GW by 2020E
GRET Solar	嘉悦能源	2.5	To add 7.5GW
Yingfa	英发太阳能	2.8	To add 3.75GW
DAS Solar	一道新能源	1.0	To add 9GW
<b>Total (incl. CMBI est.)</b>		<b>~123GW</b>	<b>Additions max. ~320GW</b>

Source: Listed companies' announcements, public information, CMBIS estimates

Note: Mainly PERC capacity expansion plans are calculated here.

**Figure 18: 17 major cell makers' capacity expansion plans suggest 261% growth from YE19...**



Source: CMBIS estimates

**Figure 19: ... and we est. this could drive new eqpt. demand of RMB 47-76bn over 2020E-2022E**

Item	2020E-2022E		
	Bear	Base	Bull
% of completion of planned capacity expansion	70%	80%	90%
Implied capacity additions (GW)	224	256	288
Sample makers' capacity as % of China total	95%	95%	95%
<b>Est. China capacity addition (GW)</b>	237	271	305
Per GW CAPEX (RMB bn)	0.20	0.23	0.25
<b>Implied eqpt. demand (RMB bn)</b>	<b>47.4</b>	<b>61.0</b>	<b>76.3</b>

Source: CMBIS estimates

Note: numbers in red are our assumptions.

## ■ Downstream clients' availability of equity financing greatly enhanced

Downstream solar manufacturers' financial conditions will directly affect equipment suppliers' operating cash flow and profitability. Thanks to a series of capital market reform in China onshore market, and restored investor confidence on solar industry, major solar manufacturers have obtained smoother access to equity financing tools.

Major U.S.-listed module makers either relisted on A-share market after privatization or listed their subsidiaries on home market. Moreover, we calculated that 12 downstream manufacturers had revealed or completed RMB 46.6bn refinancing plans to support their facility expansions, among which 70%-80% was budgeted for equipment. We see these ample funding sources can help improve equipment suppliers' financial status.

**Figure 20: Major PV manufacturers' equity financing plan in recent two years**

Type of maker	Time	Company	Listed market	Equity financing plan
<b>A-share homecoming</b>				
Modules	Jun-20	Trina	SSE STAR Market - China	Completed RMB 2.5bn IPO after privatized and delisted from NYSE in 2017
Integrated maker	Dec-19	JA Solar	SZSE - China	Achieved backdoor listing after privatized and delisted from NASDAQ in 2018
Modules	Jul-20	Canadian Solar	NASDAQ – U.S.	To pursue listing of its MSS business on ChiNext or STAR Market in China onshore market
Integrated maker	Sep-20	Jinko	NYSE – U.S.	To list its domestic operation arm on STAR Market in three years
Poly-Si	Sep-20	Daqo	NYSE – U.S.	Filed application to list its domestic operation arm on STAR Market
Modules	Jul-20	LDK Solar	N/A	Became controlling shareholder of A-share listed ST Haiyuan, and could potentially achieve backdoor listing
<b>Follow-on offering plans</b>				
Cells	Dec-19	Aiko	SSE - China	Completed backdoor listing To raise max. RMB 2.5bn to fund solar cell fabs and R&D center through private placement
Poly-Si & Cells	Apr-20	Tongwei	SZSE - China	To raise max. RMB 6.0bn to fund solar cell fabs through private placement
Cells	Mar-20	Akome	SZSE - China	To raise max. RMB 1.7bn to fund HJT cell fabs through private placement
Wafers	Jul-20	Shangji Automation	SSE - China	To raise max. RMB 3.0bn to fund mono-Si ingot pulling capacity through private placement
Wafers	Feb-20	Zhonghuan	SZSE - China	To raise max. RMB 5.0bn to fund semiconductor wafer fab through private placement
Cells & module	Sep-20	Risen	SZSE - China	To raise max. RMB 3.3bn to fund cell and module fab through CB issuance
Integrated maker	Apr-19	LONGi	SSE - China	Raised RMB 3.9bn to fund cell fab through rights issue
	Aug-20			Raised RMB 5.0bn to fund wafer and cell capacity expansion through CB issuance
Cells	Oct-20	Jollywood	SZSE ChiNext - China	To raise max. RMB 1.9bn through private placement
	Mar-19			Raise RMB 1.0bn to fund TOPCon cell fab through CB issuance
Wafers	Jun-20	Jingyuntong	SSE - China	To raise max. RMB 2.5bn for mono-Si ingot fab through private placement
Modules	Jun-20	GCL System	SZSE - China	To raise max. RMB 4.2bn for reclaim wafers and imbricated modules through private placement
Cells	Jun-20	Zhongli	SZSE - China	To raise max. RMB 1.58bn for HJT and TOPCon cells and module fabs through private placement
Wafers	Aug-20	Zhonghuan	SZSE - China	Raised RMB 5.0bn for semiconductor wafer fabs through private placement

Source: Company data, CMBIS

## Next-gen technology – Potential game changer

### ■ Solar cells: N-type cells, esp. HJT shall boost more demand for new equipment

Thanks to China's Top Runner Program, PERC overtook Al-BSF to become mainstream solar cell in 2019. Solar cell makers' rapid progress in R&D has greatly improved its performance, and the cell is achieving theoretical efficiency limit of 24.5% (CPIA expects p-mono PERC's average conversion efficiency to reach 22.7% in commercial production in 2020E, and current world record was set by LONGi, whose bifacial mono-Si PERC on M2 wafer reported 24.06%). Though, certain optimizing procedures, e.g. PERC+SE (Selective Emitter) and bifacial cells, could still help to marginally enhance PERC's efficiency, many cell makers have already eyed on and begun to invest in next-generation technology that enables higher efficiency gains.

**HJT (Heterojunction Technology) and TOPCon (Tunnel Oxide Passivated Contact) are among the most promising next-gen solar cell technologies.** Unlike in PERC, where silicon wafers are doped with boron (B), i.e. p-type doped, in HJT and TOPCon cells, wafers are mostly doped with phosphorus (P), i.e. n-type doped. Theoretically, n-type cells have longer minority carrier lifetime values and are naturally immune to LID (Light Induced Degradation), therefore are more efficient. According to CPIA's 2019 PV Technologies Roadmap, HJT and TOPCon are expected to achieve 25.5% and 24.5% conversion efficiency in 2025E, respectively, higher than PERC's 24.0%. While PERC will continue to be the workhorse, for its highest cost-effectiveness and replacement for Al-BSF capacity, n-type high-efficiency solar cells, led by HJT and TOPCon, are going to capture more shares over the next five years.

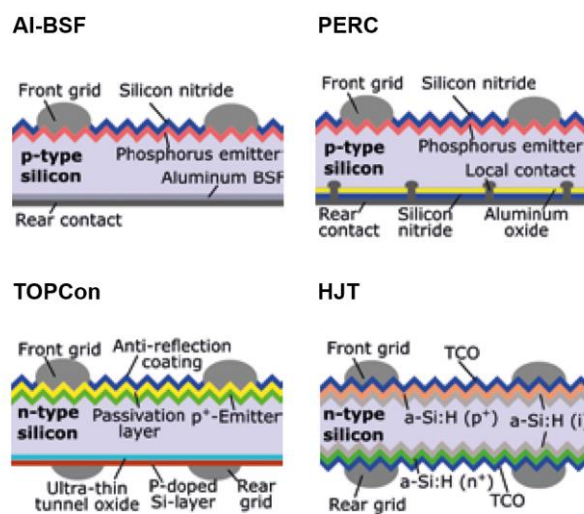
Figure 21: Comparison of major types of solar cells

	Al-BSF	PERC	N-PERT/ TOPCon	HJT
2020E Efficiency*	19.4% (P-poly)	22.7% (P-mono)	23.3%	23.5%
2025E Efficiency*	To be phased out in 2022E	24.0% (P-mono)	24.5%	25.5%
Advantage	Cost saving	Most cost-effective	Easy to upgrade from PERC	Fewer production process
Wafer type	Poly-/Mono-Si	Poly-/Mono-/Cast mono-Si	Mono-Si	Mono-Si
Doping type	P-type	P-type	N-type	N-type
Bifacial cells	Possible	Possible	Possible	Easy
Manufacturing cost	Lowest	Low	Higher	Highest
Technology difficulty	Easiest	Easy	Quite difficult	Difficult

Source: CPIA, PVInfolink, CMBIS

\*: Based on CPIA 2019 PV technologies roadmap.

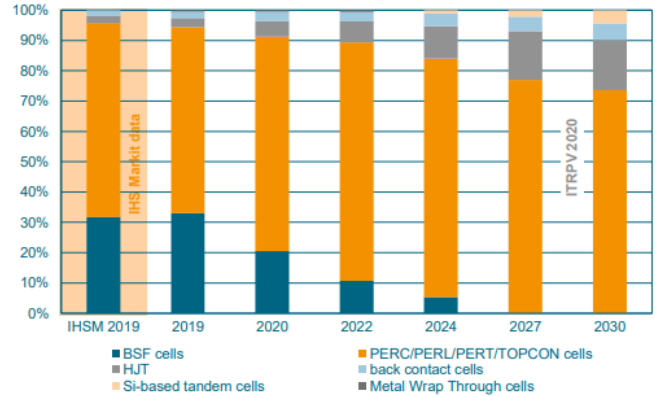
Figure 22: Structure of major types of solar cells



Source: N. Wöhrle et al., "Solar cell demand for bifacial and singulated-cell module architectures", CMBIS

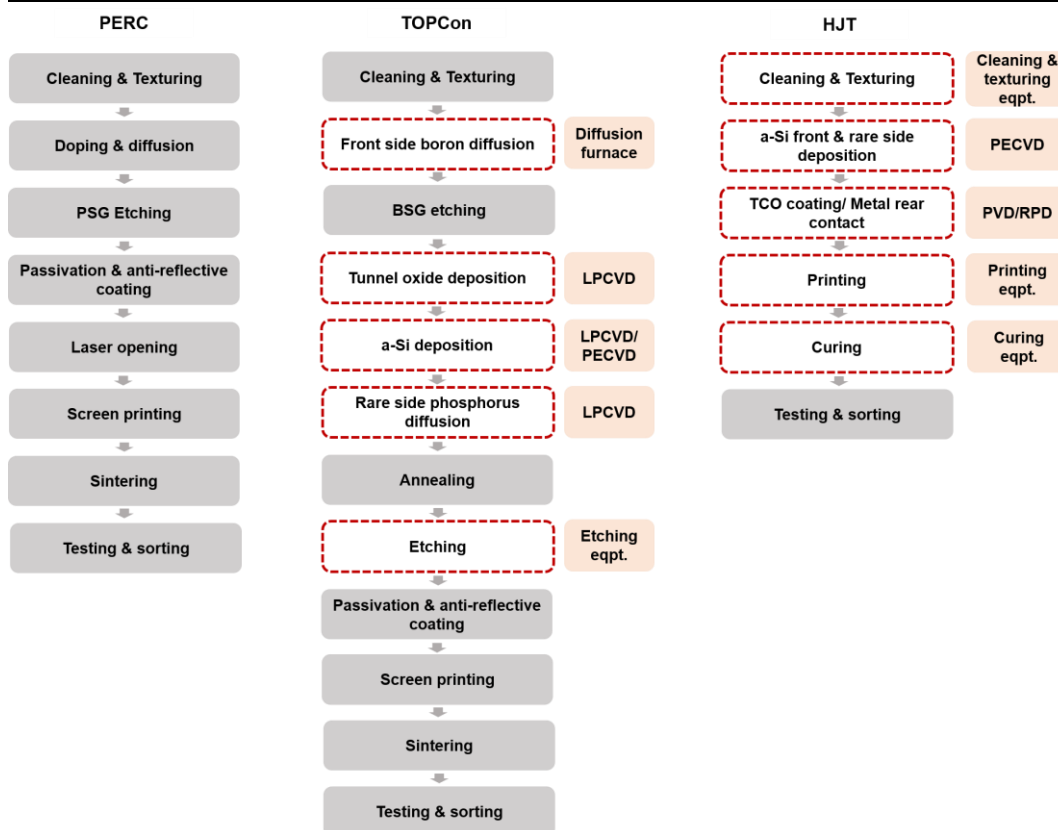


**Figure 24: ITRPV projects PERx/TOPCon are going to be mainstream cell technologies in coming years while HJT will grab 10%/17% share in 2024E/2030E**



Source: ITRPV 11th Edition (updated in Oct 2020), CMBIS

**Figure 25: Comparison of production process of PERC, TOPCon and HJT cells; steps in red dotted lines require additional or different eqpt. vs. PERC production**



Source: CMBIS

**Chinese solar cell makers have scheduled >35GW HJT capacity expansion, implying ~RMB 18bn equipment sales**, based on our estimates. Oversea cell makers are leaders in n-type solar cell technologies for their advanced R&D, led by Panasonic and REC. Chinese HJT early movers are mainly the thin film solar cell makers, e.g. GS-Solar and Hanergy, while Jollywood is major N-PERT/TOPCon player. Due to n-type cells' current relatively low cost-effectiveness compared with PERC, only a few cell makers have owned GW-scale fab.

Nonetheless, many mid-sized Chinese cell makers led the start of a large scale HJT capacity expansion cycle in 2H19 (when larger peers focused on PERC expansion), whose announced plan totaled 35.3GW based on our calculation. We estimate that per GW equipment CAPEX for domestic complete HJT production line should be at ~RMB 500mn, thus 35.3GW HJT expansion plan implies RMB 17.7bn equipment sales value, boosting another 23% growth on top of our bull case scenario for PERC equipment sales.

**Figure 26: Oversea cell makers are early movers in n-type cells while Chinese makers are catching up**

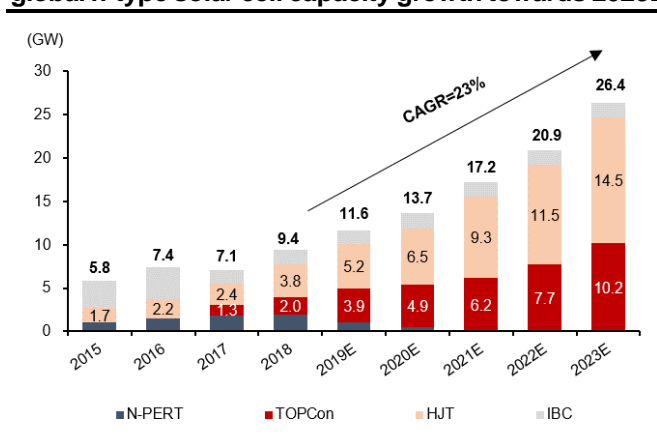
HJT			
Maker	Capacity	Maker	Capacity
<b>Oversea</b>	(GW)	<b>China</b>	(GW)
Panasonic - Japan	1.00	GS-Solar	1.10
REC - Singapore	0.60	Tongwei	0.40
Hevel - Russia	0.34	Jinergy	0.20
3 Sun - Italy	0.20	Hanergy	0.12
Solartech - US	0.20		
SolarCity & Panasonic - US	0.20		

N-PERT/TOPCon			
Maker	Capacity	Maker	Capacity
<b>Oversea</b>	(GW)	<b>China</b>	(GW)
LG Electronic - Korea	1.60	Jollywood	2.40
REC - Singapore	0.20	Trina	0.50
		Linyang	0.40

Source: Asiachem, PVInfolink, CMBIS

**Figure 27: HJT and TOPCon are expected to lead global n-type solar cell capacity growth towards 2032E**



Source: PVInfolink, CMBIS

**Figure 28: Scheduled and in-progress HJT cell capacity expansion plan of Chinese solar cell makers**

Company - ENG	Company - CHN	Announced capacity expansion plan	Progress
Canadian Solar	阿特斯	250MW in 2020	Began construction in Jul 2020; To develop advanced products in 2022
Kaisheng New Energy	宣城开盛新能源	500MW	Announced tender results of eqpt. procurement in Oct 2020
Tongwei	通威	600MW in 2020	Stated during 1H20 results briefing
Belight	比太科技	1.0GW	To complete the construction in Oct 2020; In discussion with local govt. about a 5.0GW HJT fab in Yingshang, Anhui Province
Talesun	中利腾晖	1.0GW	Announced in Mar 2020
Gold Sun Energy	山东高登塞	1.0GW	Signed agreement with local govt. in Jun 2020
Zhangjiakou Govt., SDIC Power, GS-Solar and Huayuan Power	张家口市政府、国投电力、金石能源、华源电力	1.5GW	Signed agreement in Jun 2020
Jinergy	晋能科技	2.0GW	Signed agreement in Dec 2015; Current capacity reached 200MW
Xiamen Shenke	厦门神科太阳能	2.0GW	Signed agreement with local govt. in Sep 2020
Risen	东方日升	2.5GW	Began construction in Aug 2019; Fulfilling small orders of HJT cells
Yingfa	安徽英发	3.75GW	Saving Tianchang Phase II fab for HJT cells production
Akcome	爱康科技	5.0GW	Signed agreement with local govt. in May 2018; First 220MW pilot-scale production line to go into operation in Oct 2020
Jinrui	福建晋锐	5.0GW	Phase I 2.0GW fab began construction in Feb 2020
Shanxi Coal Int'l	山煤国际	10.0GW	Announced in Jul 2019; Set up JV for Phase I 3.0GW in Aug 2020
<b>Total</b>		<b>35.3GW</b>	

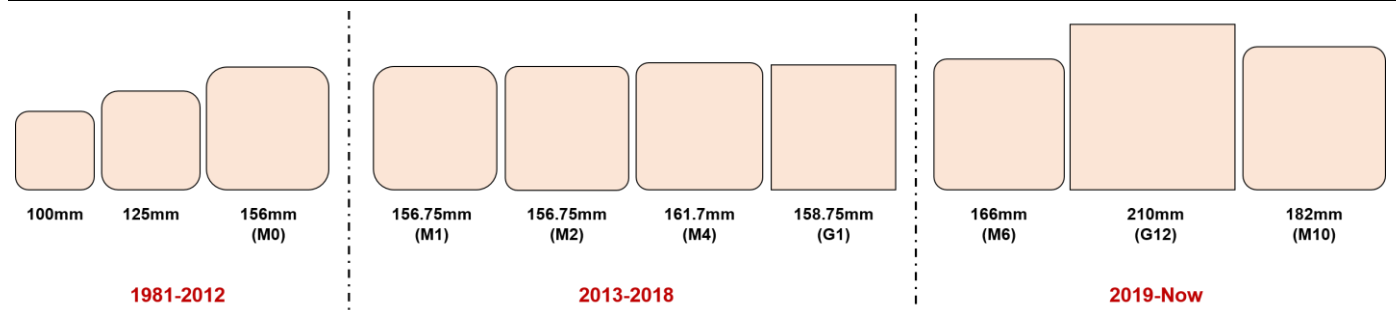
Source: news, company announcements, CMBIS

## ■ Solar wafers: transitioning to bigger size could bring about equipment upgrade/replacement demand along the industry chain

The size of solar wafers is going larger as same throughput in bigger format could help reduce cost per watt, therefore achieving higher efficiency. Currently, M6 (166mm) outstrips M2 (156.75mm) to become mainstream size, but new larger wafers initiated by leading wafer makers, i.e. Zhonghuan's G12 (210mm) and LONGi's M10 (182mm), are already ramping capacity. This would bring about upgrade or even replacement demand throughout the solar power equipment industry chain.

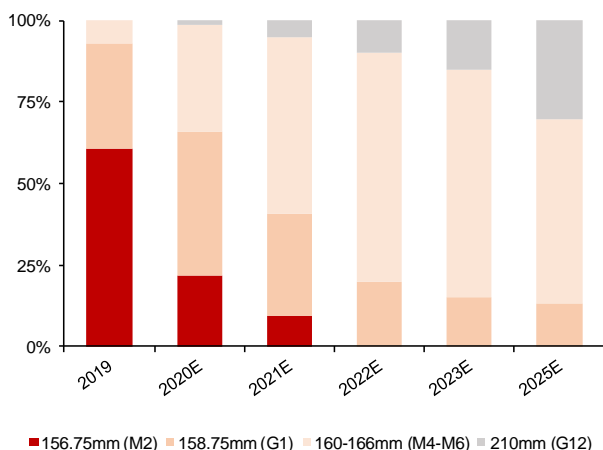
For ingots/wafers equipment, existing M2 production lines could be upgraded to manufacture M6 and M10, while G12 requires new equipment as its diameter (295mm) will exceed the size of current mainstream crystal growing furnaces and diamond wire cutters. For solar cells production equipment, both M10 and G12 require new equipment, as most existing equipment can only be compatible with M6. If M10 and G12 could gain more shares in the future, the upgrade and replacement demand of equipment will be greater.

**Figure 29: The evolution of solar wafer size**



Source: CMBIS

**Figure 30: CPIA predicts that 160-166mm (M4-M6) will become mainstream wafer size in 2021E**



Source: CPIA, CMBIS

Note: 182mm (M10) was not yet launched at the time CPIA published its 2019 Technologies Roadmap.

**Figure 31: ITRPV's projection on implementation timeline of new wafer formats**

	2020	2022	2024	2027	2030
Wafer manufacturing mc-Si	166 (+/-0.25) mm <sup>2</sup>				
	182 (+/-0.25) mm <sup>2</sup>				
	192 (+/-0.25) mm <sup>2</sup>				
	200 (+/-0.25) mm <sup>2</sup>				
	210 (+/-0.25) mm <sup>2</sup>				
Wafer manufacturing mono-Si	166 (+/-0.25) mm <sup>2</sup>				
	182 (+/-0.25) mm <sup>2</sup>				
	192 (+/-0.25) mm <sup>2</sup>				
	200 (+/-0.25) mm <sup>2</sup>				
	210 (+/-0.25) mm <sup>2</sup>				
Cell Manufacturing	166 (+/-0.25) mm <sup>2</sup>				
	182 (+/-0.25) mm <sup>2</sup>				
	192 (+/-0.25) mm <sup>2</sup>				
	200 (+/-0.25) mm <sup>2</sup>				
	210 (+/-0.25) mm <sup>2</sup>				
Module Manufacturing	166 (+/-0.25) mm <sup>2</sup>				
	182 (+/-0.25) mm <sup>2</sup>				
	192 (+/-0.25) mm <sup>2</sup>				
	200 (+/-0.25) mm <sup>2</sup>				
	210 (+/-0.25) mm <sup>2</sup>				

mass production considered

mass production not considered

Source: ITRPV 11th Edition (updated in Oct 2020), CMBIS

Note: mc-Si = multi-Si.



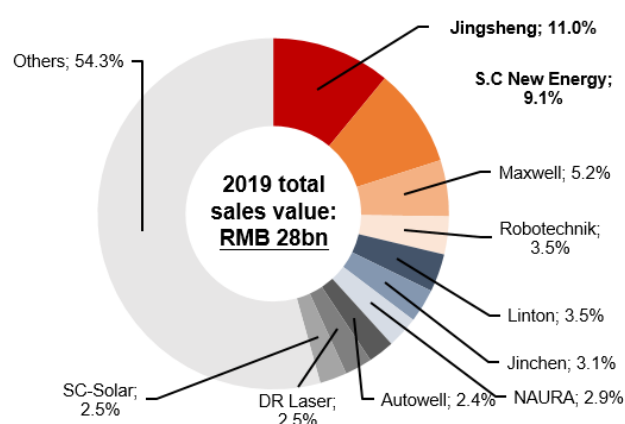
## Competitive Landscape

### Jingsheng and S.C are leaders in the solar equipment market

China has basically achieved self-sufficiency in solar power equipment production in respect of current mainstream technologies, thanks to rapid expansion of installed capacity and pressing needs of cost reduction that propelled technological advancements in recent years. Regarding next-gen technologies (e.g. HJT cells), though large European and Japanese equipment suppliers are technologically more mature, leading domestic equipment suppliers have already been working with their clients to develop complete production lines.

According to CPIA, there were over 200 manufacturers in China engaged in the production of solar power equipment in 2019, but the industry concentration rate is high. The sales value of each sub-segment along the industry chain is dominated by top players, and this is consistent with the competitive landscape of their downstream customers. Leading equipment manufacturers usually have firm relationship with leading solar manufacturers, and they work closely together in technology upgrade and innovation.

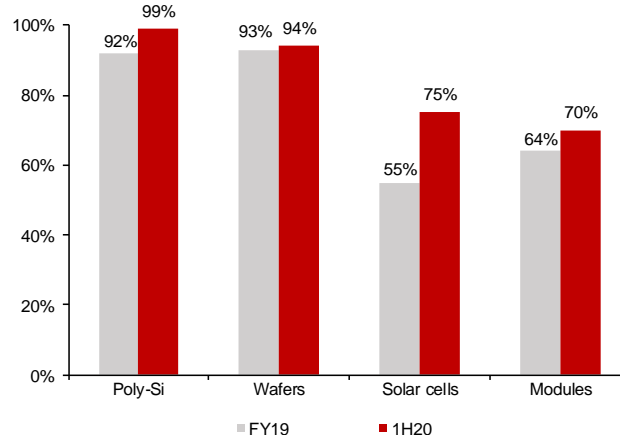
**Figure 32: Major domestic solar power eqpt. suppliers' market shares in 2019**



Source: CPIA, CMBIS estimates

Note: Calculated by dividing individual company's total PV-related revenue by industry total sales value.

**Figure 33: Top 10 domestic solar manufacturers' market shares by output**



Source: CPIA, CMBIS

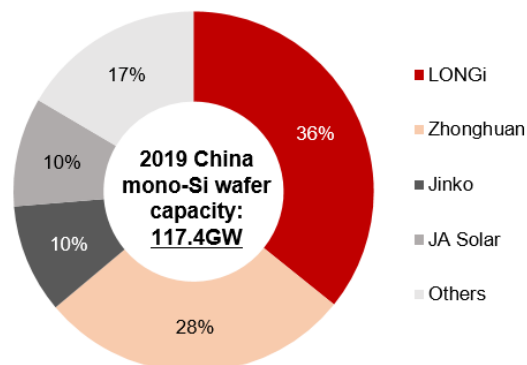
### ■ Major Si-crystal growing and wafer slicing equipment manufacturers

High market concentration in solar wafer production industry (top 2 possessing 64% market share in 2019 by mono-Si wafer capacity) creates high concentration ratio in their equipment suppliers. For example, **Jingsheng** and **Linton** (China NEEQ-listed) are principal mono-Si crystal growing furnace suppliers to **Zhonghuan** and **LONGi**, the two largest mono-Si wafer makers in the world, respectively. We estimate Jingsheng and Linton took up to 26% and 8% in total sales value of silicon ingot/wafer manufacturing equipment, respectively, in 2019.

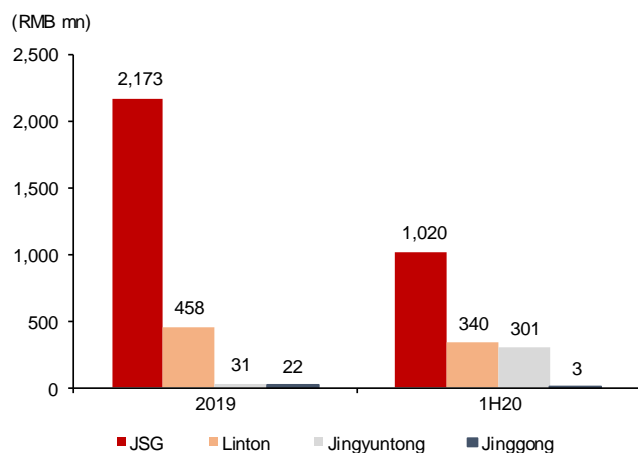
**Figure 34: Major listed c-Si ingots/wafers eqpt. suppliers in China and their key clients**

Eqpt. Suppliers	Key clients
<b>Mono-Si crystal growing furnace</b>	
Jingsheng	Zhonghuan (>55% of FY19 revenue), Jinko, Shangji Automation
Linton	LONGi (68% of FY19 revenue), Huajun Power
NAURA	LONGi
<b>Diamond wire cutting eqpt.</b>	
Gaoce	LONGi, Jinko Solar, Solargiga
Linton	LONGi
Shangji Automation	GCL-Poly

Source: Company data, CMBIS estimates

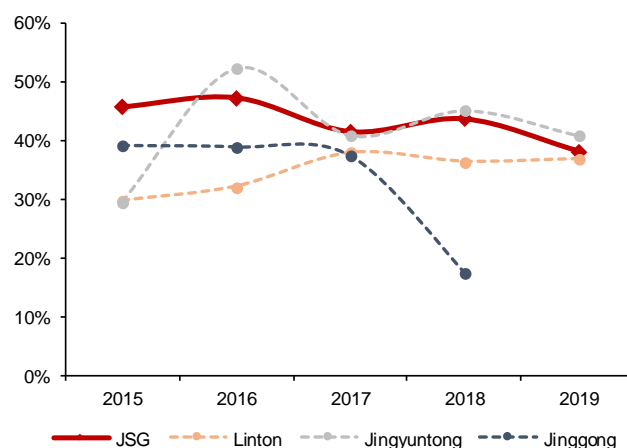
**Figure 35: LONGi and Zhonghuan are two dominant mono-Si wafer makers by capacity**


Source: CPIA, Company data, CMBIS estimates

**Figure 36: Si-crystal growing eqpt. revenue of major listed China domestic equipment suppliers**


Source: Company data, CMBIS

Note: Revenue refers to crystal growing eqpt. revenue for Jingsheng and Linton and solar power eqpt. revenue for Jingyuntong and Jinggong.

**Figure 37: Si-crystal growing eqpt. GPM of major listed China domestic manufacturers**


Source: Company data, CMBIS

Note: Jinggong's 2019 GPM data is not available.

## Major solar cell equipment manufacturers

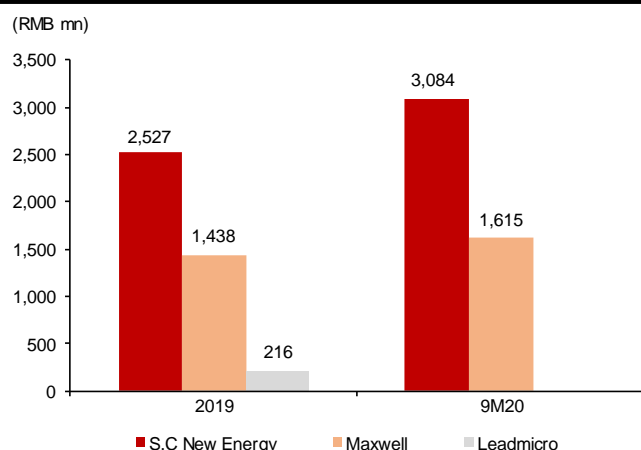
According to CPIA, China's PERC production lines achieved over 90% self-sufficiency in 2019. Regarding rear surface passivation equipment, the core equipment needed in PERC cells making, **S.C New Energy** is the largest among peers, mainly providing PECVD systems, while **Leadmicro** (private) and **Ideal Deposition** (private) are key ALD system suppliers. Regarding screen printing equipment, **Maxwell (300751 CH, NR)** is the market leader.

Overseas suppliers are much more mature in HJT cell production equipment, and many domestic cell makers used to rely on their equipment and solutions. The core equipment required are a-Si layer deposition equipment, primarily PECVD, and TCO coating equipment, i.e. PVD or RPD. As domestic HJT cell capacity began to expand, domestic equipment suppliers are catching up in R&D together with the cell makers. For example, **S.C and Maxwell** are now able to provide domestic equipment covering most production steps, while GS-Solar produces HJT cells with its proprietary equipment. **Jinchen Machinery (603396 CH, NR)** also announced that it was in R&D progress for HJT technologies.

**Figure 38: Major domestic and overseas core solar cell production eqpt. suppliers**

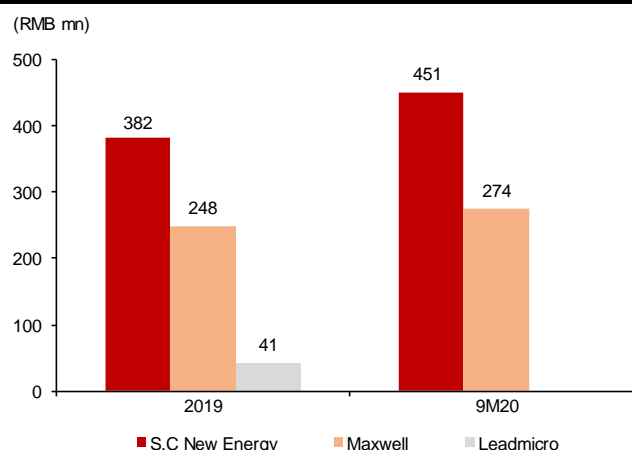
Eqpt. Suppliers	China	Oversea
<b>Deposition eqpt. (PERC)</b>		
PECVD	S.C New Energy Fullshare Equipment	Meyer Burger - Swiss Centrotherm - Germany
ALD	Leadmicro Ideal Deposition	SoLayTec - Netherlands
<b>Deposition eqpt. (HJT)</b>		
PECVD	Maxwell GS-Solar Ideal Deposition	Meyer Burger - Swiss Applied Materials - U.S. Panasonic - Japan
<b>TCO coating eqpt. (HJT)</b>		
PVD	Maxwell GS-Solar	Meyer Burger - Swiss VON ARDENNE - Germany
RPD	S.C New Energy	Sumitomo - Japan Archers - Taiwan
<b>Screen printing eqpt.</b>		
	Maxwell Folungwin Solar	Applied Materials - U.S. ASYS - Germany

Source: Company data, CMBIS

**Figure 39: Revenue of major listed China domestic solar cell eqpt. suppliers**

Source: Company data, CMBIS

Note: Data of Leadmicro was from its IPO prospectus on SSE's STAR Market; 9M20 revenue N/A.

**Figure 40: Net profit of major listed China domestic solar cell eqpt. suppliers**

Source: Company data, CMBIS

Note: Data of Leadmicro was from its IPO prospectus on SSE's STAR Market; 9M20 net profit N/A.

## Two future trends that may impact the landscape

### ■ Oversea players leaving the battlefield

As more Chinese players are able to offer equipment with similar quality but at lower prices, many overseas players have been losing orders and suffering declining profitability. This led to changes in their strategic focuses through exiting current business lines, leaving more room for China's domestic equipment suppliers to grow.

In Jun 2020, the world's leading solar power equipment manufacturer, **Mayer Burger (MBTN SW, NR)** announced its transformation plan from an equipment manufacturer to a cell and module maker. Its HJT/SWCT equipment will no longer be sold to third parties but will only be used for its own production. Another example was **Amtech System (ASYS US, NR)**, a U.S.-based equipment supplier, which announced in Apr 2019, to exit solar business by divesting its subsidiaries making PECVD and ALD systems, which are either in restructuring process or shifting business focus to industries other than solar.

### ■ Equipment manufacturers seeking vertical expansion

Amid a pro-solar environment, many domestic equipment manufacturers are looking for more value through business expansion along the industry chain. The first direction is horizontally, i.e. expanding to produce downstream products like wafers, cells and modules, and the other one is vertically, i.e. seeking to manufacture other equipment for solar power component makers. We see the latter trend quite evident in solar cell equipment industry, as some new entrants aim to leapfrog current PERC equipment leaders through directly entering into the HJT cell equipment manufacturing, which may lead to changes in competitive landscape ahead.

For example, **S.C New Energy** is now capable to provide screen-printing and curing equipment, while leading screen-printing equipment supplier **Maxwell** has succeeded in developing PECVD and PVD systems for HJT cells. **Jinchen Machinery**, a market leader of solar modules production equipment, also announced in May 2020 to engage in the manufacturing of PECVD equipment for HJT cells.

# Zhejiang Jingsheng (300316 CH)

## Dominant domestic crystal grower supplier

We initiate coverage on Jingsheng with BUY and TP at RMB 40.20. We believe Jingsheng, as a dominant crystal growing equipment supplier, is a desirable name to capture strong downstream demand by leveraging its solid relationship with PV wafer oligarch **Zhonghuan (002129 CH, NR)**, its diversified customer base and its leading-edge R&D capabilities. Our TP of RMB 40.20 is based on 45x FY21E P/E, equivalent to the Company's historical average plus 0.5SD, echoing with current industry up-cycle.

- **Dominant supplier of PV silicon crystal growing equipment.** Jingsheng is a leading supplier of crystal growing and processing equipment in China, taking up 26% market share in domestic sales value of equipment for ingots/wafers in 2019. Jingsheng's product offerings cover over 90% CAPEX in wafer production, with crystal growing furnaces as its flagship product.
- **Long-standing relationship with Zhonghuan to secure growth.** Jingsheng is a core crystal growing furnace supplier of Zhonghuan, the world's second largest mono wafer maker. We think Jingsheng will continue to gain from the client's ambitious capacity expansion, as Zhonghuan has scheduled 50GW G12 capacity additions towards 2023E, 25% of our calculated new capacity in China. G12 is Zhonghuan's proprietary ultra-large wafer format, which is gaining increasing downstream adoptions based on our understanding. We believe larger wafers will provide Jingsheng with further equipment replacement demand. Besides, we estimate Jingsheng owns >60% share in ex-LONGi market, ensuring it to enjoy growth from more customers. We project a 40% revenue CAGR of Jingsheng's crystal growing equipment over FY19-FY22E.
- **Empowering R&D to sharpen PV equipment edge and explore semiconductor industry.** Jingsheng has maintained a higher-than-peers R&D spending, enabling it to be the earliest supplier to meet the equipment demand for larger wafers and overcome higher technological barriers. In addition, Jingsheng is one of a few domestic suppliers capable to provide 8' and 12' crystal growing furnace for semiconductor clients, making it able to tap into this market with huge potential amid fabs expansion and equipment localization.
- **Key risks:** 1) Weaker-than-expected downstream capacity expansion; 2) Unfavorable changes in relationship with key clients, esp. with Zhonghuan; 3) Deterioration of clients' financial ability to pay.

### Earnings Summary

(YE 31 Dec)	FY18A	FY19A	FY20E	FY21E	FY22E
Revenue (RMB mn)	2,536	3,110	3,936	5,560	7,341
Net profit (RMB mn)	582	637	810	1,155	1,525
EPS (RMB)	0.52	0.50	0.63	0.90	1.19
YoY growth (%)	34	(5)	27	43	32
Consensus EPS (RMB)	N/A	N/A	0.64	0.85	1.07
P/E (x)	61.2	64.7	50.9	35.7	27.1
P/B (x)	10.2	9.1	8.3	6.9	5.6
Yield (%)	0.3	0.3	0.3	0.3	0.4
ROE (%)	15.3	14.8	17.1	21.2	22.8
Net gearing (%)	Net cash	Net cash	Net cash	Net cash	Net cash

Source: Company data, Bloomberg, CMBIS estimates

### BUY (Initiation)

Target Price	RMB 40.20
Up/Downside	+25.2%
Current Price	RMB 32.12

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#### Stock Data

Mkt Cap (RMB mn)	41,258
Avg 3 mths t/o (RMB mn)	1,014.62
52w High/Low (RMB)	35.68/13.20
Total Issued Shares (mn)	1,284

Source: Bloomberg

#### Shareholding Structure

Shaoxing Shangyu Jingsheng	
Invst. Mgmt. and Consulting	48.32%
QIU Minxiu	2.97%
CAO Jianwei	2.77%

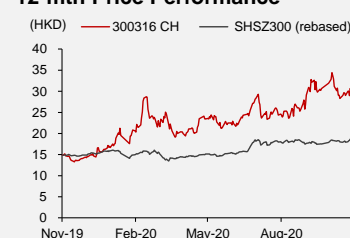
Source: Company data

#### Share Performance

	Absolute	Relative
1-mth	-0.3%	-6.3%
3-mth	30.8%	23.6%
6-mth	35.7%	8.0%

Source: Bloomberg

#### 12-mth Price Performance



Source: Bloomberg

Auditor: Pan-China CPA

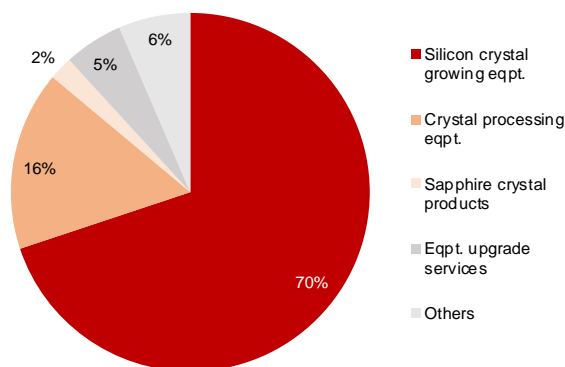
## Investment Thesis

### Dominant supplier of PV silicon crystal growing equipment

Zhejiang Jingsheng Mechanical & Electrical Co., Ltd. ("Jingsheng") is a leading supplier of crystal growing and processing equipment for customers in both solar power and semiconductor industry (91% of FY19 revenue) as well as sapphire products for customers in LED industry (2% of FY19 revenue).

Jingsheng was the largest equipment manufacturer for silicon ingots and wafers in China, taking up 26% market share in terms of 2019 revenue based on our estimates, while its key competitor Linton (China NEEQ-listed) accounted for 8%.

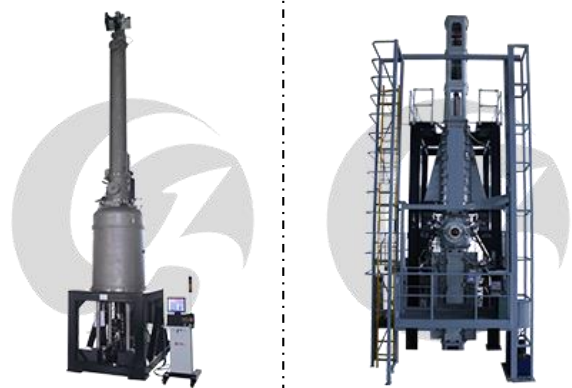
**Figure 41: Jingsheng's FY19 revenue mix**



Source: Company data, CMBIS

**Figure 42: Jingsheng's flagship product, mono-Si crystal growing furnaces**

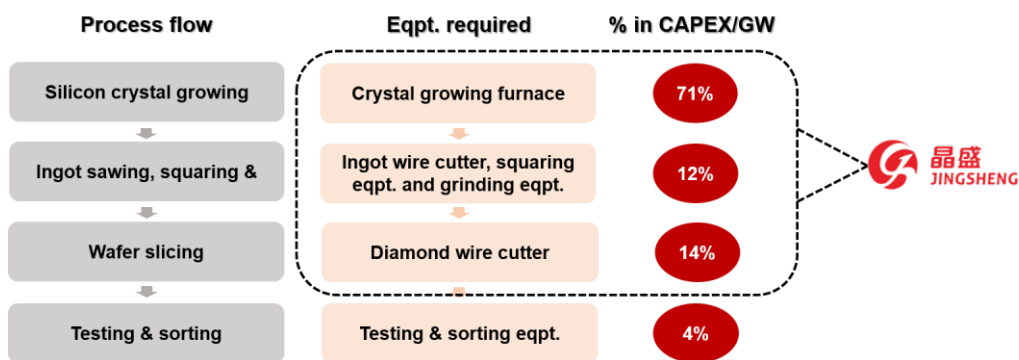
CZ Mono-Si Crystal Growing Furnace      CFZ Mono-Si Crystal Growing Furnace



Source: Company data, CMBIS

Two major processes are required in the production of PV wafers, namely crystal growing (for mono-Si) or casting (for poly-Si or cast mono-Si) and wafer slicing. Crystal growing furnaces and diamond wire cutting equipment are the core equipment required. Jingsheng's product offerings cover over 90% CAPEX in wafer production equipment, with crystal growing furnaces as its most competitive product.

**Figure 43: Jingsheng's PV equipment offerings cover >90% of CAPEX for ingot growing and wafer slicing production lines**



Source: CMBIS estimates

## Long-standing relationship with Zhonghuan to secure growth

Our projection shows that major mono-Si wafer makers in China planned over 221GW capacity expansion in coming five years, adding another 192% to the annual capacity in 2019. We estimate the additional equipment demand for ingot/wafer equipment would range from RMB 34bn-51bn in 2020E-22E.

Against the backdrop of proactive wafer capacity expansion and higher downstream market concentration, we believe Jingsheng is a desirable name to capture the uptrend in equipment demand for **1)** its rock-solid partnership with Zhonghuan, one of the world's mono wafer oligarchs, and **2)** its large market share in the ex-LONGi market.

### ■ Riding on Zhonghuan's expansion plan to achieve higher growth visibility

The solar mono-Si wafer making market is highly concentrated, with top 2 players, **LONGi (601012 CH, BUY, covered by Robin XIAO)** and **Zhonghuan** taking up over 60% of China's total capacity. The two players almost exclusively partner with their crystal grower suppliers, i.e. LONGi with its affiliate Linton (China NEEQ-listed) and Zhonghuan with Jingsheng.

Jingsheng has long been highly engaged in Zhonghuan's wafer capacity expansion, supplying ~100% of mono-Si crystal growing furnace to Zhonghuan's latest facilities (Fig. 44). In turn, Jingsheng earned over half of its FY19 revenue from Zhonghuan. The two companies cooperate closely in R&D regarding advanced technologies that could ensure future order inflows.

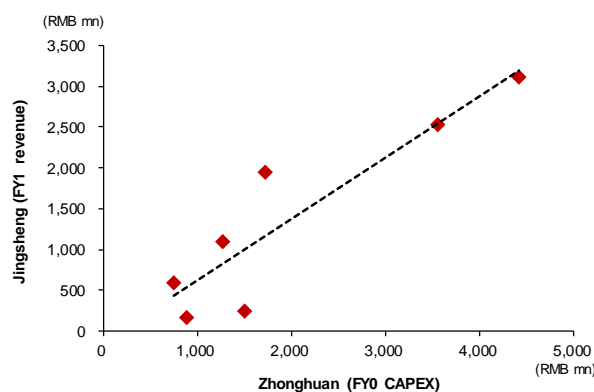
This solid relationship with Zhonghuan has provided Jingsheng with strong revenue growth with good visibility. Zhonghuan planned 50GW capacity additions in 2020E-23E (~25% of total announced new capacity we gauged) and has recently proposed to accelerate the ramp-up in capacity and potential expansion. Assuming Jingsheng could obtain 100% of these crystal growing equipment orders from Zhonghuan, implied revenue could reach ~RMB 6.0bn, or 20% of Jingsheng's FY19 revenue.

**Figure 44: Jingsheng's orders obtained from Zhonghuan and crystal growers supplied**

Zhonghuan's facilities	Design capacity (GW)	Jingsheng's announced orders obtained from Zhonghuan (RMB bn)	Est. % Jingsheng's crystal growers in Zhonghuan's total capacity
Phase I - III	6.4	N/A	>70%
Phase IV	16.6	3.9	100%
Phase V	25.0	2.7	100%

Source: Company data, CMBIS estimates  
 Note: Only PV orders are included.

**Figure 45: Jingsheng's revenue (FY1) trend versus Zhonghuan's CAPEX (FY0)**



Source: Company data, CMBIS estimates  
 Note: Data as of FY12-FY19; Zhonghuan's CAPEX on wafer-related projects were calculated.

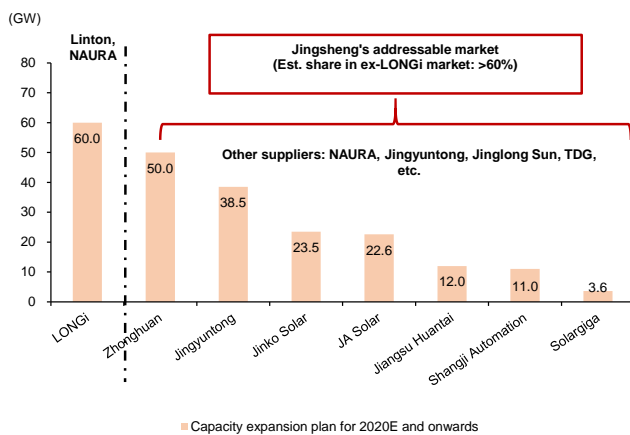


## ■ Large market shares in the ex-LONGi market to further capture demand uptrend

In terms of 2020E new mono-Si wafer capacity in China, we estimate that LONGi accounts for ~30% market share, of which the crystal growing furnace demand is primarily fulfilled by Linton and partly by **NAURA (002371 CH, NR)**. Though Jingsheng could not penetrate into LONGi's supply chain, the remaining 70% market share is large enough for it to explore, in our view.

Jingsheng has established a diversified client portfolio aside from its core client Zhonghuan. The client base covers emerging vertically integrated PV companies like **Jinko (JKS US, NR)**, as well as new entrants like **Shangji Automation (603185 CH, NR)** which are equipment suppliers. We estimate Jingsheng owns ~60% shares in the ex-LONGi market. We believe this leadership could support Jingsheng to gain from rising equipment demand on a broader base.

**Figure 46: Major crystal grower suppliers' addressable market by key clients' capacity expansion plan**



Source: Company data, CMBIS estimates

**Figure 47: Jingsheng's key clients in solar power business**



Source: Company data, CMBIS



## Empowering R&D to sharpen PV edge and explore semi industry

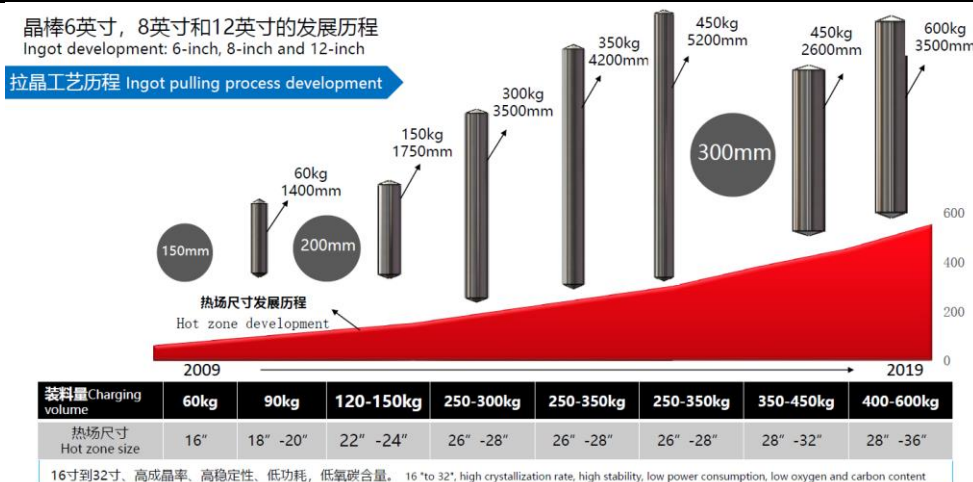
### ■ Leading capability to provide equipment for larger PV wafers

As mentioned in industry chapter, the solar wafer size is getting larger to achieve cost saving and efficiency gain. While currently G1 (158mm) remaining mainstream format and M6 (166mm) is rapidly gaining ground, leading wafer makers have already initiated larger size beyond 180mm, i.e. Zhonghuan's G12 (210mm) and LONGi-aligned M10 (182mm).

These larger wafers could substantially drive up equipment modification and replacement demand with increasing market adoption, as wafer makers have to change for thermal shields (32' and above) to achieve better production efficiency under new format. Meanwhile, larger wafer size sets higher technological barriers for equipment suppliers, therefore those with leading-edge technologies will definitely benefit more from this trend.

Jingsheng has maintained an above-peers' R&D spending to keep its technological competitiveness. The Company is now developing crystal growers with 36' to 40' thermal shields. With its unrivaled relationship with Zhonghuan, the initiator of G12 with 50GW planned G12 capacity, and its industry-leading capability to offer equipment for larger wafer format, Jingsheng is well positioned to win more new orders from this emerging trend, in our view.

**Figure 48: Larger wafer size requires larger hot zone design, which could bring new modification or replacement demand for crystal growing furnaces**

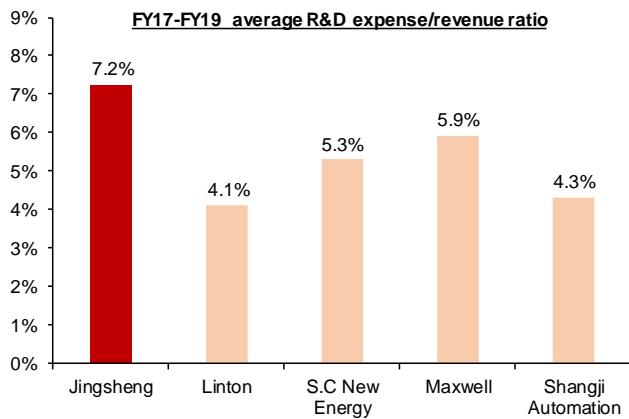


Source: Company data, CMBIS

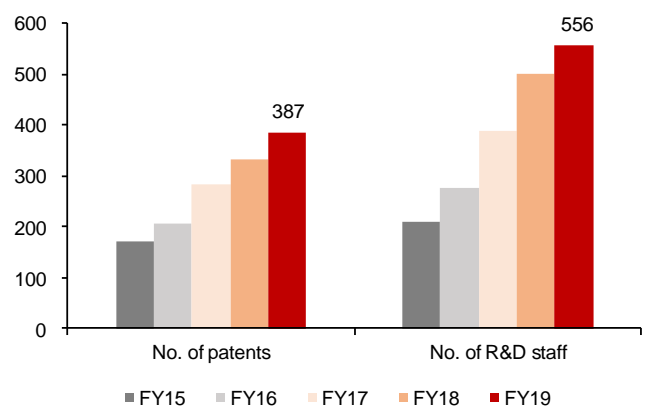
**Figure 49: Adoption of 210mm wafer format by key players along the supply chain**

Product line	Maker's name	Capacity plan
Wafers	Zhonghuan	To increase G12 wafer capacity from 19GW in 1H20 to 50GW by 2023E
	Shangji Automation	5GW Phase II fab to produce G12 wafers
	GCL-Poly	Achieved mass production of 210mm cast-mono wafers in Jan 2020
	Jingyuntong	Achieved mass production of G12 wafers in Aug 2020
Cells and modules	Aiko Solar	The first cell maker to ship 210mm cells in Jan 2020; To increase 210mm cell capacity to 10GW by 2020E; Guided >70% of new capacity to be 210mm cells
	Tongwei	Meishan Phase I fab compatible with 210mm cells; To adopt 210mm in Meishan Phase II and Jintang Phase I fabs, totaling 15GW capacity
	Risen	Launched new 210mm module products in Dec 2019/Sep 2020; Guided all new capacity in 2021E would be compatible with 210mm
	Trina	Launched 210mm module products in Jan 2020; Guided >70% of cell capacity in 2021E will be 210mm; Guided 31GW 210mm module capacity in 2022E

Source: News, Company data, CMBIS estimates

**Figure 50: Jingsheng's above-peers R&D spending**

Source: Company data, CMBIS

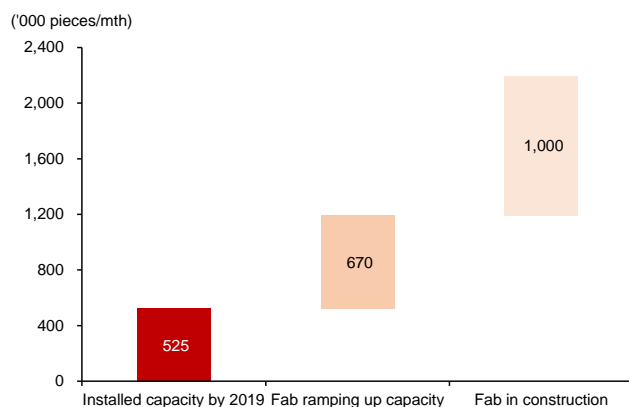
**Figure 51: Jingsheng's no. of R&D staffs and patents**

Source: Company data, CMBIS

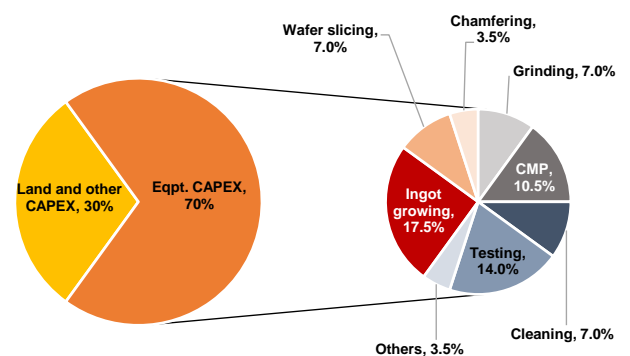
### ■ Expanding in semiconductor equipment to tap into a promising market

Jingsheng has been engaged in the manufacturing of crystal growing furnaces for semiconductor clients since the very beginning, and is now capable to achieve commercial production of crystal growing furnace for 8-inch and 12-inch semiconductor ingots as well as wafer slicing equipment, wafer polishing & grinding equipment and epitaxy growth equipment. In addition, Jingsheng has also invested RMB 770mn for 10% stake in Zhonghuan Advance, Zhonghuan's subsidiary for IC wafer production, to further capture growth opportunity in semiconductor industry.

As of 30 Sep 2020, Jingsheng's semiconductor equipment orders valued at RMB 410mn, accounting for 7% of its total orderbook, with Zhonghuan Advance as one of its key clients. We see huge potential in this segment as Chinese wafer fabs are expanding capacity and equipment localization is underway. According to IC Insights, by the end of 2019, 14 new wafer fabs were under construction with a total CAPEX spending of RMB 567bn. If we assume 3% of total CAPEX will be invested into wafer making process, of which 70% will be spent on equipment, this will translate to RMB 12bn new demand. We believe further penetration into semiconductor equipment industry will not only help with Jingsheng's revenue growth but also improve profitability as we expect higher GPM of semiconductor equipment over PV equipment.

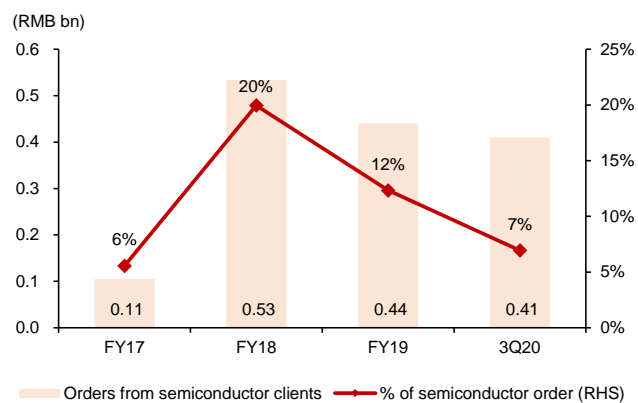
**Figure 52: Chinese semiconductor wafer fabs' capacity expansion plan (6/8/12-inch)**

Source: IC Insights, CMBIS

**Figure 53: Semiconductor wafer making CAPEX mix**

Source: SEMI, CMBIS

**Figure 54: Jingsheng's order backlog for semiconductor wafer equipment**



Source: Company data, CMBIS

**Figure 55: Jingsheng's key clients in semiconductor business**



Source: Company data, CMBIS

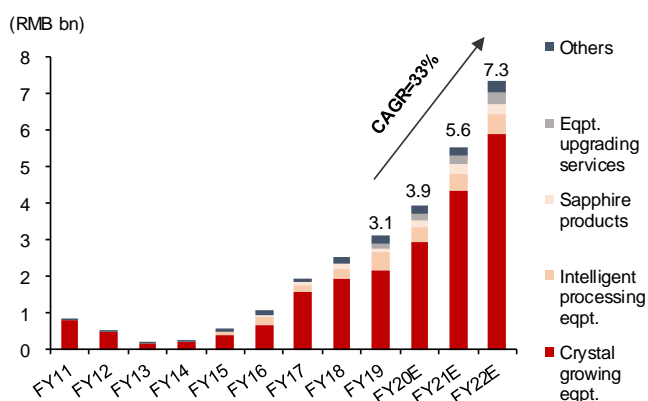
## Earnings Forecast

We project Jingsheng's net profit to grow 27%/43% YoY in FY20E/21E, to RMB 810mn/RMB 1.16bn, mainly driven by strong demand for silicon crystal growing furnaces and a mild recovery of GPM.

**Revenue CAGR at 33% over FY19-FY22E on robust new orders.** Backed by solid order backlog and expected increasing orders from key clients' capacity expansion plan, we believe Jingsheng could achieve healthy top-line growth powered by a 40% CAGR of crystal growing equipment revenue.

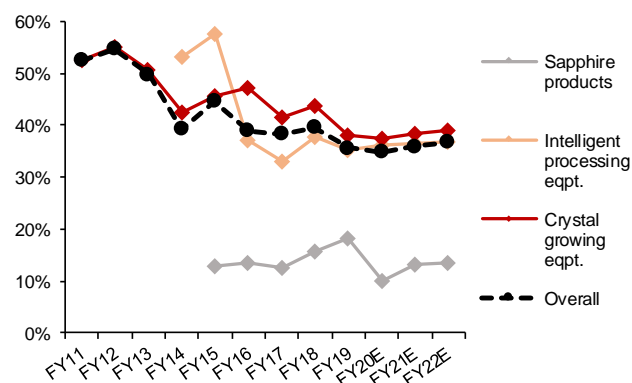
**Gross profit margin exposed to mild expansion.** Jingsheng's GPM in 2Q20 (37%) and 3Q20 (39%) showed promising recovery from 1Q20 low (23%) as short-term procurement cost pressure in new products gradually faded. We expect the Company to see mild upward GPM trend back towards its normalized level during FY20E-FY22E.

Figure 56: Jingsheng's revenue by products



Source: Company data, CMBIS estimates

Figure 57: Jingsheng's GPM by products



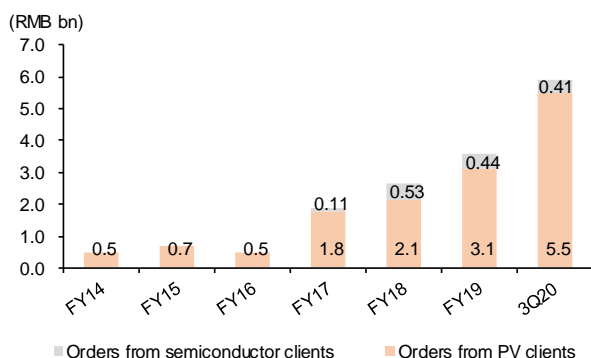
Source: Company data, CMBIS estimates

Figure 58: Major new orders Jingsheng announced in recent two years

Date	Client	Content	Order value (RMB mn)	Delivery date
2020-06	Inner Mongolia Zhonghuan GCL	Automatic crystal growing furnaces	1,209.6	2021-01-31
		Mono-Si rod chamfering and grinding eqpt.	17.1	2020-11-30
2019-11/12	Inner Mongolia Zhonghuan GCL	Mono-Si rod chamfering and grinding eqpt.	17.1	2020-05-31
		Silicon ingot single diamond wire cutter	198.0	2020-05-31
2019-12	Inner Mongolia Zhonghuan GCL	Automatic crystal growing furnaces	1,209.6	2020-05-31
2019-4/5/7	Jinko	Automatic crystal growing furnaces, etc.	954.1	2019-12-31
2019-5/6	Shangji Automation	Automatic crystal growing furnaces	553.9	2019-12-20

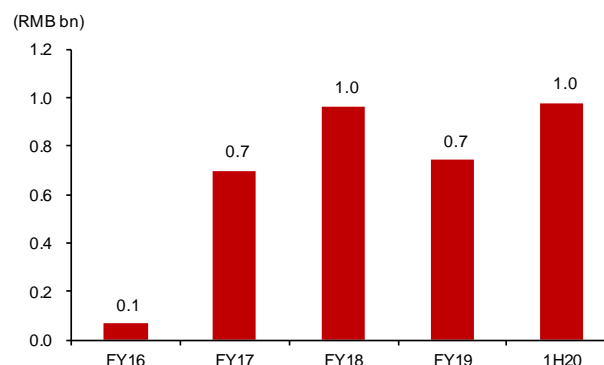
Source: Company data, CMBIS

Figure 59: Jingsheng's order backlog



Source: Company data, CMBIS

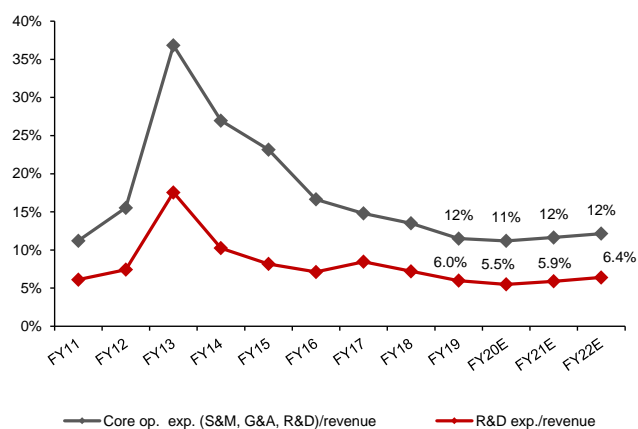
Figure 60: Jingsheng's goods in transit



Source: Company data, CMBIS

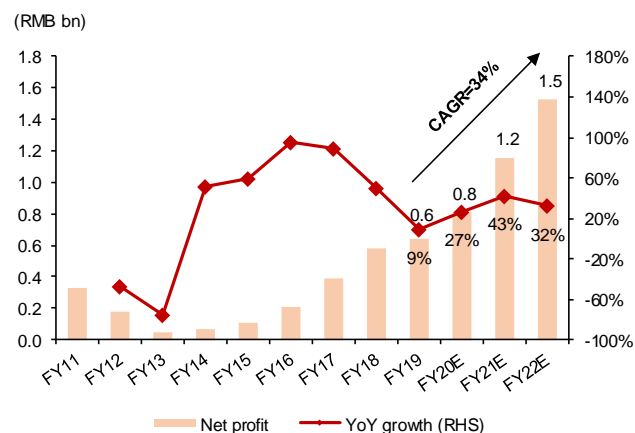
**Opex ratio to remain stable.** We project a flattish core opex ratio trend for Jingsheng in FY20E-22E. We believe the rising R&D expense ratio will be offset by lower SG&A expense ratio.

**Figure 61: Jingsheng's opex/revenue ratio trend**



Source: Company data, CMBIS estimates

**Figure 62: Jingsheng's net profit trend**



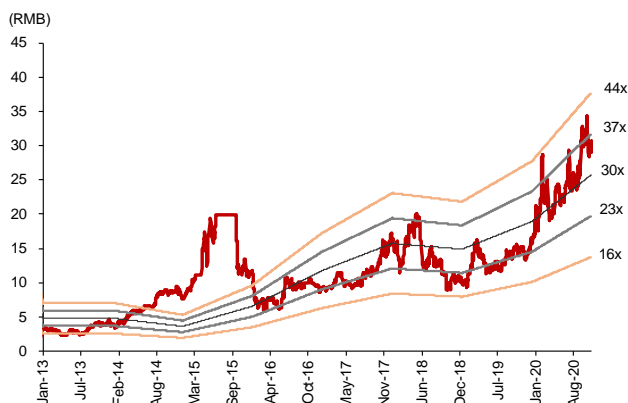
Source: Company data, CMBIS estimates

## Valuation

We initiate coverage on Jingsheng with BUY rating and set our TP at RMB 40.20 based on 45x FY21E P/E. We generate our target P/E based on 1.2x PEG on the back of 37% EPS CAGR over FY20E-22E. The multiple is equivalent to the Company's historical average plus 0.5SD, echoing with current industry up-cycle.

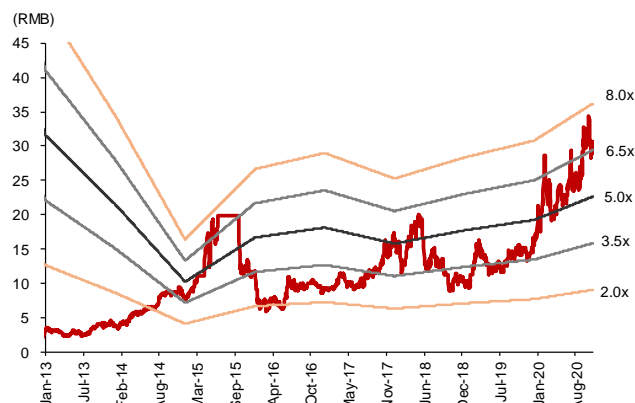
The Company's valuation was sluggish in the year after listing in May 2012, as EU's and U.S.'s imposing anti-dumping and anti-subsidy measures on Chinese solar power component makers dampened sector sentiment and profitability. However, the valuation has started an upward trend since late-2013 as the Company delivered strong earnings growth.

**Figure 63: Jingsheng's 12M forward P/E band**



Source: Bloomberg, CMBIS estimates

**Figure 64: Jingsheng's 12M forward P/B band**



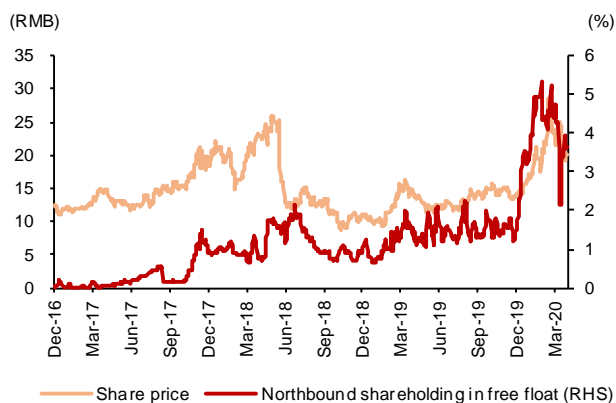
Source: Bloomberg, CMBIS estimates

**Figure 65: Peers' PEG comp**

Company	Ticker	Market cap (US\$mn)	P/E (x)		EPS Growth FY20E-22E	PEG
			FY20E	FY21E		
Zhejiang Jingsheng	300316 CH	6,246	50.9	35.7	37.2%	1.0
S.C New Energy	300724 CH	4,911	56.6	36.0	45.3%	0.8
Suzhou Maxwell	300751 CH	3,432	61.5	44.6	36.7%	1.2
Yingkou Jinchun	603396 CH	548	38.8	28.5	35.0%	0.8

Source: Bloomberg, CMBIS estimates

**Figure 66: Northbound shareholding in Jingsheng surged since 2020**



Source: Wind, CMBIS estimates

## Risk Factors

### Weaker-than-expected downstream capacity expansion

Our positive stance on Jingsheng's growth prospectus is based on the expectation of a strong industry-wide capacity expansion cycle. Any factor that could weaken the end-market installation demand and slow the solar wafer makers' (especially Zhonghuan's) expansion, such as economic downturn, unfavorable changes in current pro-solar policies or delay/cancellation of individual wafer maker's expansion plan, would pose downside risks to our earnings forecast for the Company.

### Client concentration risk

Jingsheng earned 56%/85% of its sales revenue from its top 1/top 5 clients in FY19. Any unfavorable changes in the Company's relationship with these core clients, especially those would hurt its position as Zhonghuan's core crystal growing furnace supplier, would negatively affect the Company's revenue growth and profitability.

### Deterioration of clients' financial ability to pay

Due to the industry-specific long revenue recognition cycle (usually 9-12mths), Jingsheng has long receivable turnover days of 261/319 in FY19/1H20. If the clients' ability to pay deteriorates substantially during this period, the Company may have to make provision.

## Financial Summary

### Income statement

YE 31 Dec (RMB mn)	FY18A	FY19A	FY20E	FY21E	FY22E
<b>Revenue</b>	<b>2,536</b>	<b>3,110</b>	<b>3,936</b>	<b>5,560</b>	<b>7,196</b>
Crystal growing eqpt.	1,940	2,173	2,934	4,342	5,775
Intelligent processing eqpt.	277	504	428	480	528
Eqpt. modification	-	165	199	254	313
Sapphire products	125	66	171	240	288
Others	194	201	203	244	293
<b>COGS</b>	<b>(1,534)</b>	<b>(2,004)</b>	<b>(2,566)</b>	<b>(3,560)</b>	<b>(4,562)</b>
<b>Gross profit</b>	<b>1,002</b>	<b>1,105</b>	<b>1,370</b>	<b>2,000</b>	<b>2,634</b>
S&M expenses	(46)	(46)	(63)	(86)	(112)
G&A expenses	(114)	(126)	(161)	(234)	(302)
R&D expenses	(183)	(186)	(216)	(328)	(461)
Other opex	(24)	(15)	(58)	(72)	(88)
<b>Core operating profit</b>	<b>636</b>	<b>733</b>	<b>871</b>	<b>1,280</b>	<b>1,711</b>
Impairment losses	(93)	(97)	(57)	(51)	(46)
Other expenses and incomes	82	70	71	51	37
<b>Pre-tax profit</b>	<b>649</b>	<b>721</b>	<b>943</b>	<b>1,352</b>	<b>1,789</b>
Income tax	(80)	(97)	(146)	(209)	(277)
Minority interest	14	13	13	13	13
<b>Net profit</b>	<b>582</b>	<b>637</b>	<b>810</b>	<b>1,155</b>	<b>1,525</b>

### Cash flow

YE 31 Dec (RMB mn)	FY18A	FY19A	FY20E	FY21E	FY22E
<b>PAT</b>	<b>568</b>	<b>624</b>	<b>797</b>	<b>1,142</b>	<b>1,512</b>
D&A	82	114	136	144	165
Change in working capital	(558)	(47)	422	(160)	(857)
Others	73	88	(155)	35	26
<b>Operating cash flow</b>	<b>166</b>	<b>779</b>	<b>1,199</b>	<b>1,161</b>	<b>846</b>
CAPEX	(235)	(95)	(188)	(292)	(279)
Others	(213)	(441)	(648)	(280)	(459)
<b>Investing cash flow</b>	<b>(449)</b>	<b>(536)</b>	<b>(835)</b>	<b>(571)</b>	<b>(738)</b>
Proceeds from fund raising	74	1	-	-	-
Changes in borrowings	4	(45)	(4)	3	(3)
Dividends paid	(108)	(135)	(128)	(128)	(128)
Others	(0)	5	-	-	-
<b>Financing cash flow</b>	<b>(29)</b>	<b>(174)</b>	<b>(133)</b>	<b>(125)</b>	<b>(132)</b>
<b>Net change in cash</b>	<b>(312)</b>	<b>69</b>	<b>232</b>	<b>464</b>	<b>(24)</b>
Cash at the beginning	790	476	545	777	1,241
Forex change, net	(1)	(0)	-	-	-
Less: restricted cash	80	37	88	126	306
<b>Cash at the end</b>	<b>476</b>	<b>545</b>	<b>777</b>	<b>1,241</b>	<b>1,217</b>

### Balance sheet

YE 31 Dec (RMB mn)	FY18A	FY19A	FY20E	FY21E	FY22E
<b>Current assets</b>	<b>4,427</b>	<b>5,675</b>	<b>7,824</b>	<b>10,086</b>	<b>12,627</b>
Cash and restricted cash	556	582	865	1,367	1,523
Trade receivables	1,583	2,865	3,936	5,004	6,460
Inventories	1,451	1,389	2,121	2,641	3,327
Other current assets	837	839	902	1,074	1,317
<b>Non-current assets</b>	<b>1,908</b>	<b>2,187</b>	<b>2,654</b>	<b>2,879</b>	<b>3,042</b>
Long-term equity investment	263	503	846	930	977
Fixed assets	980	1,147	1,145	1,269	1,379
Other non-current assets	665	537	663	680	687
<b>Total assets</b>	<b>6,335</b>	<b>7,863</b>	<b>10,478</b>	<b>12,965</b>	<b>15,669</b>
<b>Current liabilities</b>	<b>2,038</b>	<b>3,085</b>	<b>5,292</b>	<b>6,726</b>	<b>8,021</b>
ST borrowings	84	42	39	40	39
Trade payables	1,230	1,869	2,309	3,204	3,720
Contract liabilities	518	1,007	2,780	3,303	4,063
Other current liabilities	207	167	164	179	199
<b>Non-current liabilities</b>	<b>66</b>	<b>61</b>	<b>63</b>	<b>67</b>	<b>67</b>
LT borrowings	39	36	34	36	34
Other non-current liabilities	27	25	29	31	33
<b>Total liabilities</b>	<b>2,104</b>	<b>3,146</b>	<b>5,355</b>	<b>6,793</b>	<b>8,088</b>
Share capital	1,285	1,284	1,284	1,284	1,284
Reserves	1,415	1,448	1,540	1,650	1,784
Retained earnings	1,358	1,819	2,120	3,045	4,308
<b>Shareholders' fund</b>	<b>4,058</b>	<b>4,551</b>	<b>4,944</b>	<b>5,980</b>	<b>7,376</b>
Minority interest	173	165	179	192	205
<b>Total equity</b>	<b>4,231</b>	<b>4,716</b>	<b>5,122</b>	<b>6,172</b>	<b>7,582</b>

### Key ratios

YE 31 Dec	FY18A	FY19A	FY20E	FY21E	FY22E
<b>Revenue mix (%)</b>					
Crystal growing eqpt.	76	70	75	78	80
Intelligent processing eqpt.	11	16	11	9	7
Eqpt. modification	-	5	5	5	4
Sapphire products	5	2	4	4	4
Others	8	6	5	4	4
<b>YoY growth (%)</b>					
Revenue	30.1	22.6	26.6	41.3	32.0
Gross profit	34.0	10.3	23.9	46.0	34.5
Net profit	50.6	9.5	27.1	42.7	32.0
<b>Operating efficiency</b>					
Gross margin	39.5	35.5	34.8	36.0	36.6
Core operating margin	25.1	23.6	22.1	23.0	23.3
Net profit margin	23.0	20.5	20.6	20.8	20.8
<b>B/S ratios (%)</b>					
Net gearing	Net cash	Net cash	Net cash	Net cash	Net cash
Receivable turnover days	277	261	315	293	288
Inventory turnover days	180	167	163	156	150
Payable turnover days	273	282	297	283	274
<b>Profitability (%)</b>					
ROE	15.3	14.8	17.1	21.2	22.4
ROA	9.4	9.0	8.8	9.9	10.5
<b>Per share data (RMB)</b>					
EPS	0.52	0.50	0.63	0.90	1.16
DPS	0.10	0.10	0.10	0.10	0.12
BVPS	3.16	3.54	3.85	4.66	5.72

Source: Company data, CMBIS estimates

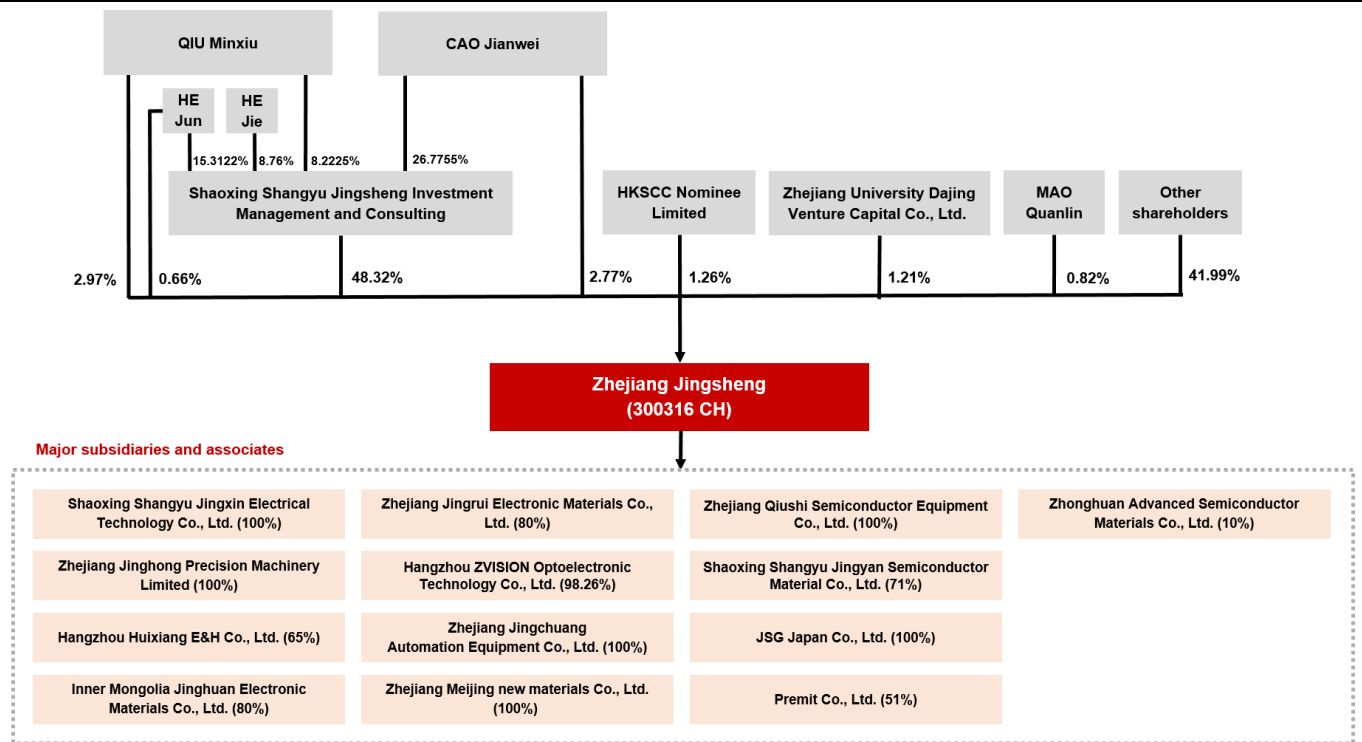


## Company Background

Zhejiang Jingsheng Mechanical & Electrical Co., Ltd. was founded in 2006 and headquartered in Shaoxing, Zhejiang Province. The Company is primarily engaged in developing, manufacturing and marketing crystal growing and processing equipment for customers in PV and semiconductor industry as well as sapphire products for customers in LED industry.

Jingsheng was listed on ChiNext Board of SZSE on 11 May, 2012. As of 30 Sep 2020, CAO Jianwei, the Chairman, and QIU Minxiu, the former Chairwoman, were controlling shareholders of the Company, together holding 54% of total equity interest.

**Figure 67: Jingsheng's shareholding structure**



Source: Company data, CMBIS

Note: data as of 30 Sep 2020.

**Figure 68: Business milestones of Jingsheng**

Time	Milestone
2006	Shangyu Jingsheng Mechanic & Electronic, the predecessor of Jingsheng, was established.
2007	Successfully developed and marketed the first domestic CZ mono-Si crystal growing furnace.
2008	Fully acquired Huixiang E&H for its silicon crystal growing control system.
2010	Jingsheng was incorporated.
2012	The Company was listed on ChiNext Board on 11 May 2012.
2014	Subsidiary Zhejiang Jingrui was established to be engaged in manufacturing of sapphire.
2015	Acquired 51% of ZVISION to expand product offerings into LED testing eqpt.
2017	Invested in 10% equity stake of Zhonghuan Advanced to enhance competitiveness in semiconductor manufacturing eqpt.
	"Domestic 200mm FZ mono-Si crystal growing furnace", funded by National Science and Technology Major Project of the Ministry of Science and Technology of China, was successfully accepted by the project team.
2018	Established 71%-holding subsidiary Shangyu Jingyan to develop CMP materials for semiconductor process.
2020	Set up a JV (holding 51% stake) with Lens Technology to seek corporation in sapphire product business.

Source: Company data, CMBIS

**Figure 69: Profile of key management**

Name	Age	Role	Time of appointment	Working experience
CAO Jianwei	42	Chairman	Dec 2016	Mr. CAO was Director and President of the Company from Nov 2010 to Dec 2016 and was appointed as Chairman and R&D Director in Dec 2016. He had been with Huixiang, currently a subsidiary of the Company since 2004. Mr. CAO holds a Doctor of Philosophy degree in Engineering.
QIU Minxiu	75	Director	Nov 2010	Ms. QIU was the founding director of the Company, served as Chairman from Nov 2011 to Dec 2016, and was appointed as Director in Dec 2016. Prior to Jingsheng, she had worked for Mechanical Control Engineering Research Institute of Zhejiang University for 28 years. Ms. QIU has profound experience in mechanical engineering as well as in fluid power and controls, and is a professor and doctoral advisor.
HE Jun	51	Director President	Nov 2010 Dec 2016	Mr. HE joined the Company in Dec 2006, and has been a Director since Nov 2011. He has profound working experience in marketing and sales.
MAO Quanlin	50	Director Vice President	Nov 2010 Dec 2016	Mr. MAO was appointed as Director and Vice General Manager of Jingsheng in Nov 2010 and as director and Vice President of the Company in Dec 2016. He has profound working experience in production management.
ZHU Liang	41	Director Vice President	Nov 2010 Dec 2016	Mr. ZHU joined the Company as Chief Engineer in Sep 2007, and later served as Vice General Manager, Director and Vice President.
LU Xiaowen	37	Vice President Financial Controller Secretary to the Board	Dec 2016 Nov 2010 Nov 2010	Ms. LU has been Financial Controller and Secretary to the Board of Jingsheng since Nov 2010, and was appointed as Vice President in Dec 2016. Prior to joining Jingsheng, she was with Ernst & Young.

Source: Company data, CMBIS

Note: data as of 31 Dec 2019.

# S.C New Energy Technology (300724 CH)

## A comprehensive leader of solar cell equipment

We initiate coverage on S.C New Energy with BUY and TP at RMB 138.00. We like S.C for its market leadership, its broad product offerings that cover >70% equipment CAPEX for mainstream PERC technology, as well as its early-mover advantage in developing HJT production equipment, that enables it to enjoy the uptrend in equipment demand regardless of the change in technology. We project a 47% CAGR for S.C's net profit in FY19-22E. We set our TP at RMB 138.00, implying 49x FY21E P/E.

- **Leading solar cell equipment supplier.** S.C New Energy specializes in providing diffusion & deposition equipment and wet process equipment for solar cell production. Thanks to the strong downstream capacity expansion and rising trend of import substitution, S.C achieved 64%/76% CAGR of revenue/net profit growth over 2015-2019, and overtook Meyer Burger to become the world's largest solar cell equipment supplier in 2019 by revenue.
- **Key beneficiary of PERC capacity expansion cycle.** We believe, S.C will continue to be a principal beneficiary of the ongoing PERC cell capacity expansion cycle, as **1)** its product scope covers ~70% of CAPEX on a PERC cell production line, with the capability in offering core PECVD systems, **2)** its comprehensive client mix covers largest solar cell makers, and **3)** its cutting-edge R&D capabilities could turn into innovative products with higher efficiency and protect margin.
- **Early mover in next-gen solar cell technologies.** S.C is one of a handful of Chinese players capable to provide equipment for HJT cells, and could be the first to capture the emerging demand for domestic next-gen solar cell equipment. To fulfill increasing orders, the Company recently announced a private share placement plan aiming to raise a max. of RMB 2.5bn to fund its capacity expansion on PERC+/HJT equipment. It also revealed its ambition to penetrate into semiconductor equipment with detailed R&D and production plans, which we see could become the Company's next leg of growth. This will offer potential upside to our existing earnings estimates.
- **Key risks:** **1)** Weaker-than-expected downstream capacity expansion; **2)** Little progress in R&D or betting on the wrong technologies; **3)** GMP contraction; **4)** Deterioration of clients' financial ability to pay.

### Earnings Summary

(YE 31 Dec)	FY18A	FY19A	FY20E	FY21E	FY22E
Revenue (RMB mn)	1,493	2,527	4,169	6,478	8,472
Net income (RMB mn)	306	382	572	902	1,210
EPS (RMB)	1.12	1.19	1.78	2.81	3.77
YoY growth (%)	6	7	49	58	34
Consensus EPS (RMB)	N/A	N/A	1.84	2.66	3.52
P/E (x)	90.2	84.6	56.6	36.0	26.8
P/B (x)	14.5	12.7	10.7	8.3	6.5
Yield (%)	0.2	0.2	0.2	0.3	0.4
ROE (%)	19.4	16.0	20.4	26.0	27.2
Net gearing (%)	Net cash	Net cash	Net cash	Net cash	Net cash

Source: Company data, Bloomberg, CMBIS estimates

### BUY (Initiation)

Target Price	RMB 138.00
Up/Downside	+36.6%
Current Price	RMB 100.99

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#### Stock Data

Mkt Cap (RMB mn)	32,440
Avg 3 mths t/o (RMB mn)	299.86
52w High/Low (RMB)	119.97/29.73
Total Issued Shares (mn)	321.2

Source: Bloomberg

#### Shareholding Structure

YU Zhong	9.13%
LIANG Meizhen	8.86%
ZUO Guojun	8.29%

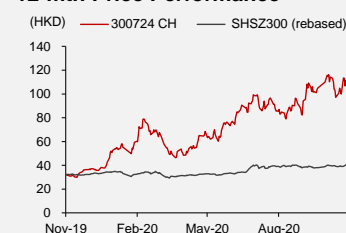
Source: Bloomberg

#### Share Performance

	Absolute	Relative
1-mth	-5.9%	-11.6%
3-mth	20.7%	14.1%
6-mth	51.0%	20.2%

Source: Bloomberg

#### 12-mth Price Performance



Source: Bloomberg

Auditor: RSM Global

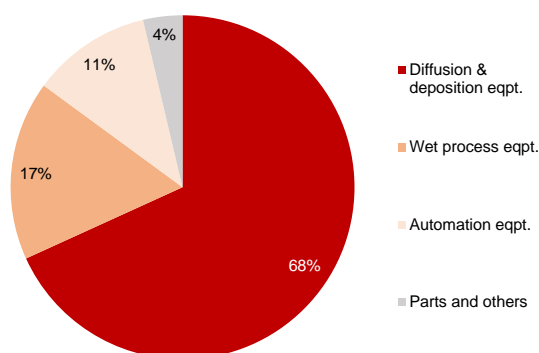
## Investment Thesis

### Leading solar cell equipment supplier

Shenzhen S.C New Energy Technology Equipment ("S.C") is a leading provider of solar cell production equipment, principally engaged in manufacturing and marketing diffusion & deposition equipment (i.e. diffusion furnaces and PECVD systems, 68% of FY19 revenue) and wet process equipment (i.e. texturing, etching and cleaning equipment, 17% of FY19 revenue), as well as relevant automation equipment (11% of FY19 revenue).

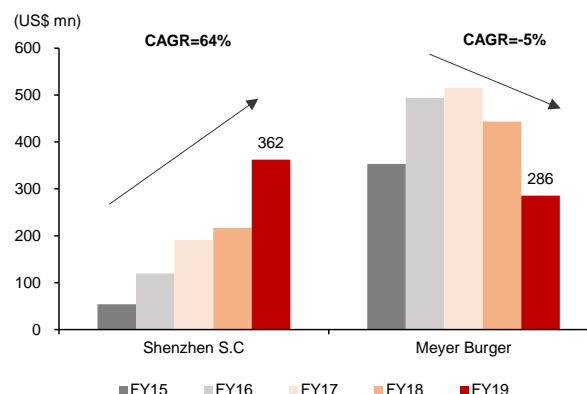
In 2019, the Company recorded a revenue of RMB 2.5bn, overtaking **Meyer Burger (MBTN SW, NR)** to become the world's largest solar cell equipment supplier. We estimate S.C owned 18% market share of total solar cell equipment sales value in China in 2019.

Figure 70: FY19 revenue mix of S.C



Source: Company data, CMBIS

Figure 71: S.C is a winner in gaining shares from overseas suppliers



Source: Company data, CMBIS estimates

### Key beneficiary of mainstream PERC capacity expansion cycle

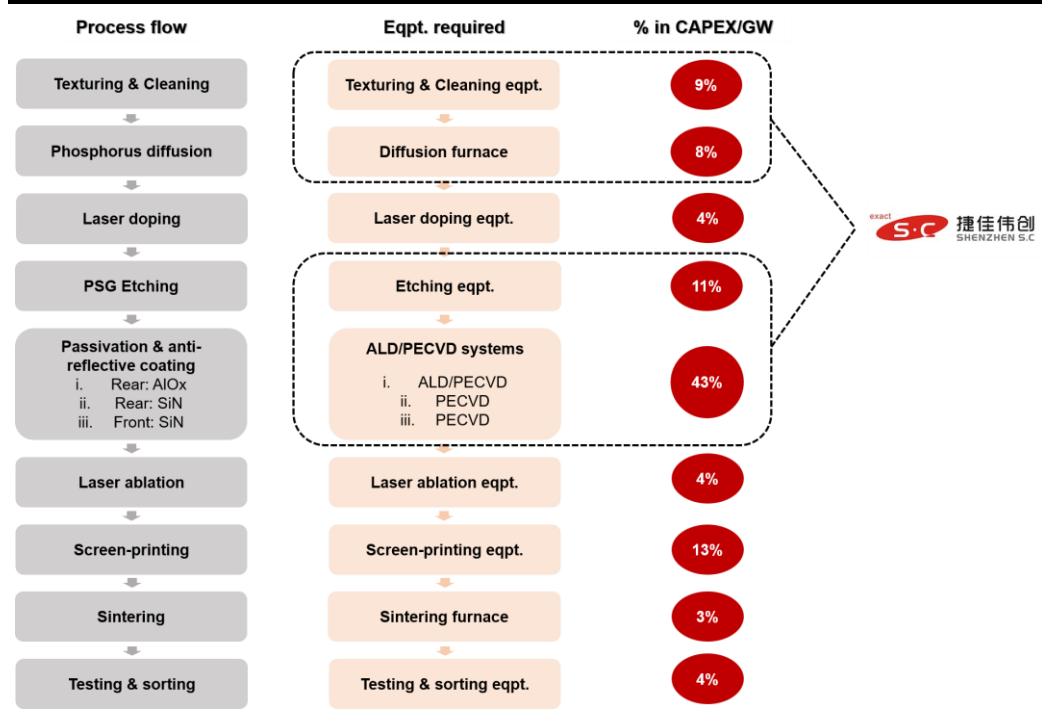
Based on our projection, major Chinese solar cell makers have lined up 320GW capacity expansion plans (primarily PERC) between 2020E and 2024E, which will add 261% to 2019 existing capacity. We estimate this will bring about RMB 61.0bn equipment demand over 2020E to 2022E under base-case scenario.

We believe, S.C, as a market leader, will continue to be a principal beneficiary of the ongoing PERC cell capacity expansion cycle, as **1)** its product scope involves ~70% of per GW CAPEX on a PERC cell production line, esp. with its strength in offering core PECVD system, **2)** its comprehensive client mix covers largest solar cell makers, and **3)** its cutting-edge R&D capabilities could turn into innovative products with higher efficiency and potential higher margin.

#### ■ Key product offerings cover ~70% CAPEX on a PERC cell production line

As shown in Fig. 72, S.C's key product offerings, diffusion and deposition equipment comprise 52% in a high-efficiency PERC cell production line, and texturing, cleaning and etching equipment comprise another 20%, based on our estimates. Specifically, the Company owns a high market share in providing PECVD system, core equipment for depositing SiNx films. This equipment is used in rear surface passivation and anti-reflective coating, of which the quality is critical to increase solar cell efficiency.

Figure 72: S.C's key products cover ~70% of value on a PERC cell production line



Source: CMBIS estimates

### ■ Comprehensive client mix and strong order intakes from largest solar cell makers

Solar cell is the most fragmented sub-market along the PV industry chain, while S.C has established solid relationships with a wide range of downstream clients through its advanced equipment offerings. Its key clients cover most leading cell makers that already revealed ambitious capacity expansion plans.

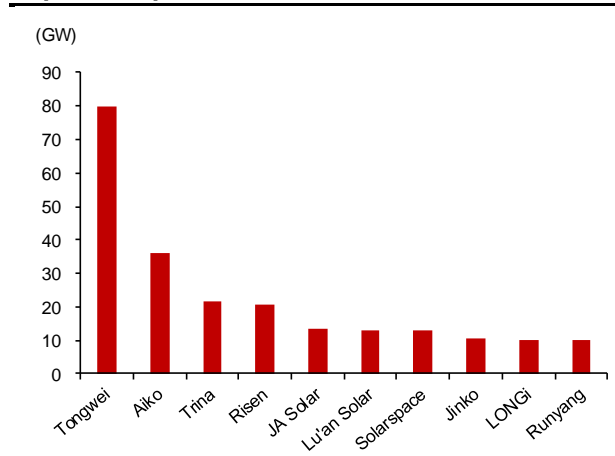
For example, in Dec 2019, the Company announced that the total order value it obtained from the world's largest solar cell maker **Tongwei (600438 CH, NR)** had reached RMB 970mn in 2019 (~36% vs. S.C's FY19 revenue). As at end Jun 2020, RMB 23mn or 2% of these orders were completed. Considering the relatively long acceptance testing period (usually 6-9 mths), these orders will support S.C revenue growth in 2H20E and 1H21E.

Figure 73: Key clients of S.C covers most leading solar cell makers globally



Source: Company data, CMBIS

Figure 74: Major cell makers' announced capacity expansion plans for 2020E and onwards



Source: Company data, CMBIS estimates

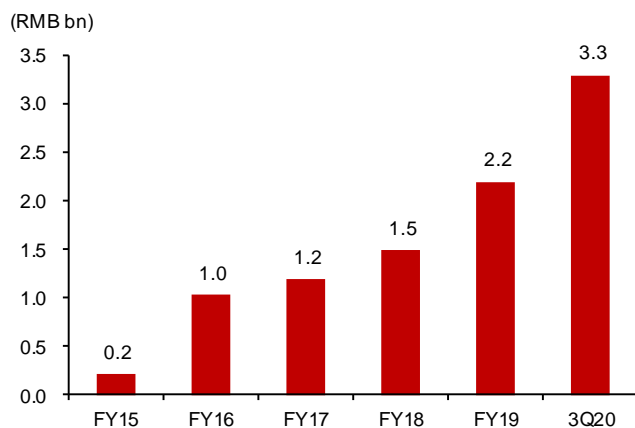
Leading indicators also suggest that S.C's revenue is on a robust growth trajectory. Fig. 75 exhibits the order cycle of S.C. It would take 9-12 months for ~90% of the order value to be recognized as revenue after an order being placed. As such, contract liabilities (disclosed quarterly) and goods in transit (disclosed semi-annually) could be good proxies of order backlog and for projection of short-term revenue trend.

**Figure 75: Order cycle of S.C**

#	Procedure	Time span	% of total order size	Accounting treatment
1	Prepayment	3 days - 3 mths after order placed	20-30%	Contract liabilities
	Production of eqpt.	1-3 months		
2	Delivery payment	Before/after the delivery day	30-40%	Contract liabilities
	Client acceptance test	6-9 months		Goods in transit
3	Acceptance payment	After acceptance test is passed	20-30%	Revenue recognized
	Warranty period	1 year		
4	Warranty payment	1 week - 1mth after warranty period ends	10%	

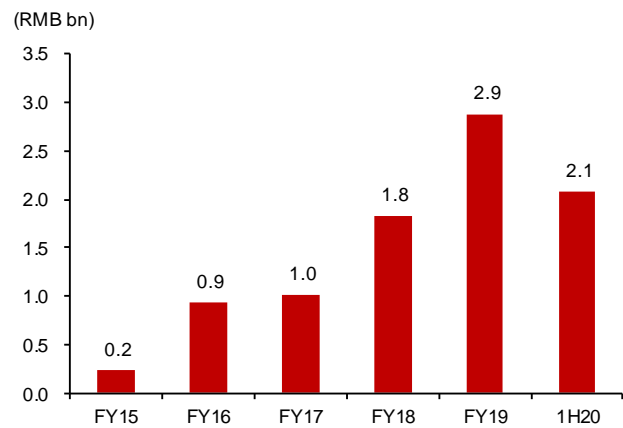
Source: Company data, CMBIS

**Figure 76: S.C's contract liabilities**



Source: Company data, CMBIS

**Figure 77: S.C's goods in transit**

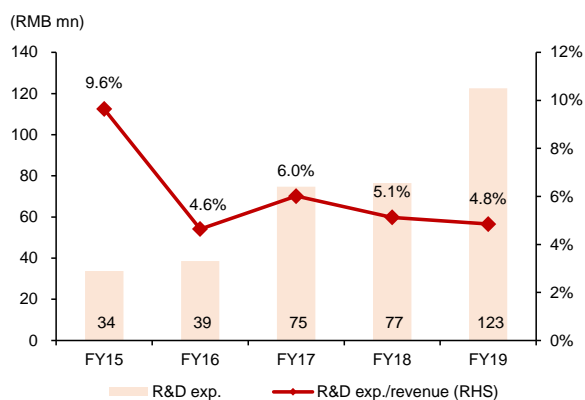


Source: Company data, CMBIS

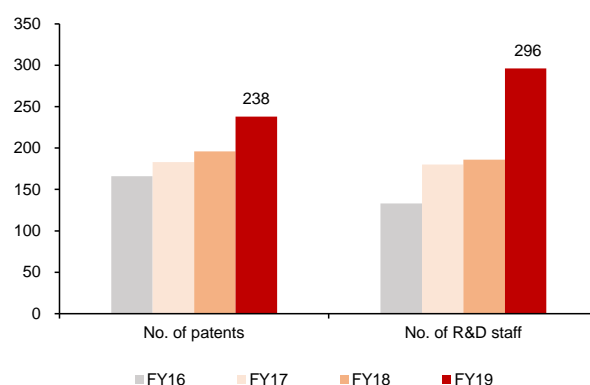
## ■ Strong R&D capability to ensure cutting-edge technology

R&D capability is crucial for an equipment supplier to keep up its edge. S.C has remained proactive investment into innovative technologies and professional talents, which results in continuous new product launches with high-efficiency technology adaption that could earn higher margins.

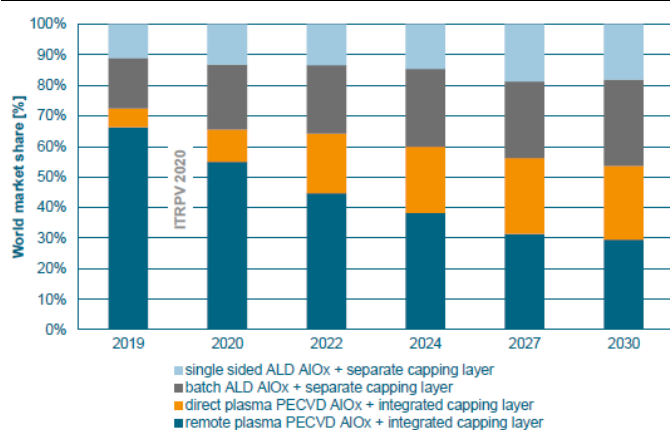
In Apr 2019, the Company launched a new PECVD system that could deposit both AlOx and SiNx layers (previously only providing PECVD for SiNx layers), and soon won orders from clients like Tongwei. Currently, mainstream rear surface passivation technology is plate/remote PECVD AlOx with integrated capping layer, while ALD AlOx with separate capping layer is becoming more popular. ITRPV projects direct/tube PECVD AlOx with integrated capping layer, which is adopted by S.C's new equipment, will continue to gain share. We believe this new product will further expand S.C's product offerings on core process in PERC production, enhance its competitiveness in emerging technologies and bring in new orders to boost both its top-line and margin.

**Figure 78: S.C's R&D spending**

Source: Company data, CMBIS

**Figure 79: No. of R&D staffs and patents of S.C**

Source: Company data, CMBIS estimates

**Figure 80: ITRPV's projection on rear surface passivation technologies**

Source: ITRPV 11th Edition (updated in Oct 2020), CMBIS

Note: direct plasma PECVD = tubular PECVD; remote plasma PECVD = parallel-plate PECVD.

**Figure 81: S.C's new tubular PECVD (AlOx)**

Source: Company data, CMBIS



## Early mover in next-gen solar cell technologies

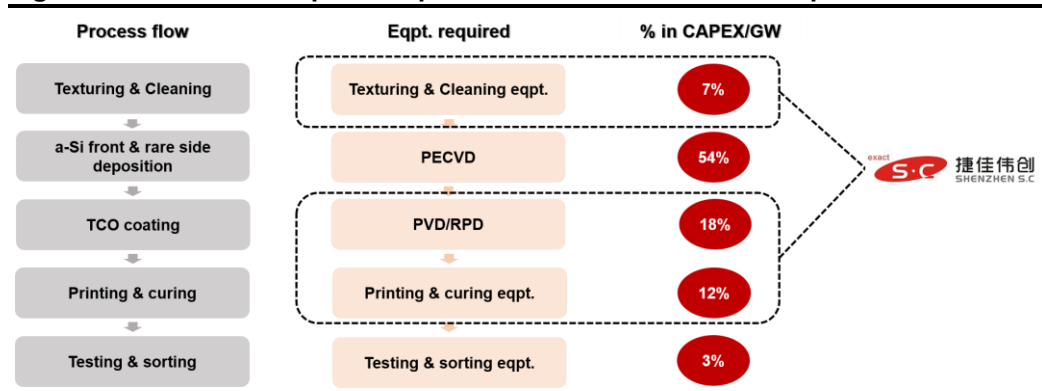
We estimate that Chinese solar cell makers are embarked on over 35GW capacity expansion for HJT cells, which implies RMB 17.7bn new equipment demand. Oversea equipment suppliers used to dominate this market, while their high price, ~RMB 800mn per GW, is one of the reasons that hinders the cell from mass production. Localization of equipment manufacturing can reduce per GW CAPEX by 40% to ~RMB 500mn. This will significantly save HJT's non-silicon cost and boost demand. At present, S.C is one of a few domestic equipment suppliers that is capable to achieve such localization in China.

### ■ Capable to provide equipment for ~40% CAPEX on HJT production line; core PECVD in R&D process

The production of HJT cells contains four major steps, of which a-Si layer deposition and TCO (Transparent Conductive Oxides) coating are the key processes to improve cell efficiency. Such processes require more technologically advanced equipment that carry higher prices. These two steps require 54% and 18% of per GW CAPEX on a HJT production line, respectively, based on our estimates.

S.C is now capable to offer texturing and clearing equipment, TCO coating equipment RPD (Reactive Plasma Deposition) and metallization equipment for HJT cell production, covering 37% of per GW CAPEX, and these sets of equipment have already been applied in pilot production lines of Tongwei and **Akcome (002610 CH, NR)**. In May 2020, the Company also signed an MOU with Akcome to collaborate in the R&D of core PECVD and RPD devices for Akcome's 2GW HJT cell fab.

**Figure 82: S.C is now capable to provide ~40% CAPEX on a HJT production line**



Source: CMBIS estimates

Regarding TCO coating equipment, current mainstream device is PVD (Physical Vapor Deposition), while S.C adopts RPD that could form higher-quality films with patent authorized by **Sumitomo Heavy Industries (6302 JP, NR)**. In Sep 2020, S.C succeeded in developing RPD devices with proprietary IP, which could further improve HJT cell efficiency by at least 0.6ppt. Moreover, the Company is going to launch a new PAR equipment combining PVD and RPD that could reduce equipment cost and footprint.

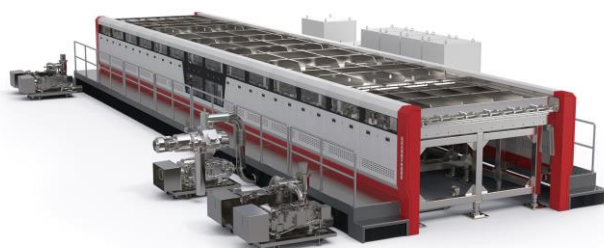
S.C is in the R&D stage of the core PECVD systems. Given that there are limited domestic competitors in this space, we believe S.C could leverage its early-mover advantages to gain shares from import substitution and enjoy the next cycle of capacity expansion.



**Figure 83: S.C's achievement in providing next-gen solar cell equipment**

Equipment	Availability	Achievement
<b>HJT</b>		
Texturing & cleaning eqpt.	√	Provided core eqpt. for Tongwei's pilot line
a-Si deposition eqpt. (PECVD)	In R&D	
TCO coating eqpt. (RPD)	√	Provided core eqpt. for Tongwei's pilot line
		Launched proprietary RPD 5500A in Sep 2020, which could improve regular HJT cells' efficiency by at least 0.6ppt
		PAR 5500 in R&D process, which integrates RPD and PVD, with lower eqpt. CAPEX and smaller footprint
Metallization eqpt.	√	Providing core eqpt. for Tongwei's pilot line
<b>TOPCon</b>		
Tunnel oxide deposition eqpt. (LPCVD)	√	
a-Si deposition eqpt. (PECVD)	In R&D	

Source: Company data, CMBIS

**Figure 84: S.C's Reactive Plasma Deposition (RPD)**

Source: Company data, CMBIS

**Figure 85: S.C's Horizontal LPCVD**

Source: Company data, CMBIS

### ■ A-share private placement to fund HJT equipment capacity and ambition into semiconductor equipment industry

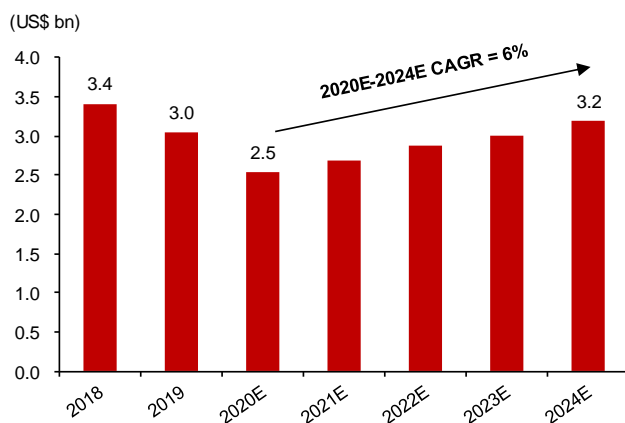
On 29 Sep, S.C announced its first private placement plan since listing in 2018, to raise at most RMB 2.5bn through issuing max. 32mn new shares (or 9.1% of enlarged equity base). The proceeds will mainly be spent on 1) the production of wet process equipment, CVD equipment and TCO deposition equipment for HJT cells, and 2) R&D of cleaning equipment and furnaces for semiconductor production.

We expect the fund raising and capacity expansion plan will enhance S.C's capability to fulfill the ever-increasing orders amid an industry up-cycle. In addition, the Company's ambition to penetrate into semiconductor equipment industry represents a new growth opportunity. Fig. 87 shows that global demand for semiconductor wet process equipment is recovering, and leading Chinese wafer cleaning equipment supplier **ACMR (ACMR US, NR)**'s data (Fig. 88) suggests that the market for import substitution is huge and the GPM is much higher than that of solar cell equipment.

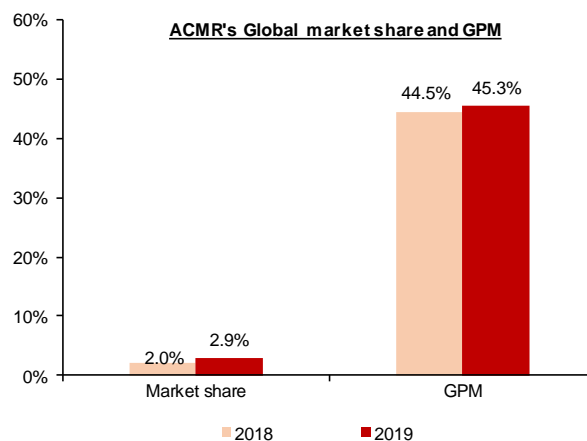
**Figure 86: Use of proceeds from the proposed A-share private placement**

#	Investment plans	Details	Investment budget (RMB mn)
1	<b>Hyper-efficiency solar cell production eqpt.</b> (超高效太阳能电池装备产业化项目)		<b>1,333.2</b>
1.1	Pan-semiconductor eqpt. (Wet process eqpt. and single layer a-Si thin film plate CVD eqpt.) (泛半导体装备产业化项目 (超高效太阳能电池湿法设备及单 层载板式非晶半导体薄膜 CVD 设备产业化项目) )	To build production base in Changzhou in two years, with capacity to manufacture 20GW wet process eqpt. for PERC+ cells and 20GW wet process eqpt. and PECVD system for HJT cells	998.8
1.2	TCO coating eqpt. PAR (integrating PVD & RPD) (二合一透明导电膜设备 (PAR) 产业化项目)	To build production base in Shenzhen in two years, with capacity to manufacture 50 series of PAR devices for HJT cells	334.4
2	<b>R&amp;D of advanced semiconductor production eqpt.</b> (Cleaning eqpt. and tube furnaces) (先进半导体装备 (半导体清洗设备及炉管类设备) 研发项目)	To improve semiconductor CVD system technologies and to launch wet process eqpt.	<b>646.1</b>
3	<b>Replenishing working capital</b> (补充流动资金项目)		<b>523.9</b>
<b>Total</b>			<b>2,503.2</b>

Source: Company data, CMBIS

**Figure 87: Global wafer cleaning equipment market sets for recovery in 2020E**

Source: Gartner, CMBIS

**Figure 88: ACMR's data suggests higher GPM (vs. S.C.'s 32% in FY19) and ample room for import substitution**

Source: Company data, CMBIS

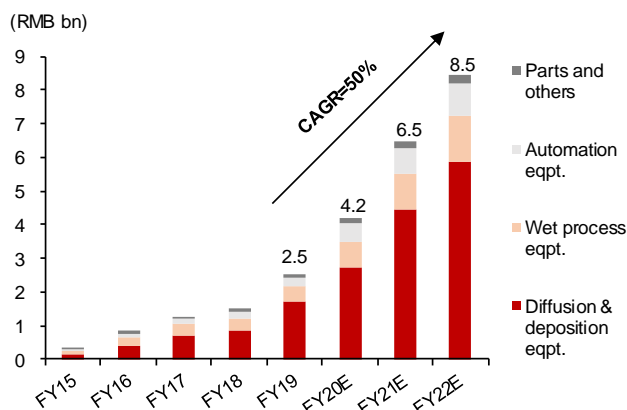
## Earnings Forecast

We project a 50%/58% net profit growth for S.C in FY20E/FY21E, reaching RMB 572mn /RMB 902mn, mainly driven by strong top-line growth and stabilizing gross profit margin.

**Revenue CAGR at 50% over FY19-FY22E on strong order inflows.** We believe the robust downstream demand during FY19-FY21E should well support S.C's top-line growth. This will be underpinned by 62%/58%/31% YoY growth of key diffusion & deposition equipment and wet process equipment in FY20E/21E/22E (vs. 76%/48% in FY19/1H20), which comprise ~85% of S.C's revenue.

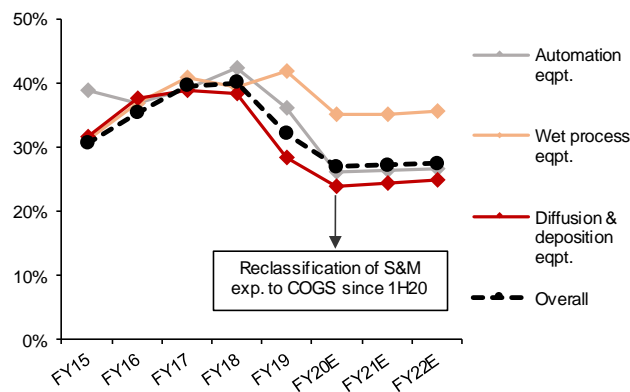
**Gross profit margin to mildly recover.** We expect S.C's gross profit margin will mildly pick up from 27.0% in FY20E to 27.5% in FY22E, as equipment applied with more advanced technologies in new orders could help support GPM expansion. Part of selling expenses was reclassified into COGS since 1H20 due to accounting policy change, which led to a 4-5ppt contraction on GPM, based on our estimates.

**Figure 89: S.C's revenue by products**



Source: Company data, CMBIS estimates

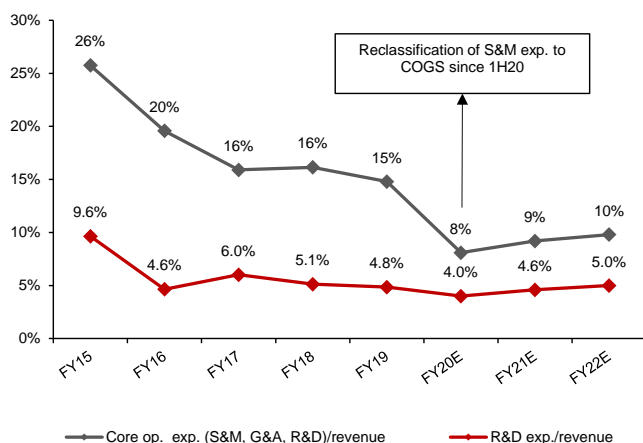
**Figure 90: S.C's GPM by products**



Source: Company data, CMBIS estimates

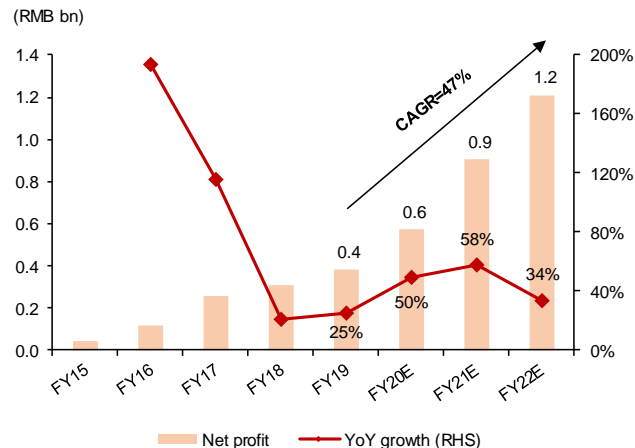
**Opex pick-up on R&D expenses.** Due to the reclassification of S&M expenses in 1H20 and the impact from COVID-19, we expect core opex-to-revenue ratio will drop from 15% in FY19 to 8% in FY20E, while we project a gradual increase in FY21E and FY22E, as we believe S.C will continue to increase its investments in R&D.

**Figure 91: S.C's core opex/revenue ratio trend**



Source: Company data, CMBIS estimates

**Figure 92: S.C's net profit trend**



Source: Company data, CMBIS estimates

**Figure 93: A-share private placement offering size and dilution impact**

Item	Amount
<b>Offering size</b>	
Max. no. of new shares offered (mn)	32.1
Max. amount raised (RMB mn)	2,503.2
Implied min. offering price (RMB)	77.9
Current price (RMB)	100.99
<b>No. of total issued shares (mn)</b>	
Before	320.0
After - at max. offering size	352.1
% of enlarged equity base	9.1%
<b>Impact on FY21E financial data</b>	
EPS (RMB) - before	2.84
<b>EPS (RMB) - after</b>	<b>2.72</b>
<i>Diff</i>	<i>-4%</i>
ROE - before	26.7%
ROE - after	17.9%
<i>Diff</i>	<i>-8.8ppt</i>
<b>Impact on FY22E financial data</b>	
EPS (RMB) - before	3.77
<b>EPS (RMB) - after</b>	<b>3.44</b>
<i>Diff</i>	<i>-9%</i>
ROE - before	27.2%
ROE - after	17.4%
<i>Diff</i>	<i>-9.8ppt</i>

Source: Company data, CMBIS estimates

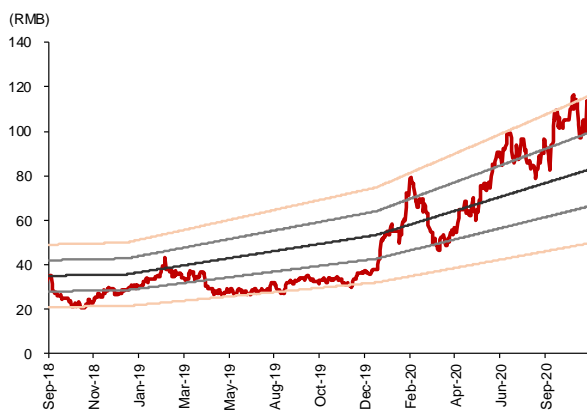
Note: assume that the private placement will be completed by 30 Jun 2021.

## Valuation

We initiate coverage on S.C with BUY rating and set our TP at RMB 138.00 based on 51x FY21E diluted EPS of RMB 2.72. We have factored in the potential EPS dilution impact from A-share private placement (Fig. 93). Our target P/E is generated from 1.3x PEG on the back of 39% diluted EPS CAGR in FY20E-22E.

We think the Company's historically low valuation was caused by its IPO timing (Aug 2018) after A-share market experienced peak-to-trough decline and stayed stagnant throughout 2019. A strong re-rating started in 4Q19, when downstream expansion plans were frequently announced and strong order inflows began to translated into the Company's earnings. We expect a premium valuation is justified going forward, given the structural growth of downstream capex cycle and the rising overseas ownership of the stock through Stock Connect.

**Figure 94: S.C's 12M forward P/E band**



Source: Bloomberg, CMBIS estimates

**Figure 95: S.C's 12M forward P/B band**



Source: Bloomberg, CMBIS estimates

**Figure 96: Peers' PEG comp**

Company	Ticker	Market cap (US\$mn)	P/E (x)		EPS Growth FY20E-22E	PEG
			FY20E	FY21E		
Zhejiang Jingsheng	300316 CH	6,246	50.9	35.7	37.2%	1.0
S.C New Energy	300724 CH	4,911	56.6	36.0	45.3%	0.8
Suzhou Maxwell	300751 CH	3,432	61.5	44.6	36.7%	1.2
Yingkou Jinchun	603396 CH	548	38.8	28.5	35.0%	0.8

Source: Bloomberg, CMBIS estimates

**Figure 97: Northbound kept accumulating S.C**



Source: Wind, CMBIS

## Risk Factors

### Weaker-than-expected downstream capacity expansion

Our positive stance on S.C's growth prospectus is based on the expectation of a strong industry-wide capacity expansion cycle. Any factor that could weaken the end-market installation demand and slow the solar cell makers' expansion, such as economic downturn, unfavorable changes in current pro-solar policies or delay/cancelation of individual cell maker's expansion plan, would pose downside risks to our earnings forecast for S.C.

### Technology risk

Equipment suppliers have to keep their competitive edge through continuous achievements in R&D in this technology-intensive industry. If the Company lags far behind domestic peers or fails to develop core equipment for next-gen cell technologies, it may miss out growth opportunity in the next cycle. In addition, some technologies that S.C adopts now in their equipment are not mainstream ones, e.g. providing PECVD in PERC AlOx passivation rather than ALD, and RPD in HJT TCO coating rather than PVD. If these technologies later are not proved to be well adapted by the market, it would result in the loss of orders.

### Gross profit margin contraction

S.C saw an overall downward GPM trend for their key products in recent years, both due to relatively strong bargaining power of the customers and increase in procurement cost. If S.C fails to transfer cost pressure to their clients or to improve its own production efficiency, its GPM may be exposed to further contraction.

### Deterioration of clients' financial ability to pay

Due to the industry-specific long revenue recognition cycle (usually 9-12mths), S.C has a high percentage of trade receivables vs. its revenue (37%/45% for FY19/1H20). If the clients' ability to pay deteriorates substantially, the Company may have to make provision.

## Financial Summary

### Income statement

YE 31 Dec (RMB mn)	FY18A	FY19A	FY20E	FY21E	FY22E
<b>Revenue</b>	<b>1,493</b>	<b>2,527</b>	<b>4,169</b>	<b>6,478</b>	<b>8,472</b>
Diffusion & deposition eqpt.	838	1,723	2,723	4,439	5,859
Wet process eqpt.	383	426	767	1,090	1,395
Automation eqpt.	184	284	534	748	935
Parts and others	87	93	145	202	283
<b>COGS</b>	<b>(895)</b>	<b>(1,717)</b>	<b>(3,043)</b>	<b>(4,720)</b>	<b>(6,149)</b>
<b>Gross profit</b>	<b>598</b>	<b>810</b>	<b>1,126</b>	<b>1,758</b>	<b>2,323</b>
S&M expenses	(118)	(179)	(83)	(149)	(212)
G&A expenses	(46)	(73)	(88)	(149)	(195)
R&D expenses	(77)	(123)	(167)	(298)	(424)
Other opex	12	1	(55)	(62)	(75)
<b>Core operating profit</b>	<b>369</b>	<b>437</b>	<b>733</b>	<b>1,100</b>	<b>1,418</b>
Impairment losses	(68)	(86)	(172)	(103)	(72)
Other expenses and incomes	50	78	83	25	27
<b>Pre-tax profit</b>	<b>351</b>	<b>429</b>	<b>643</b>	<b>1,021</b>	<b>1,372</b>
Income tax	(45)	(55)	(80)	(128)	(172)
Minority interest	-	7	9	9	9
<b>Net profit</b>	<b>306</b>	<b>382</b>	<b>572</b>	<b>902</b>	<b>1,210</b>

### Cash flow

YE 31 Dec (RMB mn)	FY18A	FY19A	FY20E	FY21E	FY22E
<b>PAT</b>	<b>306</b>	<b>374</b>	<b>563</b>	<b>893</b>	<b>1,201</b>
D&A	5	18	29	33	38
Change in working capital	(416)	(723)	117	(476)	(567)
Others	44	76	216	140	109
<b>Operating cash flow</b>	<b>(60)</b>	<b>(254)</b>	<b>925</b>	<b>590</b>	<b>781</b>
CAPEX	(41)	(121)	(77)	(78)	(88)
Others	(823)	754	103	101	121
<b>Investing cash flow</b>	<b>(864)</b>	<b>632</b>	<b>26</b>	<b>23</b>	<b>33</b>
Proceeds from funding	1,064	11	25	-	-
Changes in borrowings	-	16	168	53	(4)
Dividends paid	(60)	(58)	(58)	(58)	(90)
Others	(17)	(302)	(240)	(300)	(260)
<b>Financing cash flow</b>	<b>988</b>	<b>(333)</b>	<b>(106)</b>	<b>(305)</b>	<b>(355)</b>
<b>Net change in cash</b>	<b>63</b>	<b>45</b>	<b>846</b>	<b>308</b>	<b>460</b>
Cash at the beginning	378	454	501	1,342	1,651
Forex change, net	13	3	(5)	-	-
Less: restricted cash	96	427	383	464	519
<b>Cash at the end</b>	<b>454</b>	<b>501</b>	<b>1,342</b>	<b>1,651</b>	<b>2,111</b>

### Balance sheet

YE 31 Dec (RMB mn)	FY18A	FY19A	FY20E	FY21E	FY22E
<b>Current assets</b>	<b>4,106</b>	<b>5,553</b>	<b>7,856</b>	<b>10,297</b>	<b>12,959</b>
Cash and restricted cash	550	929	1,725	2,115	2,630
Trade receivables	485	929	2,293	3,110	3,812
Inventories	2,087	3,342	3,469	4,685	6,109
Other current assets	984	354	368	388	408
<b>Non-current assets</b>	<b>338</b>	<b>458</b>	<b>481</b>	<b>542</b>	<b>603</b>
Long-term equity investment	130	129	108	109	110
Fixed assets	162	246	265	302	343
Other non-current assets	46	83	109	130	149
<b>Total assets</b>	<b>4,444</b>	<b>6,011</b>	<b>8,338</b>	<b>10,839</b>	<b>13,561</b>
<b>Current liabilities</b>	<b>2,201</b>	<b>3,424</b>	<b>5,249</b>	<b>6,895</b>	<b>8,486</b>
ST borrowings	-	-	168	221	216
Trade payables	613	1,059	1,461	1,982	2,214
Advances from customers	1,493	2,201	3,434	4,490	5,837
Other current liabilities	95	163	186	201	218
<b>Non-current liabilities</b>	<b>15</b>	<b>31</b>	<b>45</b>	<b>46</b>	<b>48</b>
LT borrowings	-	-	-	-	-
Other non-current liabilities	15	31	45	46	48
<b>Total liabilities</b>	<b>2,217</b>	<b>3,455</b>	<b>5,293</b>	<b>6,941</b>	<b>8,533</b>
Share capital	320	320	321	321	321
Reserves	1,206	1,235	1,252	1,325	1,422
Retained earnings	702	998	1,469	2,242	3,264
<b>Shareholders' fund</b>	<b>2,227</b>	<b>2,552</b>	<b>3,043</b>	<b>3,888</b>	<b>5,008</b>
Minority interest	-	3	2	11	20
<b>Total equity</b>	<b>2,227</b>	<b>2,556</b>	<b>3,045</b>	<b>3,899</b>	<b>5,028</b>

### Key ratios

YE 31 Dec	FY18A	FY19A	FY20E	FY21E	FY22E
<b>Revenue mix (%)</b>					
Diffusion & deposition eqpt.	56	68	65	69	69
Wet process eqpt.	26	17	18	17	16
Automation eqpt.	12	11	13	12	11
Parts and others	6	4	3	3	3
<b>YoY growth (%)</b>					
Revenue	20	69	65	55	31
Gross profit	40	32	27	27	27
Net profit	21	25	50	58	34
<b>Operating efficiency (%)</b>					
GP margin	40.1	32.1	27.0	27.1	27.4
Core operating margin	24.7	17.3	17.6	17.0	16.7
Net profit margin	20.5	15.1	13.7	13.9	14.3
<b>B/S ratios (%)</b>					
Net gearing	Net cash	Net cash	Net cash	Net cash	Net cash
Receivable turnover days	100	102	141	152	149
Inventory turnover days	420	392	298	230	233
Payable turnover days	200	178	151	133	125
<b>Profitability (%)</b>					
ROE	19.4	16.0	20.4	26.0	27.2
ROA	8.7	7.3	8.0	9.4	9.9
<b>Per share (RMB)</b>					
EPS	1.12	1.19	1.78	2.81	3.77
DPS	0.18	0.18	0.18	0.28	0.38
BVPS	6.96	7.98	9.47	12.10	15.59

Source: Company data, CMBIS estimates

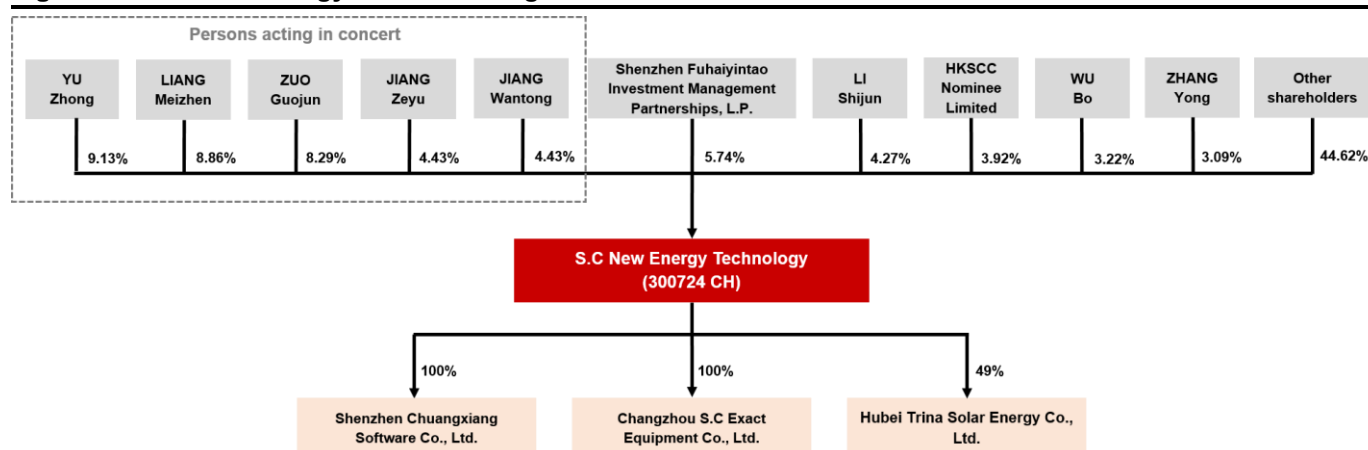


## Company Background

Headquartered in Shenzhen, Guangdong Province, Shenzhen S.C New Energy Technology Corporation was founded in 2003. The Company is a leading new energy equipment manufacturer in China, offering products in six categories, i.e. mono-/poly-Si texturing equipment, DOA equipment, acid & alkaline polishing equipment, PECVD, intelligent automation equipment and automatic screen-printing equipment, etc.

The Company went listed on SZSE on 10 Aug 2018. As of 30 Sep 2020, YU Zhong, ZUO Guojun and LIANG Meizhen, founding shareholders and directors of the Company acting in concert, were controlling shareholders, together holding 35.14% of the Company's total issued shares.

**Figure 98: S.C New Energy's shareholding structure**



Source: Company data, CMBIS

Note: data as of 30 Sep 2020.

**Figure 99: Business milestones of S.C New Energy**

Time	Milestone
2003	Mr. JIANG Liujian, the deceased former Chairman, founded Shenzhen S.C Exact Equipment Co., Ltd.
2007	Shenzhen S.C Wetron Electronic Equipment Co., Ltd was founded in Shenzhen.
2008	Changzhou S.C Exact Equipment Co., Ltd was founded in Changzhou.
2010	S.C Wetron was merged into S.C Exact Equipment. Products were exported to India.
2011	The Company was incorporated and renamed "Shenzhen S.C New Energy Technology Corporation".
2015	The Company was listed on China NEEQ on 16 Oct 2015.
2017	The Company achieved mass production of MCCE equipment and HJT texturing equipment.
2018	The Company was successfully listed on ChiNext Board on 10 Aug 2018. Products were exported into Turkey, Egypt and Singapore.
2019	Products were exported into Korea.

Source: Company data, CMBIS

**Figure 100: Profile of key management**

Name	Age	Role	Time of appointment	Working experience
YU Zhong	41	Chairman Vice President	Jul 2017 Jul 2017	Mr. YU was one of the founding shareholders of the Company in 2003. He has been serving in several positions for the Company ever since, and was appointed Chairman in Jul 2017. Prior to founding the Company, he used to work for SUN EAST Tech Development Co., Ltd. and Shenzhen Xinqun Machinery Co., Ltd.
ZUO Guojun	41	Director Vice President	Oct 2011 Oct 2011	Mr. ZUO was one of the founding shareholders of the Company in 2003. He has been serving in several positions for the Company ever since, and was appointed Director and Vice President in Oct 2011. Prior to founding the Company, he used to work for SUN EAST Tech Development Co., Ltd.
LIANG Meizhen	45	Director Senior manager of President office	Aug 2017 Sep 2018	Ms. LIANG joined the Company in Jun 2007, and was appointed as Senior manager of President office in 2018. Previously, she worked for Measurement Specialties China Ltd.
LI Shijun	56	Director President	Oct 2011 Oct 2011	Mr. LI joined the Company in Dec 2010, and was appointed as General manager in 2011. Prior to S.C New Energy, he had worked with The 48th Research Institute of China Electronic Technology Group Corporation and GreatWall Information Industry Co., Ltd. Mr. LI is a senior engineer and holds an MBA degree.
WU Bo	45	Director Vice President	Oct 2011 Oct 2011	Mr. WU joined the Company in Jul 2008, and was appointed as Vice President in 2011. Previously, he had worked with The 48th Research Institute of China Electronic Technology Group Corporation and JA Solar Holdings Co., Ltd.
LI Ying	41	Director	Jun 2014	Ms. LI joined the Company in Jun 2014. She previously worked as Risk Management Director and Financial Director of Shenzhen Fuhaiyintao Investment Management Co., Ltd., and also worked for Deloitte Touche Tohmatsu Certified Public Accountants LLP and Pan-China Certified Public Accountants Co., Ltd.

Source: Company data, CMBIS

Note: data as of 31 Dec 2019.

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