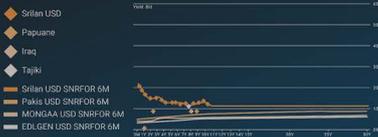


Editor's Picks Q1 2021 Edition

A Snapshot of Independent Research from the Smartkarma Network

The SRILAN Complex Remains Attractive vs "B-" Peers



Warut Promboon

Chinese Broad Liquidity Growth – Traditional Vs Shadow Banks



Michael J. Howell

Chinese Shadow Banks Return

"We must start to think of shadow bank credit as being a new and important Chinese monetary policy lever alongside traditional PBoC actions."

Michael J. Howell

How Straits Trading Could Provide Entry Into a Hot SGX IPO

"The crown jewel of Straits Trading is its 22% stake in ARA Asset Management... We believe ARA gets relisted on the SGX between 2Q21 and 2Q22. Assuming SGD 120-150b AUM at the time of IPO, ARA could be valued between SGD 6-7.5b."

Nicolas Van Broekhoven

Kunlun Energy's Favourable Multiple from Its PipeChina Deal

1.9x Kunlun Energy, 1.21x Petrochina, 1.43x China Petroleum & Chemical

Osbert Tang, CFA

Kunlun Energy Seeks to Integrate New Projects

40% of net proceeds > Developing the natural gas end-user sales business

"We expect Kunlun will go on a big spending spree for city gas projects over the next 12 months."

Osbert Tang, CFA

Kuaishou Makes Most of Its Revenue on Live Streaming



Shifara Samsudeen, ACMA, CGMA

Kuaishou User Metrics as of June 2020



Shifara Samsudeen, ACMA, CGMA

SGX Is Dominant in the Sustainability Bond Ecosystem

- Green, Social, and Sustainability bond segment
- 140+ issues worth over US\$61b
- Sustainable bonds total 7.8% of SGX's total equity market cap
- Nasdaq's exclusive partner in Asia for the Nasdaq Sustainable Bond Network

Kyle Rudden

Wilmar's Stake in YKA Reduced to 89.99% Post-Listing

Shareholder	Before IPO		After IPO	
	Shares(mn)	% Held	Shares(mn)	% Held
Wilmar	4878.0	99.99%	4878.0	89.99%
Shanghai Broid Ocean Investment	487.9	0.01%	487.9	0.01%
Public	0.0	-	542.2	10.00%
Total	4879.4	100.00%	542.2	100.00%

David Blennerhassett

The Chinese RMB's Outperformance Stands Out



Olivier Desbarres

Chinese GDP Rapidly Rebounds



Olivier Desbarres

The UK-EU Brexit Deal Remains Thin

"Additional trade frictions are still likely to weigh on growth in 2021 and beyond, although such economic damage is small beer compared to the Covid-related catastrophe."



Phil Rush

Tokopedia's Effort for "Digital Economic Equity"

100+ Million Active users every month, 9.9+M Seller, 86.5% Affordable District, The seller is a new business man

Angus Mackintosh

Solar Power Capacity of Countries Leading the Charge



Aqila Ali



Welcome to Editor's Picks 1Q2021 Edition!

It's the Year After 2020, and if the last year taught us anything, it's that connections matter. Whether on a personal or a professional level, it's connections that have helped us cope, endure, and even thrive.

Connection is what we at Smartkarma are continuously striving for. Connection begets collaboration, insight, and mutual growth. Our vision for the future points to networks of like-minded individuals, learning from each other, benefiting from each other's experience, and forging new relationships.

This is Smartkarma: an independent Investment Research Network that unites Insight Providers, Investors, and Investor Relations Professionals. By fostering and enabling connections between them, we aim to democratise the investment industry.

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- support independent Analysts on starting their own research business or complementing their existing business by finding new audiences
- empower Investor Relations professionals with robust Investor targeting tools and real-time access to independent Analysts to maximise their outreach

As an example of the Insight available through our network, we are excited to present the 1Q2021 Edition of our Editor's Picks compilation - a showcase of investment intelligence through the lens of the Smartkarma network. This collection of Insights is meant to be an illustration of the depth and breadth of insight found on our platform - a snapshot of what you can expect to see as a Smartkarma subscriber.

In the following pages, you will be able to see for yourself a sample of the efforts of Smartkarma and the Insight Providers publishing on our platform. If you want more such Insights delivered to you in real time on your desktop or mobile, visit smartkarma.com and learn more. We look forward to the connection!

Table of Contents

1. SRI LANKA: Surviving Between a Rock and a Hard Place by Warut Promboon	4
2. Asian Solar Energy Sector: Powered by Subsidies and Moving Downstream by Aqila Ali	9
3. Wilmar Is A Buy After YKA's Listing by David Blennerhassett	112
4. PBoC Likely to Keep Renminbi on Tight Leash by Olivier Desbarres	119
5. Kuaishou IPO: Advertising and E-Commerce Businesses to Drive Future Growth by Shifara Samsudeen	129
6. Could China Boom Again In 2021? by Michael J. Howell	137
7. Straits Trading: Discounted Way into 2021 SGX's Hottest IPO by Nicolas Van Broekhoven	141
8. Tokopedia PT (1087142D IJ) - From Private to Public by Hook or by Crook by Angus Mackintosh	147
9. SGX FIRST Puts SGX First in the Ranks of Asia's Most Sustainable Stock Exchanges by Kyle Rudden	156
10. Kunlun Energy (135 HK): Very Favourable Valuation for Pipeline and Dalian LNG Disposals by Osbert Tang	161
11. Brexit: Yippee Ki Yay, Negotiators by Phil Rush	165



Warut Promboon

Independent Asian Credit
Research | Bondcritic

Warut Promboon is a fixed income research professional with 20+ years of experience covering financial institutions, corporates, and sovereigns with a global client network. He's had supervisory experience since 2002, and is a regular speaker at fixed income events in Asia.

Areas of Expertise

- Primary Asset Class: Credit
- Geography: Asia Ex Japan
- Countries: Generalist
- Sectors: Generalist

Content Verticals

- Credit, Debt Capital Markets

Sri Lanka Government International Bond | Credit

SRI LANKA: Surviving Between a Rock and a Hard Place

By Warut Promboon | 24 Sep 2020

EXECUTIVE SUMMARY

In our last report dated 12-May-20 ([SRI LANKA: No Default This Year](#)), we highlighted the fact that Sri Lanka will not default this year. We also compared [Sri Lanka Government International Bond \(SRILAN GOVT\)](#) with its closest Asian peers such as Mongolia, Papua New Guinea, Tajikistan, Pakistan, and Iraq. In this report, we update with recent events on the country and relative valuation of Sri Lanka's SRILAN complex.

Despite deterioration in macroeconomic fundamentals (falling revenue vs. USD1bn debt instalment in October) further worsened by COVID-19, we remain confident that it is unlikely for Sri Lanka to default on its debt obligations in the next 12 months, given its success in securing new credit facilities partially offset by a suspension of IMF Extended Fund Facility (EFF) this month.

S&P's downgrade of Sri Lanka's issuer credit rating to B- from B should lead to Moody's downgrade of the same rating to B3 from B2 in October in the worst case scenario of which we do not believe investors will be surprised with. We have viewed Sri Lanka as a B- sovereign credit and at the "B-" range, and we see the SRILAN complex as attractive versus peers despite a rally. We like SRILAN 21s to 24s as the most attractive within the SRILAN complex and assign our **OVERWEIGHT** recommendation. We assign a **NEUTRAL** recommendation to the rest of the SRILAN complex.

The Asian USD bond universe has outperformed since many countries exited the first wave of COVID-19. Our base case scenario calls for the mass adoption of vaccines to be at least a year away and we expect the default trend to head upward and the global economy to slowly make a comeback, starting in 2022. That said, we expect a depressed yield environment to make Asian USD bonds attractive versus developed market USD bonds. That said, we expect defensive sectors such as sovereign, telecommunications, utilities, insurance, and defence to outperform cyclical sectors towards 2021. We also like issuers which will be supported implicitly and explicitly by sovereign credits.

DETAIL

A Debt Update

Sri Lanka's external debt was c.USD58.1bn in December, of which more than 10% is owed to China. Foreign exchange reserves rose to USD7.4bn in August from USD7.1bn in July. The ratio of external debt to foreign reserves was well within 10x which is a "B-" range, in our view. The country's debt service obligation was USD4.6bn this year with c.USD2.5bn remaining to be paid from now until the end of the year (USD1bn in October), according to the government. The Sri Lankan government said it is comfortable to pay back foreign debt in 2020 and expects new borrowings to be taking place in time for the proceeds to pay back debt services next year. We expect Sri Lanka to use its foreign exchange reserves and foreign direct investments as well as additional credit facilities to pay back its debt services this year and do not expect the country to default at least in the next 12 months.

So far, Sri Lanka has secured: (1) USD300m loan from Asian Development Bank^[1]; (2) USD86m loan from Asian Infrastructure Investment Bank; (3) USD400m in 9-month currency swap facility with the Reserve bank of India in July, and (4) USD500m 10-year term loan from China Development Bank in March. We understand Sri Lanka is still in the process of seeking a debt moratorium for 2021 and seeking additional loans from multilateral development bank (which, in our view, can lend more to Sri Lanka as the country's exposure at those banks remain minimal). On the other hand, the IMF suspended Sri Lanka's ongoing USD1.5bn EFF as the Central Bank of Sri Lanka does not wish to go through IMF's conditions. We note that the Central Bank opts to apply for IMF's Rapid Financing Facility (RFI) for USD800m.

A key political event since our last report is Mahinda Rajapaksa's landslide victory in a PM election on 5-August. Mr. Rajapaksa is viewed by the market as pro-China, in our opinion, and that means Sri Lanka will move closer to China which could come in handy to help Sri Lanka on its debt situation. We also believe China has a strategic interest in Sri Lanka on Sri Lanka's location on China's maritime Belt & Road Initiative. China's lease of Sri Lanka's Hambantota Port in 2017 for USD1.1bn for 99 years stirred controversy although a large portion of the lease proceeds are used to repay non-Chinese lenders. A closer tie between China and Sri Lanka could also upset Sri Lanka's relationship with India, which, in our view, is as important as Sri Lanka's relationship with China. Mr. Rajapaksa's victory, at the very least, will give Sri Lanka more options to consult with China on its debt situation.

Overall, we believe Sri Lanka's debt situation has improved but not to a level that investors are looking for. We expect one more downgrade from Moody's in a worst case scenario (See Rating Actions below) but we also do not expect many negative surprises in the near term. In general, we are looking for the following events in the next 12 months as a spread-positive event:

- (i) The government is successful in securing funding to service external debt this year without overly destabilizing the macroeconomy;
- (ii) The appeal for debt moratorium succeeds, and
- (iii) Necessary reforms are carried out to ensure Sri Lanka’s economy will be back on a healthier track (See our Sri Lanka report dated 20-May).

Rating Actions

S&P followed Fitch and downgraded Sri Lanka’s issuer credit rating to B- from B on 20-May but keeps the outlook at stable (versus Fitch’s negative outlook). Given Moody’s current review of Sri Lanka’s B2 rating and Fitch’s 24-April downgrade, S&P’s downgrade is not a surprise. We believe the market also expects Moody’s to downgrade Sri Lanka to B3 when the agency concludes the review perhaps in October on the prolonged COVID-19 crisis, a lack of progress toward appealing for debt moratorium, and the suspension of IMF EFF. We have seen Sri Lanka as a “B-“ credit and we believe Moody’s upcoming downgrade is irrelevant at this point. A rating affirmation, which we believe is unlikely, would be a major spread-positive for the SRILAN complex, on the contrary.

Valuation

The SRILAN complex remains attractive versus its “B-“ peers even after a recent rally. EXHIBIT 1 shows the SRILAN credit curve quoted with a significant spread against its Asian B- peers.



EXHIBIT 2 shows the SRILAN complex in different maturities. We see the bonds in three maturity groups: 2020s, 2021 to 2024s, and 2025s and beyond.

EXHIBIT 2: SRILAN bonds

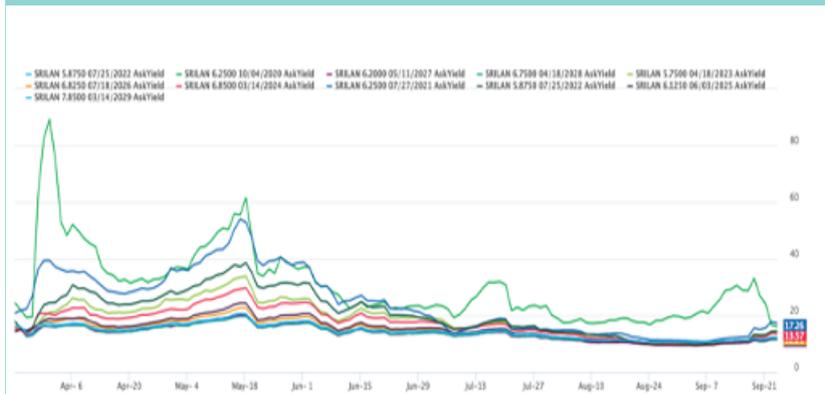
Bond name	Price (bid)	Price (ask)	YTM % (bid)	YTM % (ask)	Outstanding (USDm)	Recommendation
SRILAN 6.250% 04OCT2020	98.8	99.7	53.4	16.5	1000	Neutral
SRILAN 6.250% 27JUL2021	90.7	91.7	18.7	18	1000	Overweight
SRILAN 5.750% 18JAN2022	85.3	85.9	15.4	14.5	500	Overweight
SRILAN 5.750% 18APR2023	80.8	81.9	15	14.4	1250	Overweight
SRILAN 6.850% 14MAR2024	80.7	81.7	14.1	13.6	1000	Overweight
SRILAN 6.850% 03NOV2025	78.2	79.3	12.8	12.5	1500	Neutral
SRILAN 6.825% 18JUL2026	76.8	78.0	12.6	12.2	1000	Neutral
SRILAN 6.200% 11MAY2027	74.5	75.7	11.9	11.6	1500	Neutral
SRILAN 6.750% 18APR2028	74.8	76.0	11.9	11.6	1250	Neutral
SRILAN 7.850% 14MAR2029	76.2	77.3	12.5	12.2	1400	Neutral
SRILAN 7.550% 28MAR2030	74.8	76.1	12.1	11.8	1500	Neutral

Source: Markit

SRILAN 20s will mature in less than 2 weeks and YTM (ask) rallied from 18% to 16.5% in a week as we believe the market now expects the bonds to be repaid. The price is now very close to par (99.7c) at the time of this report and we do not believe it is worth getting into the bonds now. As such, we assign a **NEUTRAL** recommendation on SRILAN 20s.

SRILAN 21s to 24s yielded from 14% to 18% and SRILAN 25s to 30s yielded c.12% at the time of this report. EXHIBIT 3 shows outperformance of the SRILAN complex, excluding SRILAN 30s, since July. At YTM of 14% to 18% (ask), we see SRILAN 21s to 24s as most attractive among the SRILAN complex. As such we assign an **OVERWEIGHT** recommendation for SRILAN 21s to 24s. For SRILAN 25s to 30s, we believe these bonds remain attractive despite the fact that they are less attractive than SRILAN 21s to 24s, in our view. As such, we assign a **NEUTRAL** recommendation on SRILAN 25s to 30s.

EXHIBIT 3: SRILAN complex yield performance



Source: Markit

[1] <https://www.aspistrategist.org.au/will-multilateral-development-banks-step-up-to-meet-sri-lankas-funding-gap/>

Disclosure & Certification

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- I/We have signed the Insight Provider Agreement and this insight does not violate any of the terms specified therein.

– Warut Promboon (24 Sep 2020)



Aqila Ali

Equity Analyst |
LightStream Research

Aqila Ali has over five years of experience in investment research covering multiple industries including auto components, MLCCs, telecommunications, and CASE trends.

Areas of Expertise

- Primary Asset Class: Equities
- Geography: Asia Pacific
- Countries: Japan
- Sectors: Generalist

Content Verticals

- Equity Bottom-Up, Thematic (Sector/ Industry)

Thematic (Sector/Industry)

Asian Solar Energy Sector: Powered by Subsidies and Moving Downstream

By Aqila Ali | 30 Sep 2020

EXECUTIVE SUMMARY

What's Original?

This insight is an in-depth research on the Asian solar energy industry, covering the value chain and related companies in each key stage of the value chain. Our research includes the following:

- **Industry Background:** This includes an in-depth analysis on the solar energy sector, which includes an overview on the key types of solar technologies (Photovoltaic-PV, Concentrated Solar Power-CSP and Solar Heating and Cooling- SHC), and the leading Asian countries (India, Japan and China) in the sector. We provide our thoughts on which solar technology looks promising and compare the technology used across the leading Asian countries.
- **Value Chain Analysis:** We detail the value chain for PV, highlighting the critical stages of the value chain (system integration assembly and installation, and manufacturing of cells, modules, polysilicon ingot, and wafer) and the leading players in those stages (includes listed and unlisted companies).
- **Background Analysis on Key Players-** This includes researching the key Asian listed/unlisted solar energy companies and analysing the key contributing factor/product to each of them in the sector.
- **Investment opportunities and risk –** We compare and contrast the investment opportunities for each of the key players in the sector, to understand if the companies follow a similar strategy or otherwise.

- **Analysis on the key revenue and margin drivers**– We compare and contrast the key revenue growth and profitability drivers for the listed companies. We have also provided a short investment thesis on the key listed players and looked at their valuation.

The Insight is structured as follows:

A. Solar Energy Industry Background

B. A Deep Dive into the Three Key Solar Technologies

C. A Look at the Leading Asian Countries in the Solar Market: China, Japan, and India

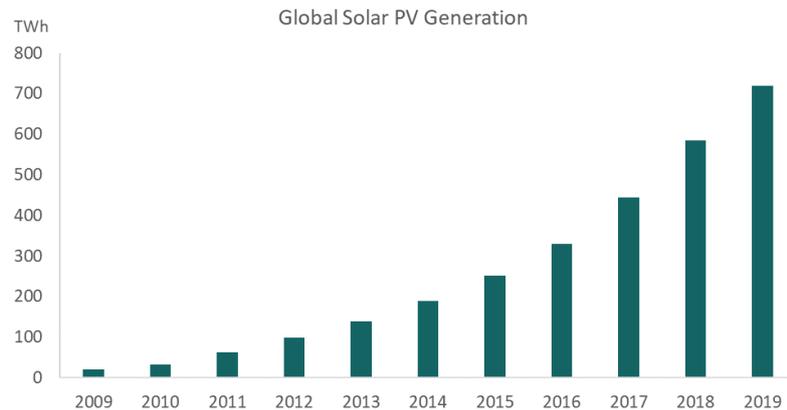
D. Value Chain Analysis

E. A Look at the Key Asian Solar Players

DETAIL

A. Solar Energy Industry Background

Solar energy has been one of the fastest growing renewable energy sources over the last few decades (the solar energy market size grew at a CAGR of 49.0% globally over the past decade, while renewable energy power capacity grew at a CAGR of 8.3%). According to the International Energy Agency (IEA), solar power generation increased by 22% (+131 TWh) in 2019, representing the second largest absolute generation growth of all renewable technologies, second to wind generation. Using solar power instead of fossil fuels allows a reduction in carbon footprint and helps combat climate change, and is a comparatively more efficient power system than producing energy from coal and oil. In 2019, a total of 720TWh was generated.



Source: IEA

Bloomberg New Energy Finance expects solar technology to represent more than 40% of global electricity capacity by 2050, which would be a significant increase from its current penetration of c. 5% of global capacity. Energy markets usually consider three main factors when deciding on power sources: cost of energy, ancillary services, and ability to dispatch power on demand. Given that solar energy satisfies all three of these factors, consensus estimates are for the sector to grow at a CAGR of 20.5% globally through 2019-2026.

Three main technologies have now emerged as the frontrunners in the solar energy field: photovoltaic cells (PV), concentrated solar power (CSP), and solar heating and cooling (SHC), which we will discuss in detail below.

B. A Deep Dive into the Three Key Solar Technologies

Summary:

Currently, while PV is largely used for residential and industrial purposes and is commercially developed, SHC is also widely used but for smaller scale purposes. SHC usage is not reflected in the number of jobs created, due to requiring a lower number of people to operate solar heating and cooling technologies. CSP is currently the least used technology due to the costs and challenges in building the system involved.

When considering the above three technologies, we have observed that the three technologies are suitable for distinct purposes. While concentrated solar power and photovoltaics are most suitable for larger scale projects, solar heating and cooling can best be used for smaller scale applications such as residential homes and small businesses.

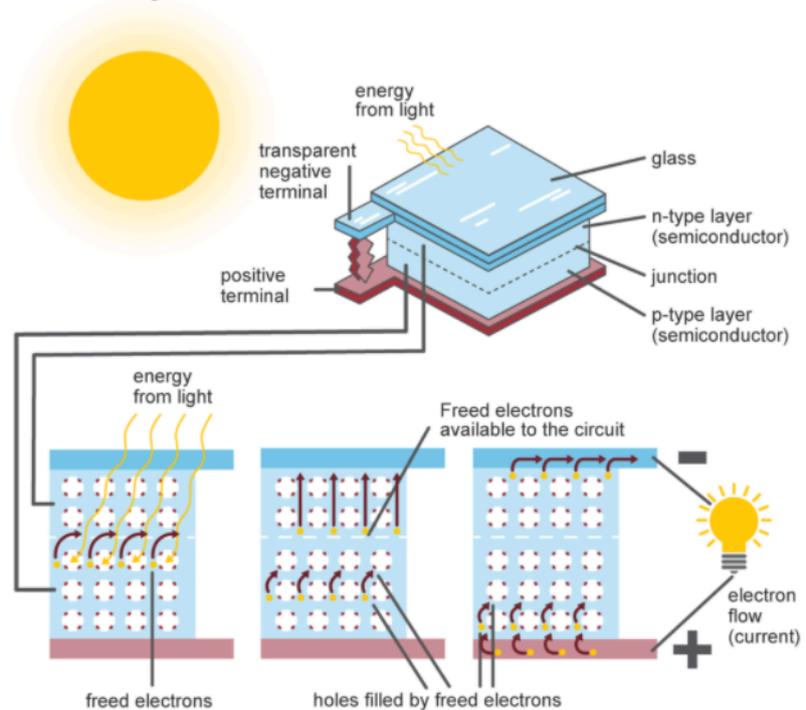
Although plants with thermal storage (such as CSP) have greater operational and capacity value, they are more costly and take a longer time to build, as opposed to photovoltaic systems.

When choosing which of the technologies to use, consideration must be paid to the energy requirement, the cost that investors are willing to incur, and the scale of the project. While this is a general rule for selecting a technology, having looked at the three technologies, we feel that CSP technology is yet to develop completely and appears to have potential for growth in the sector, while PVs will continue to be the mainline technology.

Photovoltaic (PV)

A photovoltaic cell is commonly called a solar cell, and is a nonmechanical device which converts sunlight directly into electricity. Some PV cells also have the ability to convert artificial light into electricity. A PV cell is made of semiconductor material so that once photons (particles of solar energy in sunlight) strike a PV cell, they may pass through the cell, reflect off the cell, or be absorbed by the semiconductor material. The absorbed photons would then release electrons. These free electrons can then be captured to produce an electric current, which can be used to produce electricity.

Inside a photovoltaic cell

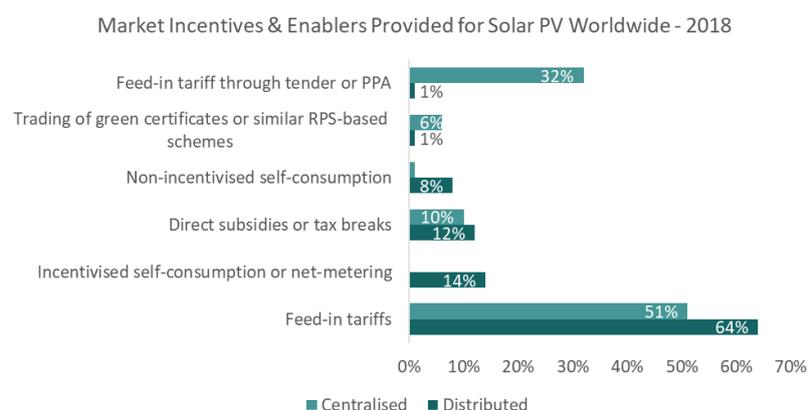


Source: U.S. Energy Information Administration

PV cells were first developed by Bell Telephone researchers in 1954, and were used to power US space satellites beginning in the late 1950s. PV panels were then used to provide electricity in remote or off-grid locations towards the late 1970s, and since 2004, the use of PV cells has greatly expanded owing to technological advances, lower costs for PV systems, and various financial incentives and government policies.

An individual PV cell can only produce 1 or 2 Watts, which allows only sufficient electricity for small tasks such as powering calculators or wristwatches. However, these cells can be electrically connected to generate higher amounts of electricity, wherein they can be used for much larger tasks such as to power communications equipment and to supply electricity for a single home or business. Although the efficiency at which PV cells convert sunlight to electricity varies based on the type of semiconductor material and PV cell technology, the efficiency now approaches c. 20% for state-of-the-art modules. However, nearly 50% efficiency has been achieved for experimental PV cells and PV cells for niche markets such as space satellites.

Solar PV is highly subsidised by governments worldwide, and the chart below shows the types of market incentives and enablers provided for solar PV worldwide in 2018.



Source: Statista

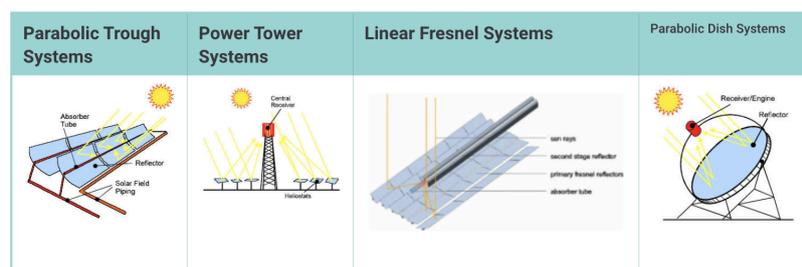
Concentrated Solar Power (CSP)

CSP is based on the principle that a temperature of around 550°C can be generated using a parabolic mirror that concentrates the sun's rays on a single point called the "fire" point. A pipe is run through at the fire point, through which a fluid with the ability to store heat flows, before passing through an exchanger. This fluid can then be used to generate industrial steam or to run a turbine and produce electricity. The CSPs can be used to generate electricity during cloudy periods or for the hours after sunset or before sunrise, hence making it a more flexible source of solar energy. The

CSP plants can use fossil fuel to supplement the solar output during periods of low solar radiation, and can also be integrated into existing thermal-fired power plants.

There are four types of CSP technologies.

- *Parabolic Trough Systems* concentrate the sun's energy using parabolically curved, trough-shaped reflectors onto a receiver pipe (the heat absorber tube which runs along about a meter above the curved surface of the mirrors). Heat energy, which is generated when the temperature of the heat transfer fluid (usually thermal oil) increases, is then used in the thermal power block to generate electricity in a conventional steam generator. As of 2018, 90% of the CPS plants in commercial operation were troughs.
- *Power tower systems* use sun-tracking mirrors (heliostats) to focus sunlight onto a receiver at the top of the tower. Electricity is then generated using a conventional turbine-generator, which is powered by steam generated when the heat transfer fluid in the receiver is heated to c. 600°C. Although the earliest power towers used steam as the heat transfer fluid, companies are now operating with water, molten salts, and other heat transfer materials in order to improve efficiency and reduce costs.
- *Linear Fresnel Systems* use the same principles of the trough system, but consist of a large number of collectors in parallel rows, and mirrors are laid flat on the ground to reflect the sunlight to the pipe above.
- *Parabolic Dish Systems* have mirrors distributed over a parabolic dish surface to concentrate sunlight on a receiver fixed at the focal point.



Source: SolarPACES

Solar Heating and Cooling (SHC)

Systems which change sunshine into usable thermal energy are referred to as solar heating and cooling (SHC) technologies. According to the Solar Energy Industries Association (SEIA), a single-family home with a solar water heating system installed will reduce its CO₂ footprint by an average of 28%. Solar heating and cooling technologies include solar heat collectors, solar air heating, solar cooling, solar water heating, and solar pool heating.

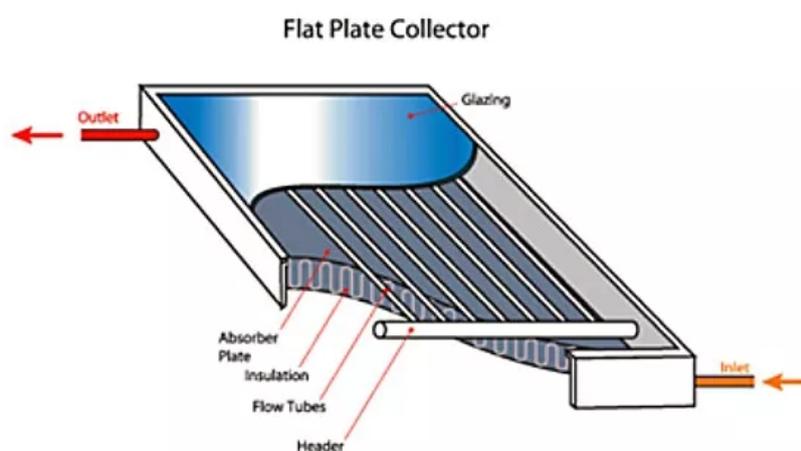
The following are some examples of solar heating and cooling technologies.

- **Solar Heat Collectors**

A solar heat collector requires c. 60sqft of roof space, and the energy needed to heat water for the average American home can be achieved with only one or two solar heat collectors. Types of solar collectors include flat plate, evacuated tube, Integral Collector Storage (ICS), thermosiphon and concentrating collectors, where flat plate collectors are the most common type of collector in the US.

Type of Solar Collector	Description
Flat plate collectors	Have copper plates attached to an absorber plate contained in an insulated box that is covered with a tempered glass or polymer cover plate.
Evacuated tube collectors	Consist of rows of parallel, transparent glass tubes that have been "evacuated" of air, creating a highly efficient heat insulator for the fluid that runs inside the length of the tube. Generally used when higher temperatures or higher volumes of water are needed, as well as for process heating and solar air conditioning systems.
Simple unglazed collectors	Usually used to heat pool water or preheat large volumes of industrial process water in warm climates.
Concentrating collectors	Useful in industrial and manufacturing processes due to their ability to produce heat in excess of 300°F-400°F

Source: Solar Love



Source: Solar Love

- **Solar Air Heating**

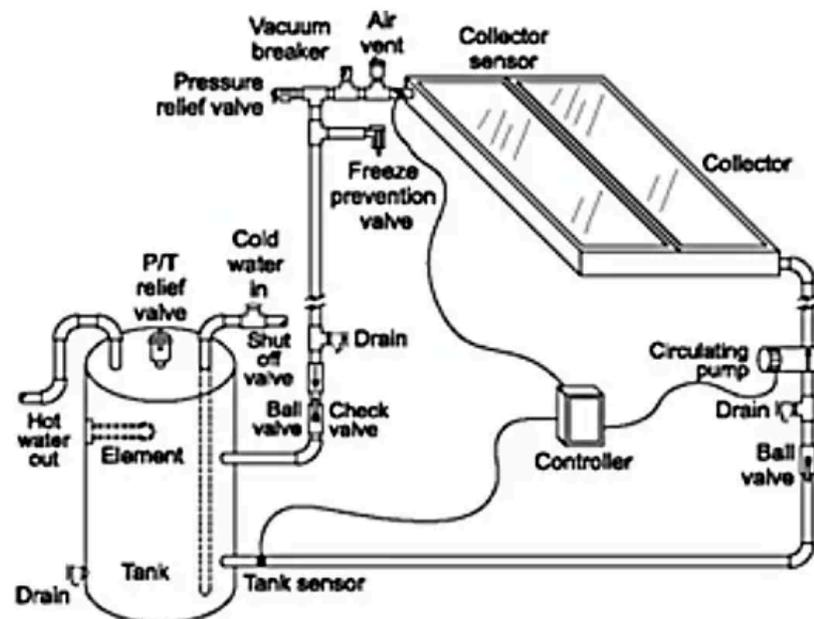
Solar heating systems have been found to produce a number of heat units equivalent to c. 80% of the available solar energy, hitting the surface of the collector where it can produce 45,000-102,000 kWhth (kilowatthours thermal) per square foot of installed collector area per year. These systems usually transfer heat from the solar collector using a non-toxic liquid, water, or air.

- **Solar Cooling**

Absorption chiller systems and desiccant systems are two types of solar cooling systems, with absorption chiller systems being the most common type. Absorption chiller systems generate air-conditioning using solar water heating collectors and a thermal-chemical absorption process. In a desiccant system, the air is cooled by passing it over a common desiccant such as silica gel, which draws out the humidity in the air.

- **Solar Water Heating**

Active solar water heating systems rely on an electric pump to circulate the water while passive solar water heating systems use thermodynamics to move the water. These solar water heaters consist of three main elements: the solar collector, insulated piping and a hot water storage tank, and when solar radiation hits the solar collector, it absorbs the heat and transfers it to potable water in the system.



Source: Solar Love

The Round-Up: The Three Technologies Serve Distinct Purposes

Measure	Photovoltaic	Concentrated Solar Power (CSP)	Solar Heating & Cooling
Technologies	Uses sunlight through the "photovoltaic effect" to generate direct electric current (DC) in a direct electricity production process. This DC then has to be converted to alternative current (AC) with the use of inverters to be distributed on the power network.	Concentrates solar radiation to heat a liquid substance which is then used to drive a heat engine and an electric generator. Generates AC, which can be easily distributed through power networks.	Uses the sun's thermal energy to change the temperature of air and water.
Energy storage and efficiency	Do not produce or store thermal energy as they directly generate electricity which cannot be easily stored especially at large power levels.	Capable of storing energy using Thermal Energy Storage technologies (TES) and using it at times of no or low sunlight, hence increasing the penetration of solar thermal technology in the power generation industry, as it helps overcome problems such as environmental fluctuations.	Has a high level of efficiency, but supplemental energy sources or storage required for long sunless stretches.
Cost	Can be built at a lower cost compared to CSP plants.	Requires higher investment and involves greater risk (challenges with thermal storage, cooling).	Lower cost involved.
Ease in building	Easier to build compared to CSP plants.	Comparatively difficult to build.	Easiest to build and adopt especially on smaller scale.
Direct and Indirect Jobs Worldwide (000 jobs)	3,605	34	801

Source: Helioscsp, triplepundit.com, International Renewable Energy Agency (IRENA)'s 2019 report

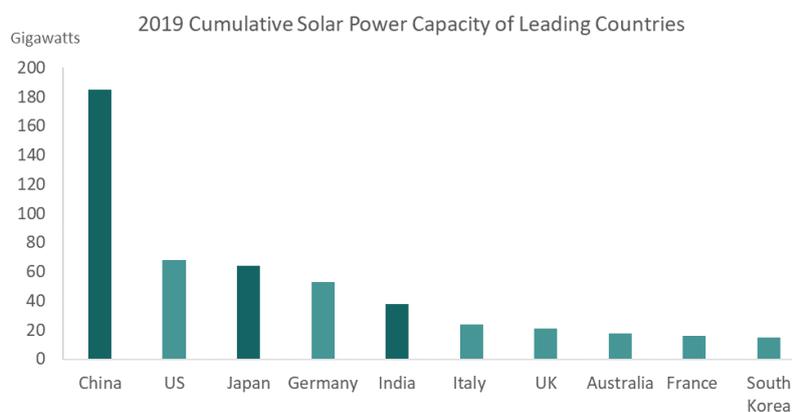
C. A Look at the Leading Asian Countries in the Solar Market: China, Japan and India

Summary:

China leads the solar market globally. India, we believe has high potential for growth. However, uncertainty in government policies and lack of investment has restricted growth thus far. Japan, with its innovation has been continuously developing its renewable energy market, but is yet to make its mark. However, the country's lack of sunlight and mountain terrain makes it difficult to erect large solar plants, when compared to India and China and other emerging markets in Asia.

In terms of technology used, China targets towards 20 CSP plants, we believe that China currently has a larger focus on CSP. In India, we feel that policies and subsidy provisions are provided to develop all three technologies equivalently, and no specific technology is targeted. Japan's proposals for its long-term emission reduction are focused more on the transport sector and zero-emission buildings. Thus, the country is likely to resort to PVs and its R&D in CSP to achieve its aim.

Until recently, the US and Europe led the renewable and solar energy markets. However, this situation has largely changed in the past decade and according to data from Statista and Equal Ocean, in 2019, China was the largest solar market, having a cumulative solar power capacity of 185 GW. This was followed by the US and Japan, while India was fifth in terms of solar power capacity.



Source: EqualOcean

Furthermore, according to a new report by EY, seven Asian countries rank among the world's most attractive markets for renewable energy sources including wind power, hydropower, and solar energy. According to the EY's Renewable Energy Country Attractiveness Index ranking, China has been in the top position for years, although the country was ranked second to the US this year. India holds the seventh place this year, compared to its previous third position, which is now held by France. Japan holds the tenth place, two slots down from its previous eighth place, with Denmark now holding the eighth place. Currently, a large number of new projects and investments are in emerging economies.

The Round-Up

	China	India	Japan
Solar power capacity- 2019 (Gigawatts)	185	38	64
Ranking in EY's Renewable Energy Country Attractiveness Index- 2019	2	7	10
Expected Target	<ul style="list-style-type: none"> Increase share of renewable-based power generation to 28.2% in 2020. 	<ul style="list-style-type: none"> Produce 175GW of renewable energy by 2022 of which 100GW is to be from solar. 	<ul style="list-style-type: none"> Have renewable resources account for 22-24% of national electricity generation by 2030, nuclear power 20-22%, and fossil fuels 56%. Cut its GHG emissions by 26% compared to 2013 levels.
Strategy	Government investment and policy support,	Attract foreign investors to the country.	Policy support
Currently focused technology	CSP	All three technologies.	SHC
Opportunities in the three tech types			
PV	<ul style="list-style-type: none"> Outperformance in the national solar PV target. Increase in China's solar PV share of total electricity generation from grid-connected sources. Emergence of new future growth areas for solar PV where feed-in-tariffs (FiTs) are now offered for PV combined with electrical energy storage in Jiangsu. The creation of 26 power-trading centres specifically for distributed generation is driving demand and the emergence of new business models for solar PV in the country. 	<ul style="list-style-type: none"> An underpenetrated solar market. High growth for rooftop solar installation which are deemed cleaner and cheaper energy solution for customers. World Bank support financially. 	<ul style="list-style-type: none"> Subsidy to promote the development of rooftop solar PV installations. Attempt to lower solar prices could boost demand. Demand from beyond residential use (self-consumption, electric vehicles (EVs) or batteries, retrofitting storage, sale of surplus electricity via one-on-one contracts with utilities or power producers and suppliers (PPSs). Support from Japan Electric Power Exchange (JEPX) to issue tenders for non-fossil-fuel certificates and is also planning to introduce future contracts. For the non-residential sector, the Japanese Ministry of Economy, Trade and Industry (METI) has set a three-year deadline for the completion of projects over 10kW in size.

<p>CSP</p>	<ul style="list-style-type: none"> Various projects to expand capacity are in place. 	<ul style="list-style-type: none"> India was the only other country in Asia to have CSP capacity under construction by the end of 2018. Early hands on technological development and is ranked fourth in terms of number of Solar Heat for Industrial Processes (SHIP) additions in 2019. Subsidy programme for concentrating on solar thermal systems. 	<ul style="list-style-type: none"> Japan has made plans to use CSP plants in the world's sunny regions such as Australia in order to generate fuel which can then be shipped back to the country.
<p>SHC</p>	<ul style="list-style-type: none"> China is one of the key markets for SHC with an installation rate stronger than the US. In 2019, China led the ranking for new installations of glazed and unglazed collectors, accounting for c. 73% of the total. Rural area demand still exists. Positive government's policies. 	<ul style="list-style-type: none"> Government support and subsidies drives popularity of solar water heaters in the country. 	<ul style="list-style-type: none"> Limited growth potential given a currently declining market.
<p>Threats in the three tech types</p>			
<p>PV</p>	<ul style="list-style-type: none"> Policy Uncertainty 	<ul style="list-style-type: none"> Economic slowdown, tariff caps, payment delays and challenges related to land acquisition and access to grid connections led to a slowdown in 2018. Expected slowdown in 2020 as well, though a rebound is expected in 2021 with capacity additions exceeding 2019 levels. 	<ul style="list-style-type: none"> Grid constraints, lack of available land and low-cost financial resources High labour costs and high prices of solar generation, where Japan's prices are some of the world's highest.

CSP	<ul style="list-style-type: none"> Higher price per kilowatt in comparison to photovoltaic power Lack of financing means. The links in the CSP industrial chain remain weak and no on-grid power price of CSP projects has yet been determined, slowing down the progress of CSP. 	<ul style="list-style-type: none"> India lags peers due to low investor confidence, unreliable solar data, low availability of skilled labour, and a high cost for CSP compared to PV. 	<ul style="list-style-type: none"> Country's rocky terrain makes it difficult to erect CSP plants within the country.
SHC	-	-	<ul style="list-style-type: none"> Declining subsidies for solar energy.
Our Thoughts	<p><i>The country has been largely focusing on PVs and is the global leader of the PV market. The country's PV and SHC markets are already well developed, which we believe to be the driver behind recent projects being more CSP-focused (piloted 20 CSP projects to be completed).</i></p>	<p><i>We feel that policies and subsidy provisions are provided to develop all three technologies equivalently and no specific technology is targeted still. Rooftop solar energy solutions is a targeted produced across the three types of technology.</i></p>	<p><i>Japan's proposals for its long-term emission reduction are focused more on the transport sector and zero-emission buildings. Given the decline in subsidies for SHC, while continuously investing R&D for PV and CSP, we believe Japan might be looking to use the latter two technologies to achieve its renewable energy aims.</i></p>

In Detail

China: The Current Leader Globally

From less than 10% solar and wind in the overall power mix in 2018, China's government aims to increase the total share to c. 30% by 2030. The Belt and Road infrastructure initiative provides businesses opportunities to export clean-energy technology and take on large-scale electricity projects in emerging countries, helping to power China's renewables sector. Since 2008, China has been the world's largest manufacturer of solar panel technology, and accounts for the production of over 60% of the world's solar panels, according to IEA.

Strategy to Achieve Renewable Energy Aims

In order to increase the country's share of renewable-based power generation, nine provinces and regions have been ordered to generate more than 15% of power from non-hydro sources, and 10 provinces and regions should generate at least 30% of power from renewable sources.

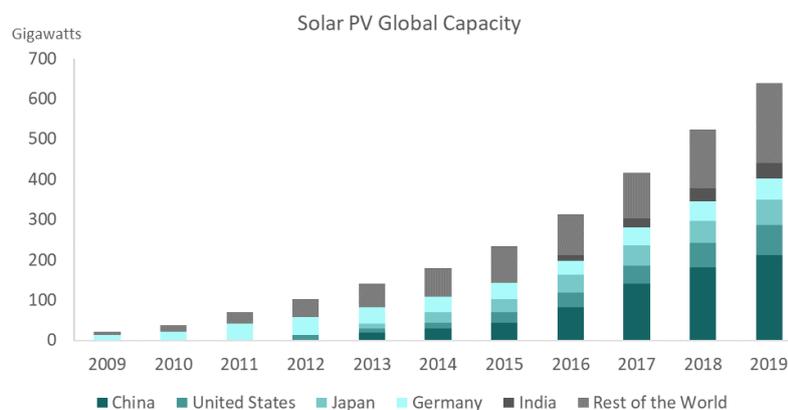
Furthermore, the country has pledged to invest CNY2.5trn in renewable power generation over 2017-2020. Below, we shall discuss whether any of the three technologies are specifically being targeted towards achieving these goals.

Photovoltaic (PV): Dominant Position

China is the single largest market for solar PV and dominates the global solar PV market, and accounted for c. 26% of capacity additions in 2019. The country has the largest solar PV employment in the world, with c. 2,194,000 direct and indirect jobs, and accounts for c. 54% of renewable energy jobs in China.

However, China's annual solar PV market (newly installed capacity) declined by nearly 32% YoY in 2019 despite the country's year-end rally, with more than 12 GW brought online in December. This was largely due to policy uncertainty, as China was restructuring its renewable energy market leading to a decrease in energy feed-in-tariffs (fixed electricity prices which are paid to renewable energy producers for each unit of energy produced and injected into the electricity grid). Another contributing factor to the decline was the continuous addition of coal-fired power capacity.

However, towards the end of 2019, China's cumulative grid-connected capacity was c. 2x the national solar PV target, which was established in 2016, of achieving 105 GW by 2020. However, reduced curtailment and increased capacity led to China's solar PV share of total electricity generation from grid-connected sources increasing to 3% in 2019 compared to 2.6% in 2018.



Source: *ewind*

China has also seen the emergence of new future growth areas for solar PV such as the combination of EVs, residential solar and storage. A recent report from the US-based Institute for Energy Economics and Financial Analysis (IEEFA) argues that batteries and EVs can improve the economics of household solar due to their ability to allow households to use more of the solar power they generate, hence leading to electricity bill savings. China has recognised the effectiveness of these combinations and feed-in-tariffs. (FiTs) are now offered for PV combined with electrical energy storage in Jiangsu. Furthermore, the creation of 26 power-trading centres specifically for distributed generation is driving demand and the emergence of new business models for solar PV in the country.

China's 14th Five-Year Plan (2021-2025) by the National Energy Administration (NEA) outlines the development of wind and solar PV grid-parity projects over the period, and action has been recommended for the country to aim for 300 GW of new solar PV power generation capacity.

Concentrated Solar Power (CSP): Increasing Focus

As of January 2020, China had eight large-scale concentrated solar power projects with total capacity of 500MW in operation across China. Five of the seven projects use the power tower system, two use the parabolic trough system, while the other uses the linear Fresnel system with molten salt as both heat transfer and thermal storage fluid. The power tower system is generally favoured over the trough system due to its higher temperature operation, which allows for greater efficiency.

China Large-scale Commercial CSP Projects					
No.	Project Name	Capacity	Technology	COD	
1	CGN Solar Delingha 50MW Parabolic Trough CSP Project	50MW	Parabolic Trough	Sep.30, 2018	
2	Shouhang Dunhuang 100 MW Molten Salt Tower CSP Project	100MW	MS Tower	Dec.28, 2018	
3	SUPCON Solar Delingha 50MW Molten Salt Tower CSP Project	50MW	MS Tower	Dec.30, 2018	
4	Power China Gonghe 50MW Molten Salt Tower CSP Project	50MW	MS Tower	Sep.19, 2019	
5	Luneng Haixi 50MW Molten Salt Tower CSP Project*	50MW	MS Tower	Sep.19, 2019	
6	CPECC Hami 50MW Molten Salt Tower CSP Project	50MW	MS Tower	Dec.29, 2019	
7	Lanzhou Dacheng Dunhuang 50MW Molten Salt Fresnel Project	50MW	MS Fresnel	Dec.31, 2019	
8	CSNP Royal Tech Urat 100MW Parabolic Trough CSP Project	100MW	Parabolic Trough	Early of 2020	
9	Yumen Xinneng 50MW Molten Salt Tower CSP Project	50MW	Beam-down MS Tower	Mid of 2020	

* All are under China 1st batch of CSP demonstration program except the 4th Luneng Haixi project.
* List created by CSP Focus in November 2019 (More CSP updates please visit <http://cspfocus.cn/en>).

Source: CSP Focus

In September 2016, the National Energy Administration issued the first batch of CSP pilot project allocations. The CSNP Royal Tech Urat 100MW Parabolic Trough CSP Project was one of the first batches of 20 pilot CSP projects, and is the country's largest parabolic trough CSP plant. The plant is expected to generate c. 350GWh of electricity annually. The status of the pilot projects as of January 2020 is as follows.

Situation	No.	Project Name	Status (as of Jan 2020)	COD (Expected)
6 completed	1	CGN Solar Delingha 50MW PT Project	In operation	30-Sep-2018
	2	Beijing Shouhang IHW Dunhuang100 MW MS Tower Project	In operation	28-Dec-2018
	3	Qinghai SUPCON Solar Delingha50MW MS Tower Project	In operation	30-Dec-2018
	4	Power China Gonghe 50MW MS Tower Project	In operation	19-Sep-2019
	5	CPECC Hami 50MW MS Tower Project	In operation	29-Dec-2019
	6	Dacheng Dunhuang 50MW Molten Salt Fresnel Project	In operation	31-Dec-2019
4 Under construction	7	CSNP Royal Tech Urat 100MW Parabolic Trough CSP Project	Under construction	Early of 2020
	8	Yumen Xinneng 50MW MS Tower Project	Under construction	Mid of 2020
	9	Royal Tech Yumendongzhen 50MW PT Project	Under construction	2020
	10	Shenzhen Jinfan Akesai 50MW molten salt PT Project	Construction pending	TBA
6 pending with little progress	11	Huaqiang Zhaoyang Zhangjiakou DSG 50MW CLFR Project	Pending	TBA
	12	Rayspower Yumen 50MW PT Project	Pending	TBA
	13	Dahua Shangyi 50MW MS Tower Project	Pending	TBA
	14	Zhongyang Zhangjiakou Chabei 64MW PT Project	Pending	TBA
	15	China Three Gorges New Energy Jinta 100MW MS Tower Project	Pending	TBA
	16	CECIC Gansu Wuwei Solar Power Gulang 100MW PT Project	Pending	TBA
4 canceled	17	Huanghe Hydropower Development 135MW MS Tower Project	Canceled	NA
	18	Guohua Yumen 100MW MS Tower Project	Taken over	NA
	19	Northern United Power Urat 50MW CLFR Project	Canceled	NA
	20	CITIC Zhangbei DSG 50MW CLFR Project	Canceled	NA

Source: CSP Focus

In May 2020, the Supcon Solar Delingha 50MW Molten Salt Tower reported that it had exceeded six-month output targets and recorded average output fulfilment rates above 100% since January 2020. The plant has come up with innovative measures, combining equipment learnings with AI technology to reduce weather risks and improve performance. Furthermore, the Dunhuang Dacheng 50MW Molten Salt Linear Fresnel Project is the first molten salt thermal power generation project in the world, which uses molten salt as the heat transfer fluid and thermal storage medium.

However, China's CSP market faces a few key development problems. The higher price per kilowatt in comparison to photovoltaic power generation restricts the development of China's CSP industry and China's CSP projects lack financing means. The links in the CPS industrial chain remain weak and no on-grid power price of CSP projects has yet been determined, slowing down the progress of CSP.

Solar Heating and Cooling (SHC): Policy to Support Strong Growth Rates

China is one of the key markets for SHC and towards 2013, the country was installing SHC systems at a rate of c. 10x that of the US. In that year, c. 50-60m households in the country used solar water heating. According to IRENA, China employs 670,000 people (16% of renewable energy jobs in China) in solar heating and cooling. Towards the end of December 2017, there was 35.4m sqm of solar thermal products installed in China. In 2019, China led the ranking for new installations of glazed and unglazed collectors, accounting for c. 73% of the total.



Source: IEA-SHC; *Solar Heat Worldwide 2019*

Given that solar water heaters can save the conventional fuel fee in rural areas without natural gas and centralised heating systems, the convenience and cost of solar water heaters acts as the main market driver. Furthermore, the Chinese government's policies towards increasing the proportion of renewable energy has led to the promotion of solar heating and cooling in urban markets. China also contains solar energy buildings known as the "passive house" which contain large southern windows and the possibility for attached sunspace.

BY INDUSTRY, 2017-18

Thousand jobs

	World	China
Solar Photovoltaic 	3 605 ^e	2 194
Liquid biofuels 	2 063	51
Hydropower ^c 	2 054	308
Wind power 	1 160	510
Solar heating/cooling 	801	670

 Internat

India: Needs Continuous Support from the Government

In May 2019, India was named the lowest cost producer of solar power globally. The country has traditionally relied on coal-fired power plants, which generated 72% of the country's electricity in 2018-19. According to the PV magazine India, the country's total solar energy potential is estimated at c. 750 GW. The country has a target of achieving 100GW of solar power by 2022, but had only installed a total of 36.6GW at the end of 1Q2020. India prioritises the expansion of solar over other renewable technologies, and the government has launched a reverse auction system for solar capacity, increased the availability of funding to the renewables sector, and allocated concentrated zones of development for solar power facilities, hence driving down the implementation time and cost of projects. India has the fourth-largest number of renewable energy jobs globally, and employed 719,000 people directly and indirectly in the sector. According to the United Nations Sustainable Development Goals partnerships platform, India plans to produce 175GW of renewable energy by 2022, of which 100GW is to be solar.

Strategy to Achieve Renewable Energy Aims

A key part of India's strategy in achieving its renewable energy aims was to attract investors to the country, for which it had taken numerous measures including the following:

- The introduction of the Power Purchase Obligation (PPO) under which state power-distribution companies and certain other private firms are required to procure part of their power requirement from renewable sources.
- A revision of the tariff policy, which includes penalties for unscheduled power cuts and removing custom barriers to provide incentives to solar and wind energy manufacturing equipment.
- Awarding power purchase agreements using reverse bidding. Also known as a reverse auction, this allows sellers who meet certain minimum criteria to submit non-negotiable price bids. The buyer then selects winning sellers based on the lowest priced bids first and signs non-negotiable standard contracts with the winning sellers. In renewable energy projects, an auction is held where developers of system-side renewable distributed generation projects bid the lowest prices which they would be willing to accept to develop renewable energy projects.
- Providing many direct and indirect subsidies. In FY19, the major subsidies provided for solar were:
 - Support for solar parks and large solar power: INR2,778 crore
 - Solar rooftop and other applications: INR1,667 crore

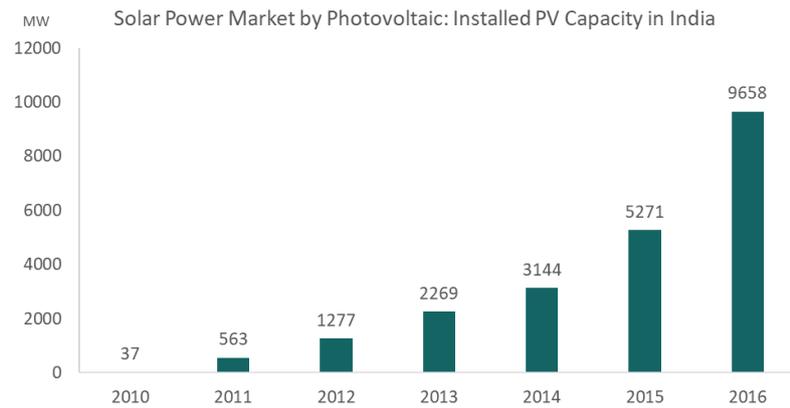
- Viability Gap Funding Scheme under the Jawaharlal Nehru National Solar Mission (JNNSM) Phase II: INR1,335 crore. The JNNSM, launched by the Indian Prime Minister in January 2010, aims to install 20,000 of grid-connected solar power by 2022.
- Accelerated depreciation for wind and solar: INR 2,778 crore. This is a tax benefit which allows companies to write off c. 80% of invested capital in the first year.

The government, in September 2019, also reduced the general corporate tax from 30% to 22% for Indian companies, adjusting the rate to those applicable in other South Asian countries, making the country more welcoming for investors.

However, India's installed capacity for all energy sources towards the end of January 2020 was c. 369GW, of which renewables accounted for c. 86.3GW. Although India's solar capacity has increased from less than 1GW in 2010 to c. 36.6GW^[FS5] ^[GB6] of solar power currently, we believe it would be difficult for India to meet its 2022 target. According to Buckley, a director of Energy Finance Studies for South Asia at IEEFA, the country also struggles with state-centre conflicts and national policy objective contraventions, which makes it more difficult for it to achieve these goals. An example which was cited was India's goal to "accelerate low cost renewable energy installations", "whilst at the same time raising costs by the imposition of import duties in order to underpin the 'Make in India' manufacturing strategy."

Photovoltaic (PV): Untapped Market Opportunity

Over 200m people in India do not have access to electricity and the installation of solar PV units on rooftops is expected to be a cleaner and cheaper energy solution for customers. Rooftop solar has been the fastest growing renewable energy sub-sector in India, with a CAGR of c. 116% over 2012-2018. To achieve the 100GW target of the Indian government, the World Bank provided US\$625m in financial support for a grid connected rooftop solar project, and the project is expected to finance the installations of at least 400 MW of grid connected solar photovoltaic units across India. India's rooftop solar PV costs are among the lowest in the world.



Source: Mordor Intelligence

Following these trends, India's solar PV sector became its second-largest renewable energy employer, where it supported c. 115,000 direct and indirect jobs. However, the country's installations declined in 2019 compared to 2018 due to economic slowdown, tariff caps, payment delays and challenges related to land acquisition and access to grid connections.

According to a report by the International Energy Agency, India's solar PV deployment is set to decrease by 23% in 2020 compared to 2019, but a rebound is expected in 2021 with capacity additions exceeding 2019 levels.

Concentrated Solar Power (CSP): Cost Factor and Low Investor Confidence Limits Growth

India was the only other country in Asia to have CSP capacity under construction by the end of 2018. The 25 MW Gujarat Solar One facility (9 hours TES) was expected to enter operation in late 2019, and the 14 MW Dadri Integrated Solar Combined-Cycle plant was also under construction. The total installed CSP capacity in India is c. 228.5 MW with a majority of upcoming CSP plants in India being PTC based and being expected to add 275 MW of capacity.

Table 1. Location, technology type, capacity and current status of various CSP plants in India¹²

Project	Technology type	Capacity (MW)	Current status
Dhursar	Fresnel reflector	125	Operational
Godawari Solar Project	Parabolic trough	50	Operational
Megha Solar Plant	Parabolic trough	50	Operational
ACME Solar Tower	Solar tower	2.5	Operational
National Solar Thermal Power Facility	Parabolic trough	1	Operational
Diwakar	Parabolic trough	100	Under construction
KVK Energy Solar Project	Parabolic trough	100	Under construction
Abhijeet Solar Project	Parabolic trough	50	Under construction
Gujarat Solar One	Parabolic trough	25	Under construction
Dadri ISCC Plant	Fresnel reflector	14	Under Construction
Rajasthan Solar One	Parabolic trough	10	Under construction

Source: Currentscience

Furthermore, in May 2020, researchers at the Indian Institute of Technology-Madras (IIT-M) developed a low-cost Solar PTC system for concentrating solar energy in areas such as desalination, space heating, and space cooling. India also ranked fourth in terms of number of Solar Heat for Industrial Processes (SHIP) additions in 2019.

	No. of systems put up in 2018	Collector area added in 2018 [m ²]	No. of systems put up in 2019	Collector area added in 2019 [m ²]	Average system size in both years [m ² per system]
China	15	28,813	26	76,182	2,561
Mexico	51	6,898	26	4,040	142
Germany	9	1,589	11	1,470	153
India	5	2,264	7	3,152	451
Spain	3	1,218	3	386	267

Source: *Solar Payback*

India had an investment subsidy programme for concentrating solar thermal systems until March 2020. In 2018 and 2019, the subsidy amount remained at 30% of the benchmark or actual investment cost, whichever is lower.

However, India lags behind other global leaders such as Spain and the United States. Challenges which slow down the growth of CSP in India include low investor confidence, unreliable solar data, low availability of skilled labour, and a high cost compared to PV.

Solar Heating and Cooling (SHC): Government Policy Drive Popularity

Due to government support and subsidies, solar water heaters are now becoming quite popular and are affordable. A 100-litre per day water heater can save yearly electricity units in various parts of the country as follows.

	Northern Region	Eastern Region	Southern Region	Western Region
Expected no. of days of use of hot water per year	200 Days	200 Days	300 Days	250 Days
Expected yearly electricity saving on full use of solar hot water (units of electricity)	1000	1000	1500	1250

Source: *Bijli Bachao!*

A subsidy is provided for the installation of a solar water heater, and the amount and procedure of subsidy varies from state to state. Where some states provide a subsidy of 30% up to 200 LPD (litres per day) capacity, others provide a Rs.100/ month subsidy in the energy bill.

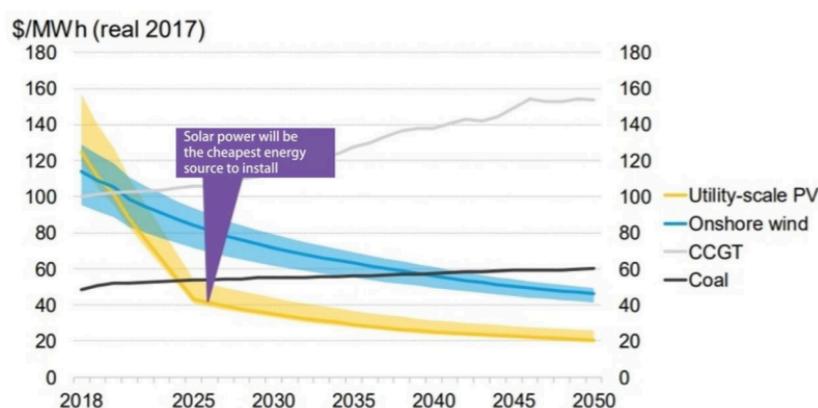
Japan: Government Yet to Completely Support Sector's Growth

Japan started embracing new power generation technologies particularly after the earthquake and nuclear disaster in Fukushima in 2011, where the shutdown of the country's nuclear fleet resulted in higher electricity prices. In 2019, renewables accounted for c. 19% of Japan's power generation, which included c. 8% wind and solar. The annual increase in figures for renewable energy has reached almost double-digit units until 2017, after which a more stable growth rate was witnessed. Japan announced in 2019 that its original FITs initiated in 2009 would be coming to an end, and the country plans to reduce its greenhouse emissions by 26% compared to 2013 levels, whilst doubling its renewable energy production by 2030.

The Japanese government aims to have renewable resources account for 22-24% of national electricity generation by 2030, nuclear power 20-22%, and fossil fuels 56%.

Strategy to Achieve Renewable Energy Aims

In 2017, Japan introduced new legislation aimed at increasing the country's percentage of renewable resources. Furthermore, analysts at energy consultancy Wood Mackenzie have stated that they estimate over US\$100bn of solar and wind power investments in Japan between 2020 and 2030, alongside a decline of c. 30% in wind and solar generation costs.



Source: Long Term Emission Reduction Proposal

Japan's proposals for its long-term emission reduction are focused more on the transport sector and zero-emission buildings. Japan is also one of the first countries to announce a hydrogen strategy and is currently the sixth largest hydrogen market. Hence, the country would also focus on hydrogen alongside solar and wind to achieve its renewable energy goals.

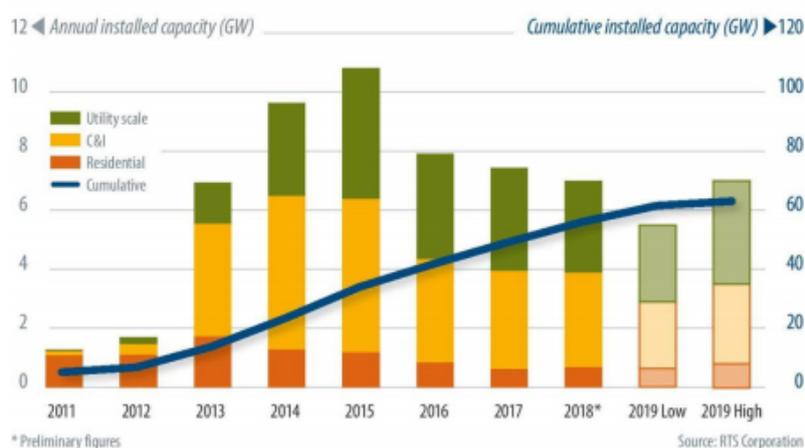
Photovoltaic (PV): Government Policies Uplift Growth

Following the Great East Japan Earthquake of 2011, Japan initially introduced a high FiT of ¥40/kWh in 2013, to kick-start the solar PV market. Solar PV Generation is now becoming competitive with grid electricity in 2019, solar PV accounted for c. 7.4% of Japan's total electricity generation compared to 6.5% in 2018.

Japan has set a solar installation target of 64GW by 2030, and despite the country's progressive decline in PV installation, since peaking in 2015, consensus believes that the country would be able to achieve its target in 2020, 10 years ahead of schedule.

The following measures are expected to drive solar rooftop installation in Japan over the next few years. Residential consumers are now looking at options beyond self-consumption, in combination with electric vehicles (EVs) or batteries, retrofitting storage, sale of surplus electricity via one-on-one contracts with utilities or power producers and suppliers (PPSs), and a newly formed power distribution business under Japan's electricity market reform. Additionally, in 2018, the Japan Electric Power Exchange (JEPX) issued tenders for non-fossil-fuel certificates, and is also planning to introduce futures contracts. For the non-residential sector, the Japanese Ministry of Economy, Trade and Industry (METI) has set a three-year deadline for the completion of projects over 10kW in size which had signed contracts with a utility (an organisation supplying the community with electricity, gas, water or sewerage) after 1st August 2016.

Annual installed PV capacity in Japan 2011–2019

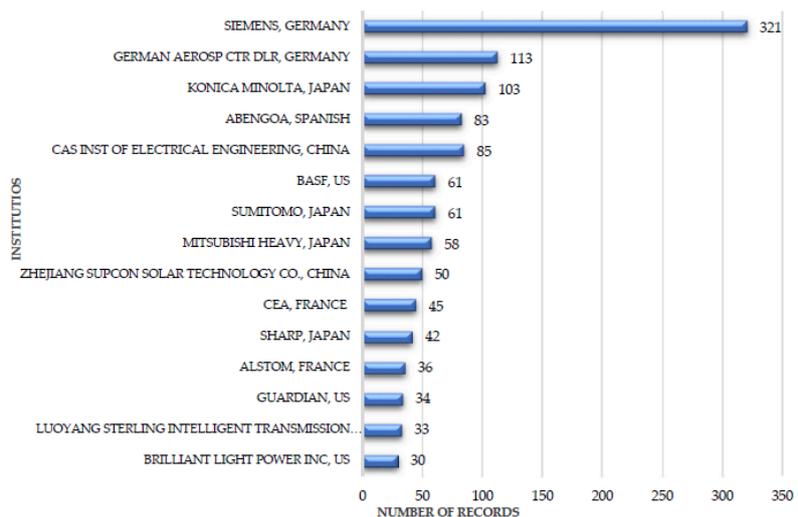


Source: PV Magazine

However, Japan's PV market continues to suffer from grid constraints, lack of available land, high labour costs and high prices of solar generation, where Japan's prices are some of the world's highest. In 2017, a tender program was introduced to reduce the high solar power price in Japan. Furthermore, with the spread of the adoption of renewables, problems have emerged with the FiT. These include increasing surcharges on the renewables and difficulties with receiving power generated by renewables on the grid side. The METI reduced the FiT by 22% YoY in 2019 for installations between 10kW and 500kW and a decision has been made to overhaul the FiT by the end of FY2020 to allow renewables to become an economically self-sustaining core element of the power generation mix. Japan hopes to integrate large solar power generation and wind power generation to the electric power market through making them more competitive sources.

Concentrated Solar Power (CSP): Continuous R&D in Attempt to Broadly Commercialises the Technology

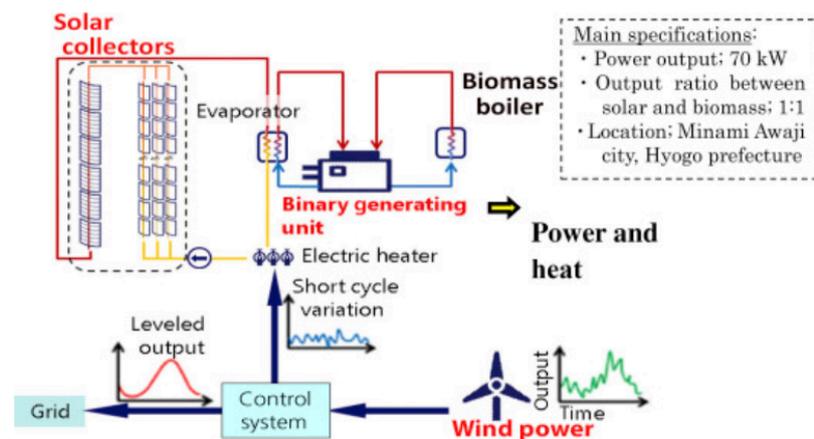
Japan began to research CSP in the 1970s, and Japanese companies have long since claimed many patents in the field of CSP. However, the country's poor Direct Normal Radiance (amount of solar radiation received per unit by a surface that is always held perpendicular to the rays that come in a straight line from the direction of the sun at its current position in the sky) and little space makes it difficult to erect CSP plants within the country, but Japan has made plans to use CSP plants in the world's sunny regions such as Australia in order to generate energy [FS7] [GB8] which can then be shipped back to the country.



Source: MDPI; showing main CSP patent applicants

The Japanese company Chiyoda Corporation is among the key players in the global- concentrating solar power market, and the company is promoting a new Molten Salt Parabolic Trough CSP (MSPT-CSP) technology, which currently has a demo plant in Italy which was built in 2013. The MSPT-CSP technology has the ability to operate at temperatures of up to 550°C by changing only the heat transfer fluid from hot-oil to molten salt.

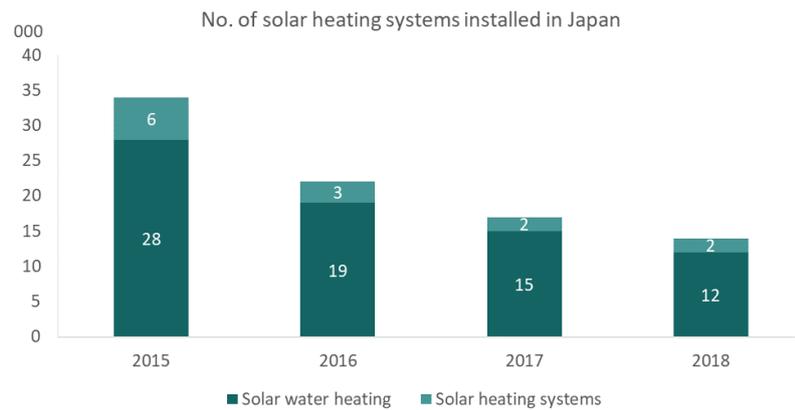
In August 2014, a pilot CSP plant based on parabolic trough solar collectors, binary power generation unit and biomass boilers started its operations in August 2014. The main specifications of the plant included a power output of 70kW and an output ratio of 1:1 between solar and biomass.



Source: Sciencedirect

Solar Heating and Cooling (SHC): Currently Declining on the Back of Reduced Subsidies

Towards the end of 2011, Japan was among the 12 countries in the world with significant capacity of solar water heating systems in operation. Under Japan's "Sunshine Project", solar heating and cooling technology and solar thermal power generation have been promoted since 1974. However, the number of solar heating systems installed in Japan has decreased over 2015-2018, alongside declining subsidies for solar energy.



Source: Statista

D. Value Chain Analysis

Summary:

Of the three technologies we have discussed above, the most elaborate value chain is that of solar photovoltaic (PV) cells. Hence, we will discuss the stages of the PV value chain below. We will also discuss the significant market conditions affecting the overall PV industry along with key players at each stage of the value chain (where such information is available).

Our key points are:

- Of the different types of solar PV cells, only wafer-based crystalline PV cells and thin film cells have been commercialised on a large scale.*
- The solar PV value chain involves silicon purification, which are converted into ingots, and are then cut into wafers. The solar cells are then produced, assembled into a solar panel and installed.*
- Silicon purification, ingots and wafer manufacturing form the upstream, while cell production, module assembly for solar panels are the mid-stream in the value chain. Installation and electricity generation form the downstream.*
- Downstream players enjoy a relatively high margin.*
- Chinese players dominate the solar market at each stage of the value chain.*

Types of Solar PV Cells

We mentioned earlier that PV cells were first developed by Bell Telephone Researchers in 1954. After many years of development, the currently existing PV cell types can be categorised into four main types.

- *Wafer-based crystalline PV cells*, which are produced using solar wafers with a thickness of 160-190µm (micrometers), are further divided into monocrystalline PV cells (PV cells produced using a single crystal growth method) and multi-crystalline PV cells (a cast solidification process which produces multiple, smaller crystals).
- *Thin film cells* are produced by depositing very thin layers of semi-conductive PV material onto cheaper backing materials such as glass, plastic, or stainless steel.
- *High efficiency cells* are made of gallium arsenide and were first developed for space applications. The efficiency of the cells is increased using either one PV cell (single p-n junction) or two types of PV cells (multi-junction) to capture a greater range of wavelengths of light.
- PV cells (made of organic materials).

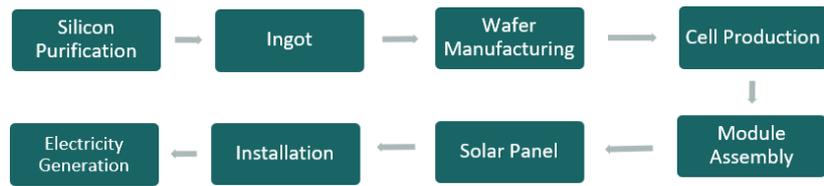
Of the above four types, only wafer-based crystalline PV cells and thin film cells have been commercialised on a large scale. To provide an overview of the general uses of PV cells, below are some categories of PV market types alongside possible applications.

Categories	Applications	Grid-connected		Size of PV system	
		Grid-connected	Off-grid	Utility	Distributed
Grid-connected, utility-scale generation	Power generators, industrial users	X		X	
Grid-connected, distributed energy	Residential & commercial buildings	X			X
Off-grid, utility-scale generation	Industrial users; remote communities		X		X
Off-grid, distributed energy	Residential & commercial buildings, including with remote communities; remote, niche applications (ranging from small calculators, to offshore oil rigs, to space applications)		X		X

Source: World Intellectual Property Organisation: *Economic Research Working Paper No. 40*

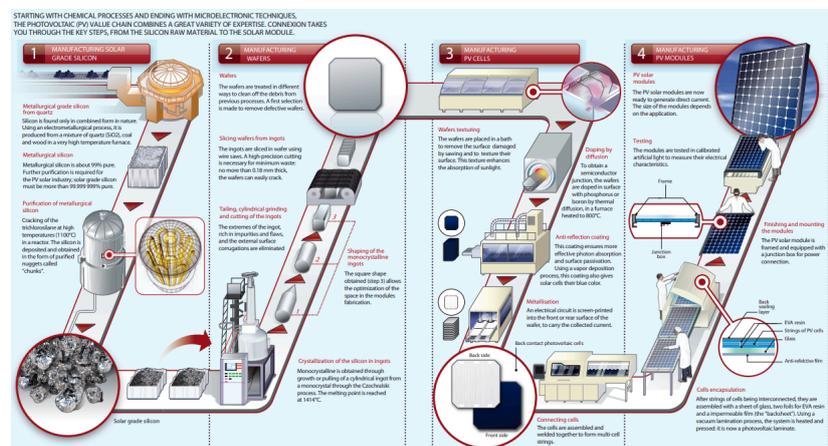
The Solar PV Value Chain

The solar PV value chain involves many chemical processes and microelectronic techniques. Starting off with purifying the silicon found in quartz (a hard, crystalline mineral composed of silicon and oxygen atoms), the value chain ends once the solar PV cells have been installed and electricity is generated using it.



Source: World Intellectual Property Organisation: Economic Research Working Paper No. 40

The following image provides a basic overview of the PV solar value chain. Although the writing is illegible, we will discuss each of the stages in detail below; the diagram has only been included to provide a clear picture on how the entire value chain functions.



Source: Total Solar Expert

Stage 1: Silicon Purification

Polysilicon wafers are a major PV cost component and account for c. 40-50% of the finished module's cost. Producing solar-grade polysilicon is complex and capital-intensive, as the minimum purity required is 99.999999% and using lower quality polysilicon can decrease PV efficiency. Any cost savings which can be gained from using polysilicon of a lower quality can be offset by even a small decrease in PV efficiency resulting from using lower quality polysilicon.

Silica found in quartz sand needs to be purified alongside a mixture of coal and wood in a high temperature furnace to create metallurgical grade silicon, which is c. 99% pure (trichlorosilane). However, further purification is needed for the solar PV industry, which is done by cracking the trichlorosilane at high temperatures in a reactor to form purified nuggets called "chunks" that are called polysilicon.

Polysilicon is also used for the semiconductor industry, but is highly demanded for crystalline PV, and in 2016, the PV industry accounted for c. 90% of the polysilicon demand. Large investments in the expansion of solar capacity have led to unprecedented growth in the polysilicon market.

Stage 2: Conversion of Ingots to Wafers

An ingot is a cylinder or brick of silicon which is grown from pure silicon and can be in the form of a single crystal (monocrystalline silicon/ monosilicon) or multiple silicon crystals, which are smaller. The following steps are then undergone to convert the ingot into a wafer.

- *Crystallisation of the silicon in ingots:* Monocrystalline is obtained through growth or pulling of a cylindrical ingot from a monocrystal through the Czochralski process, and the melting point is reached at 1414°C.
- *Tailing, cylindrical grinding and cutting of the ingots:* the extremes of the ingot and external surface corrugations are eliminated.
- *Shaping of the monocrystalline ingots:* the ingot is shaped into a square, which allows optimisation of the space when creating the module.

Stage 3: Wafer Manufacturing

A wafer is a thin slice of semiconductor such as crystalline silicon which is used to fabricate integrated circuits and manufacture solar PV cells and accounts for up to 40-50% of crystalline module cost.

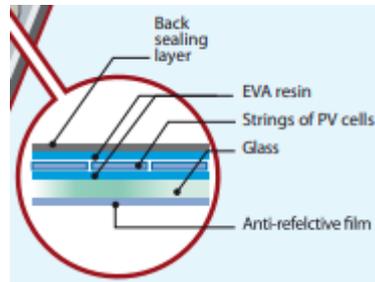
The ingots are sliced into wafers using wire saws using high precision cutting, given that the wafers are no more than 0.18mm thick and can crack easily. The wafers are then treated in different ways to clean the debris from previous processes, and a first selection is made to remove defective wafers.

Stage 4: Cell Production

- *Wafers texturing:* the wafers are placed in a bath to remove the surface damaged by sawing and to texture the surface, which enhances the absorption of sunlight.
- *Doping by diffusion:* in order to obtain semiconductor diffusion, in a furnace heated to 800°C, the wafers are doped in surface with phosphorous or boron by thermal diffusion.
- *Anti-reflection coating* ensures more effective photon absorption and surface passivation. Cells are also given their blue colour at this stage using a vapor deposition process.
- *Metallisation:* an electric circuit is screen-printed onto the front or rear surface of the wafer to carry the collected current.
- *Connecting cells:* the cells are assembled and welded together to form multi-cell strings.

Stage 5: Module Assembly

- *Cell encapsulation:* The cells are interconnected with a sheet of glass, two foils for EVA resin and an impermeable film. The module is then cooked in a laminating machine.



Source: Total Solar Expert

- *Finishing and mounting the modules:* the PV solar module is framed and equipped with a junction box for power connection.
- *Testing:* Modules are tested in calibrated artificial light to measure their electrical characteristics.

Stage 5: Formation of Solar Panel Systems

To deliver electricity to the loads (electricity consumption devices or to the electricity grid), the modules are combined with complementary equipment (such as batteries or inverters).

Stage 6: Installation

This final stage of the overall manufacturing process contains two aspects:

- A mechanical integration of the solar module into its chosen array structure and
- The electrical integration of the solar module with the rest of the system, matching the equipment to the electrical load required by the customer.

Segregation of the Solar PV Manufacturing Process: Significant Disparities Between Upstream and Downstream

The above processes have been segregated into upstream, midstream and downstream as follows.

Upstream	Silicon purification
	Ingot & wafer manufacturing
Midstream	Cell production
	Module assembly
	Systems
Downstream	Installation
	Electricity generation

Source: World Intellectual Property Organisation: Economic Research Working Paper No. 40

Although the solar industry was initially upstream focused, solar PV manufacturers have increasingly started to move to the downstream parts of the value chain, with the reduction of the cost of solar panels, which pushed manufacturing costs towards near equivalence with installation costs. This shift to the downstream parts of the value chain has been noticeable since the financial crisis of 2008/2009, where there was cancellation of orders, owing to the inability of solar PV project developers to obtain financing from banks.

Higher Margins for Downstream Companies?

Solar manufacturing is generally considered a low-margin business. Upstream companies are usually chosen by customers on the basis of brand and involve a higher running cost, thereby limiting the margins. Downstream product services, in contrast, allow manufacturers to retain higher margins. A recent trend that can be observed is that PV manufacturers across the value chain, especially those players in the mid-stream are increasingly involving themselves with downstream services. Having said that, we also note that, there are significant barriers of entry to the downstream market, due to requirements such as financing and other permits, inspections, suppliers of inverters, and parts and crew labour.

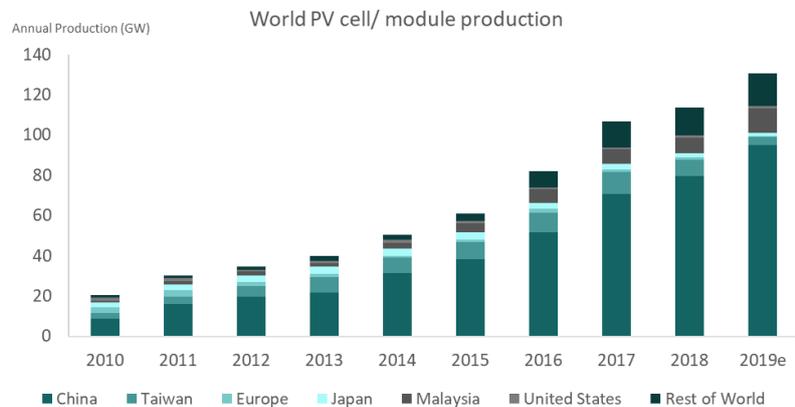
We have compared the margins of Vivint Solar, a company specifically catering to the downstream of the solar PV value chain, with those of two upstream and midstream companies, JA Solar and JinkoSolar. Although Vivint Solar made losses over 2013-2016, over the last few quarters, despite the large fluctuations, Vivint Solar's margins have remained higher than those of the other two companies.



Source: CapIQ

China’s Dominance of the Solar PV Value Chain

The reported production of solar cells globally ranged between 110-120GW in 2018 and is estimated to be between 120-140GW in 2019. Since 2000, the production of solar PV devices has grown at a CAGR of c. 40%, driven by a rapid increase in annual production in China and Taiwan in 2006 and a trend towards increasing production capacities in Asian countries including India, Malaysia, Thailand and Vietnam since 2014.



Source: European Commission PV Status Report 2019

Although, initially most of the demand and supply was located in developed economies, particularly the U.S., Japan and Germany, by c. 2010, China was dominating the global solar PV value chain, driven mainly by subsidies and incentives provided by the Chinese government.

However, though China has the competitive advantage on scale, America has the advantage in innovation. With China lowering corporate taxes, providing tax breaks and incentives, and streamlining approval processes, local solar

manufacturing was encouraged. However, downside risks also exist from badly targeted government incentives. Although sector-specific policy incentives can be beneficial, the Chinese government's encouragement has led to overcapacity and global spill over effects. As was evident during the financial crisis, the access to large amounts of credit against small differences in interest rates allows companies to grow and scale production when their competitors are unable to do so.

Key PV Manufacturers in China

Since China accounts for the largest proportion of solar PV production, we will be discussing the top component manufacturers / wholesalers in China.

Company	Description	Website
DMEGC Solar	Specialises in developing, manufacturing and marketing both monocrystalline and polycrystalline silicon wafers, cells, and modules. As of August 2019, the company had an annual production capacity of 6,000 MTA (polysilicon), 500 MW+ (wafer), 1.6 GW (solar cell), and 900 MW+ (modules).	http://www.dmegcsolar.com/
JA Solar Holdings	A manufacturer of high-performance photovoltaic products, such as silicon, batteries, components, and photovoltaic power plants.	http://www.jasolar.com/
Daquan Group	Provides polysilicon, silicon wafers, solar cells, and other solar components alongside other products catering to the electrical and rail transportation fields.	http://www.daqo.com/
Dongfang Electric Emei Semiconductor Materials	Provides semiconductor materials for many industrial sectors and research fields including electronic information, energy, transportation, machinery, and electricity.	http://www.emb739.com/
Jinko Solar	One of the largest and most innovative solar module manufacturers both in China and all over the world. As of March 2019, Jinko Solar has an integrated annual capacity of 10.5 GW for silicon wafers, 7 GW for solar cells, and 11 GW for solar modules.	https://www.jinkosolar.com/
Tangshan Haitai New Energy Technology	A manufacturing company that has been in the industry of photovoltaic technology for more than ten years now.	http://www.htsolargroup.com/index.html
Shanxi Lu'an Photovoltaics Technology	Produces silicon wafers, cells, modules and PV power plants and as of May 2020, the company had an integrated PV production capacity of 7.5GW. This was categorized as 5GW for high-efficiency PERC cell production, 1GW double-glass bifacial half-cell module production, 500MW dense grid conventional module production, 500MW chip production and 500MW crystal ingot production capacity. [MJ1] [GB2]	http://www.luansolar.com/
Luoyang SingleCrystal SiliconGroup	A high-tech enterprise that aims to provide silicon materials for scientific research, the information industry, and the new energy industry. As of August 2019, the company could produce 1.12m 5-inch circuit-grade silicon polishing wafers and 3.6m 6-inch circuit-grade silicon polishing wafers. Additionally, it can develop and produce 50,000 8-inch silicon polishing wafers per month.	http://www.ly-si.com/
Zhejiang Sunflower Light Energy Science and Technology	Mainly engages in R&D, production, and sales of solar energy batteries and components and has a complete industrial chain of the production of polycrystalline silicon wafers, solar energy batteries, and components, as well as the investment and construction of photovoltaic stations.	http://www.sunowe.com/en
Jiangsu Huantai Group	Engaged in the manufacturing of solar photovoltaic wafers and has two manufacturing bases and six-core companies. As of right now, its wafer manufacturing scale is 10 GW: 6 GW for single crystal, 3 GW for polycrystalline, and 1 GW for cast single crystal.	http://www.ht-stech.com/

Source: *Solar Feeds*

However, global leading manufacturers differ slightly, as just six of the 10 companies in the top 10 PV manufacturers listed by shipments (2019) are Chinese. As of 2019, Tongwei (China), LONGi (China), Jinko (China), Canadian Solar (Canada), and Aiko Solar (China) are the top 5 leading players in the market.

Over 2010-2019, shipments from the top 10 PV manufacturers grew from 11GW to 78GW—a CAGR of 24.3%. Only four companies from the top 10 list in 2010 remained in 2019's top 10 list. These included First Solar, Trina Solar and JA Solar, which moved to the bottom half of the top-ten list, with new companies moving to the top spots. Despite new companies moving into the market, China continues to dominate the PV manufacturing industry, given its already-established market presence.

Global leading PV manufacturers, by shipments:

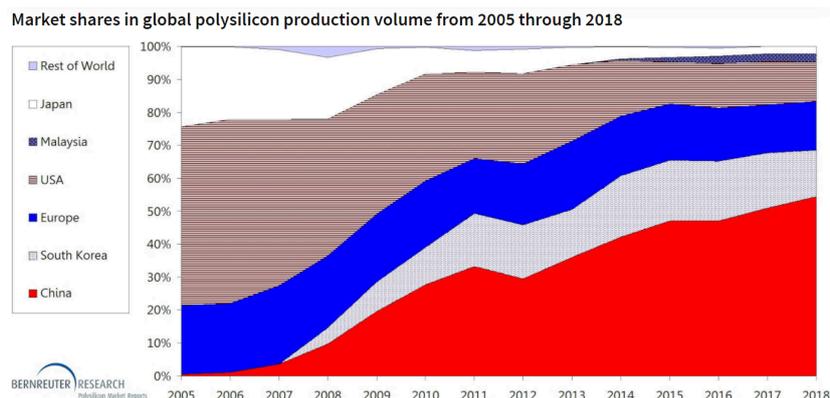
Ranking	2010	2010 MWp	2015	2015 MWp	2019	2019 MWp
1	Suntech	1572	Trina	3631	Tongwei	12752
2	JA Solar	1460	JA Solar	3617	LONGi	10957
3	First Solar	1387	Hanwha Q-Cells	3400	Jinko Solar	9708
4	Yingli	1062	Canadian Solar	2691	Canadian Solar	8600
5	Q-Cells	995	First Solar	2518	Aiko Solar	7610
6	Sharp	914	Jinko Solar	2400	JA Solar	7560
7	Trina	905	Yingli	2388	Trina Solar	6006
8	Motech	850	Motech	2100	First Solar	5400
9	Gintech	800	NeoSolar	2100	Hanwha Q-Cells	5185
10	Kyocera	631	Shungfeng-Suntech	1970	UREC	4219
Total Above		10576		26815		77997
Total Ship. MWp		17402		50877		123485

Source: NREL 4Q2019/1Q2020 Solar Industry Update

Leading Companies in Each of the Stages of the Solar PV Value Chain and Their Market Conditions

Silicon Purification

The polysilicon industry underwent numerous changes in the past few years. Back in 2004, China accounted for a fraction of the global polysilicon output. However, with the country introducing duties on polysilicon imports in 2013, by 2018, the country's output contributed 54% of the total output, and reached 63% in 2019.



Source: Bernreuter Research

However, it is not only the country-wise distribution which changed. Until 2005, only seven companies ruled the polysilicon market: Hemlock Semiconductor Corp, Wacker Chemie AG (XTRA:WCH), REC Silicon ASA (OB:REC), Tokuyama Corporation (TSE:4043), MEMC Electronic Materials, Mitsubishi Materials Corporation (TSE:5711), and OSAKA Titanium technologies Co. Ltd. (TSE:5726). However, in 2013, with China introducing duties on polysilicon imports, the country's polysilicon production expanded, alongside which four companies moved to the forefront of the global polysilicon industry. Xinte Energy Co., Ltd. (SEHK:1799), Daqo New Energy Corp. (NYSE:DQ), Tongwei Co.,Ltd (SHSE:600438) and East Hope New Energy. GCL-Poly Energy Holdings Limited (SEHK:3800), along with the previously mentioned four companies, is now among the leading companies in the polysilicon market. OCI Company Ltd. (KOSE:A010060), although the third-largest polysilicon manufacturer in 2018 and the second in 2019, shut down its Korean factory in February 2020, succumbing to the price pressure from low-cost Chinese plants. We also note that, the polysilicon industry has high barriers to entry in the form of the high capital expenditure required to establish a polysilicon production plant.

Polysilicon capacities of the Big Six in 2020:

No.	Manufacturer	Capacity (MT)
1	Tongwei	96,000
2	GCL-Poly	90,000
3	Wacker	84,000
4	Daqo New Energy	80,000
5	Xinte Energy	80,000
6	East Hope	80,000
	Total	510,000

Source: Bernreuter Research

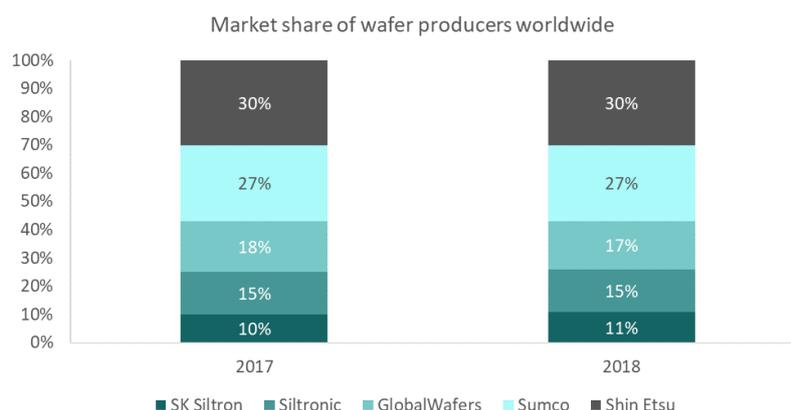
Ingots and Wafer Manufacturing

The most commonly used bulk material for solar cells is crystalline silicon, the market for which is expected to grow at a CAGR of 7% over 2020-2027, according to Data Bridge Market Research. Based on various searches, the below companies can be considered some of the leading players in the ingot manufacturing market.

Company Name	Region	Material Types
Panasonic Corporation (Sanyo)	Japan	Polycrystalline ingot
Sharp	Japan	Monocrystalline ingot
JA Solar	China	Polycrystalline ingot
LDK Solar	China	Monocrystalline ingot, polycrystalline ingot
Daqo Group	China	Polycrystalline ingot
Jinko Solar	China	Monocrystalline ingot, polycrystalline ingot
SUMCO	Japan	Monocrystalline ingot
HT-SAA	China	Polycrystalline ingot
Topray Solar	China	Monocrystalline ingot, polycrystalline ingot
Rietech	China	Monocrystalline ingot, polycrystalline ingot
Sornid Hi-Tech	China	Monocrystalline ingot, polycrystalline ingot
OCI Company	Korea	Polycrystalline ingot

Source: ENF Solar

The wafers are produced similarly for both semiconductors and solar PV cells, as solar PV cells are also a type of semiconductor device. However, the level of quality control and cleanliness required by the solar PV cells is less than that required for semiconductors. The market share of wafer producers worldwide in 2017 and 2018 was as follows.



Source: Statista

Company	Location	Description
SK Siltron	South Korea	Manufactures and sells semiconductors and provides polished wafers, which are used to make semiconductor devices.
Siltronic (XTRA:WAF)	Germany	Manufactures and sells silicon wafers with diameters of up to 300mm.
GlobalWafers (GTS:6488)	Taiwan	Manufactures and sells semiconductor ingots and wafers.
Sumco (TSE:3436)	Japan	Manufactures and sells silicon wafers and monocrystalline ingots.
Shin Etsu	Japan	Provides polyvinyl chloride (PVC) and semiconductor silicone products.

Source: CapIQ

Heavy investment is required to enter the wafer market; hence, there are high barriers to entry, with the market being controlled by the five strong players mentioned above, leading to limited competition in the market.

We have mentioned above that the prices of ingots and wafers fell partially due to process improvements. For ingots and wafers, the production equipment installed in factories has been improved. For ingots, this was done by growing larger sized crystals and improving the seed crystals needed to improve process time and increase yield. Cutting ingots into thinner wafers, reducing loss of unused ingot material, and increasing recycling rates are other production equipment improvements which enabled cost saving. Other process innovations include finding ways to reduce the amount of metallisation pastes/inks containing silver and aluminium.

Cell Production

The top-10 cell producers by volume in 2018 were the following companies.

Ranking	Cell Producer
1	JA Solar
2	Tongwei
3	Trina Solar
4	Hanwha Q-CELLS
5	JinkoSolar
6	LONGi
7	Shunfeng (incl. Wuxi Suntech)
8	Canadian Solar
9	Aiko Solar
10	First Solar

Source: PV-Tech

JA Solar, Trina Solar, JinkoSolar and Canadian Solar can be viewed as globally recognised integrated cell/ module producers who produce multi-GW levels of cells in-house while using domestic Chinese third-party cell supplies from companies such as Tongwei and Aiko. LONGi solar is the only company which covers the full solar PV value chain. The industry contains low entry barriers and is therefore highly competitive.

Module Production

Based on own-brand shipped module MWp-dc volumes in 2017 and 2018, the top 10 module suppliers were as follows, with Jinko Solar continuing to have a clear lead in the market. There were clear changes in the competitive position of many of the companies in 2018. JA Solar was placed second in the market, while Canadian Solar lost its third place to Trina Solar.

Ranking	Solar Module Manufacturer	
	2017	2018
1	Jinko Solar	Jinko Solar
2	Trina Solar	JA Solar
3	Canadian Solar	Trina Solar
4	JA Solar	LONGi Solar
5	Hanwha Q-Cells	Canadian Solar
6	GCL System Integration Technology	Hanwha Q-Cells
7	LONGi Solar	Risen Energy
8	Risen Energy	GCL System Integration Technology
9	Shufeng Photovoltaic International	Talesun
10	Yingli Green	First Solar

Source: PV-Tech

Similar to the solar cell production industry, the solar module industry also has low barriers to entry, hence is highly competitive.

Distribution and Installation

These are the downstream activities of the value chain, with a large number of wholesalers, many of whom do not operate globally. While some of the wholesalers have exclusive rights to distribute a specific module, there are very limited distinguishing features. While small installations for residential rooftop applications can be directly done by local installers and electricians, larger projects need to undergo various stages of development before construction can even begin.



A few examples of companies who carry out solar PV projects include the following.

- *Cyprus Creek Renewables* is involved in the development, financing, and operating of utility-scaled and distributed power plants across the US. The company has developed more than 8GW of solar and has more than 2.5GW under management, making it one of the country's leading solar and storage companies.
- *GreenYellow Thailand* is an energy management company with more than 1,000 energy efficient projects commissioned and more than 150 solar plants under operation worldwide, constituting more than 250MWp.
- *AMP Clean Energy* is a distributed energy company funding and developing low carbon heat and power solutions including solar PV and flexible energy plants.

E. A Look at the Key Asian Solar Players: Survival Depends on Subsidies

As discussed in the section above, a recap of the top few globally leading players in the solar PV industry and across the value chain is as follows:

Solar Module Manufacturers	Solar Cell Manufacturers	Ingot Manufacturers	PV Manufacturers
JinkoSolar Holding (JKS US) (China)	JA Solar (China)	Panasonic Corp (6752 JP) Via Sanyo Electric (Japan)	Tongwei (China)
Ja Solar Holdings Co., Ltd. (Ads) (JASO US) (China)	Tongwei (China)	Sharp Corp (6753 JP) (Japan)	LONGi (China)
Trina Solar (TSL US) (China)	Trina Solar (China)	JA Solar (China)	Jinko Solar (China)
LONGi Green Energy Technology (601012 CH) (China)		LONGi (China)	Canadian Solar Inc (CSIQ US) (Canada)
Suntech (China)			

Source: Various Sources

Having considered these leading players and conducting research on the leading companies in China, Japan, and India specifically, we shortlisted a few Asian solar energy players that we think are important players in the industry.

Our ShortListed Asian Solar Players

Solar Modules	Solar Cells	Ingot Manufacturers	PV Manufacturers	CSP Focused Manufacturers
Jinko Solar (China)	JA Solar (China)	Sharp (Japan)	Tongwei (unlisted in China)	Chiyoda (Japan)
Trina Solar (China)	Suntech (China)	Sanyo Electric (Japan)	LONGi (listed in China)	CGN New Energy Holdings (China)
Kyocera (Japan)			Yingli Green Energy (China)	
Vikram Solar Private Ltd (unlisted in India)			Adani (unlisted-India)	

Having looked at these players quite closely, we take you through our conclusions first about the similarities and differences across these players, followed by summarised company profiles.

Key conclusions about Asian players in the industry

- **Increasing downstream presence**

Most of the leading solar energy players on our list are starting to focus increasingly on the downstream rather than the upstream. Ingot and wafer manufacturers are exceptional as they are part of the upstream, but are attempting to increase downstream presence. The upstream players witness lower profitability than the downstream (as discussed in the section above). The reason for this could be that downstream players benefit more from subsidies than the upstream, alongside the fact that the upstream has more exposure to supply-demand volatility, which in turn impacts profitability. This explains players' increasing focus on an integrated supply chain model. However, there are certain exceptions like Tongwei. Apart from this, the other leading players on our list are trying to increase downstream presence, especially via the Engineering, Procurement and Construction (EPC) model.

- **ASEAN and developing market focused**

These Chinese, Japanese and Indian players aim to capture the potential demand in developing countries, especially in ASEAN. We believe that this is a key long-term driver for the players, given the potential for growth in the developing countries when compared to countries like China and Japan, where demand growth has slowed. We also highlight the need for governmental policy support in these developing countries to make it easy for solar energy players to maintain their pricing and profitability.

- **Similar basic technology: mono and multi-crystalline; some have a competitive edge by adopting slightly differentiated technology such as HJT and Shingled Module technology.**

Crystalline technology is widely used across these Asian players. Certain players like JA Solar, Suntech, Vikram Solar, Tongwei and LONGi also adopt a varied type of these crystalline technologies, like half-cut modules, Shingled Module, Mono Passivated Emitter and Rear Cell, and Heterojunction technology (these technologies are discussed below) for incremental increases in energy efficiency. It appears that the Heterojunction technology (HJT) and shingled module types allow the highest potential for increase in efficiency. These technologies will lead to an incremental increase in efficiency, though not a completely revolutionary change in the solar energy product. Companies like Suntech and Tongwei on our list have a slight competitive edge over the other players, given their head start in these technologies. We believe that as these players capitalise on the HJT and Shingled technologies, the other Chinese and Indian players might quickly follow. On the other hand, thin-film technology, which is mainly used for small-scale purposes, is adopted by Japanese companies like Sharp and Sanyo. This also explains why Japan lags behind India and China in the solar energy race.

- **The key differences in operational performances amongst the Asian players:**

- ◦ *The Chinese players* generate relatively low profitability or are making losses despite their leading position globally.

Moreover, the Chinese leading players are mostly listed companies, except for Tongwei, Suntech, and Yingli.

We note that Suntech and Yingli were also listed, but have both become unlisted now, due to increased debt burdens.

- ◦ *The Indian players*, however, are mostly private companies and generate attractive profitability (according to available information). The reason for this appears to be the attractive government policies in the country.
- With regard to *the Japanese players*, we note that these players do not solely focus on solar energy products like the Chinese and Indian players, but instead operate solar energy as a business segment for which they expect long-term growth prospects. The Japanese players are also relatively less profitable when compared to the Indian players, and they aim to price higher and increase product types in order to maintain profits.

- **Provision of subsidies is key for players to operate**

It should be noted that provision of subsidies is a key factor that influences the profitability of these leading players across Asia. The Chinese players enjoyed good profitability in the past, but have recently been struggling with their financial performance, mainly due to the government's decision to reduce subsidies for solar energy

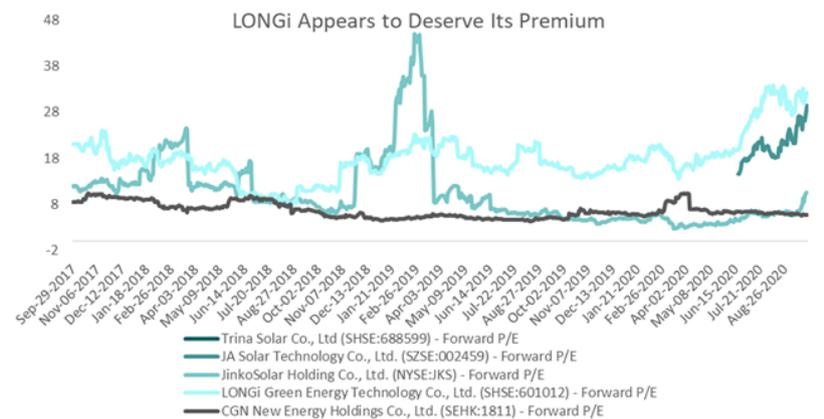
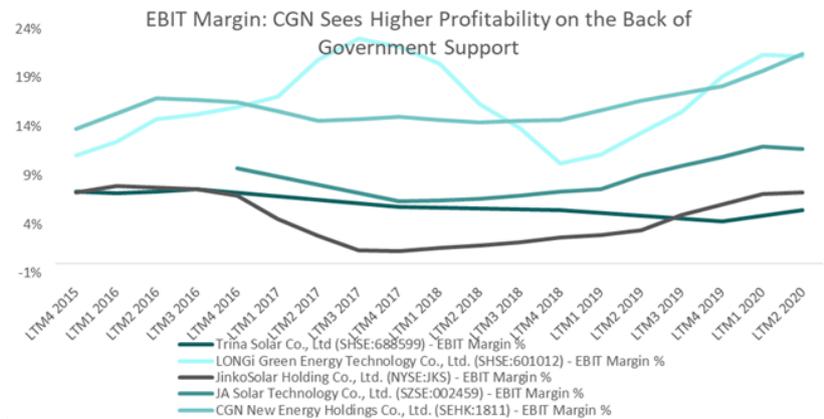
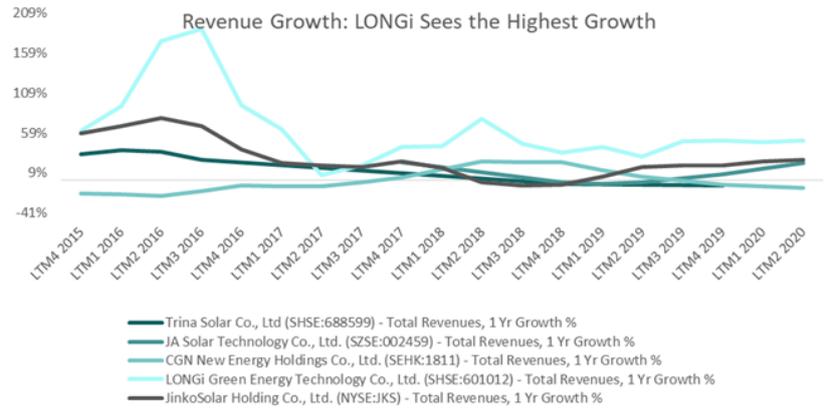
products. As of now, the Indian players appear to be the most attractive in terms of financial performance. So, the question is, would the Indian players also find themselves in a situation similar to that of the Chinese players when subsidies are removed? Firstly, we note that India is unlikely to remove its solar energy subsidies until at least the medium term, given that the industry is still at the early stages of development. As such, the Indian players are likely to benefit for some time. However, over the long term, subsidies could be removed and could impact the Indian companies in a similar way to the Chinese players. We feel that the Indian companies are looking to move towards other developing markets, and as such, could cater to other markets where subsidies are available as the market in India matures. We also feel that since most of these Indian solar companies are part of large conglomerates, they are unlikely to go public until they become much larger, thereby not giving rise to much of an investment opportunity. Regardless, we feel that the Indian companies in their domestic market alone have high potential for growth when compared to certain other leading players. Although the Japanese players are ranked amongst the top ten, they haven't yet entirely focused on capturing growth in the solar market. Their strategy appears to be to operate via a more diversified business. Moreover, the less encouraging subsidy policy in Japan could also be a reason for this relatively low focus on solar energy.

Our thoughts on the Chinese listed players:

Our main aim here is to compare the listed pure solar players in which it is possible to invest, which appears to be all Chinese companies. Indian players are mostly still private companies, while the Japanese listed leading players are not pure solar energy players. However, we have provided a brief overview of these companies and their strategies in the solar business. Most importantly, we have provided an investment thesis for each of the leading listed Chinese players. We have summarised the investment positives and negatives in the table below.

Company	Investment Positives	Investment Negatives	Financial Numbers			
			I. Revenue CAGR	II. OP CAGR	III. OPM	IV. PE Multiple
Jinko	<ul style="list-style-type: none"> M&A for growth and expansion of facilities Continuous expansion of plants key for growth 	<ul style="list-style-type: none"> Trade wars and increasing solar production affect pricing (upstream effect) 	I. 25.0% (5-year)	II. 16.2% (5-year)	III. 5.5%	IV. 6.2x (NTM)
Trina Solar	<ul style="list-style-type: none"> An EPC model to capture growth in the smart energy market Emerging market focus could be a long-term driver 	<ul style="list-style-type: none"> Reliance on subsidies Mounting competition 	I. -5.5% (3-year)	II. -18.3% (3-year)	III. 5% (3-year)	IV. 40.9x (LTM)
JA Solar	<ul style="list-style-type: none"> Acquisitions boost profit and allow the exploration of new markets Capacity expansion and product innovation key for growth 	<ul style="list-style-type: none"> Trade wars and subsidy removal 	I. 8.8% (3-year)	II. 12.9% (3-year)	III. 8.6%	IV. 21.3x (NTM)
LONGi Solar	<ul style="list-style-type: none"> Vertically integrated module maker increasing presence in the downstream Acquisitions and collaborations with key rivals Aggressive capacity expansion and strong demand for bi-facial PV modules 	<ul style="list-style-type: none"> Subsidy removal 	I. 55% (5-year, overall business)	II. 76.3% (5-year, overall business)	III. 19.1%	IV. 30.3x (NTM)
CGN	<ul style="list-style-type: none"> Targets high quality parity projects to build revenue – focus on CSP differentiates the company Expanding and strengthening competitive position through acquisitions 	<ul style="list-style-type: none"> Reliant on government policies 	I. 53% (5-year)	II. 54% (5-year)	III. 49.6%	IV. 6.1x (NTM)

Source: LSR



Source: CapIQ

Based on our analysis, we feel that:

- While LONGi has been trading at a premium to its peers, in our opinion, LONGi's premium appears justified given its strong revenue growth rates alongside its differentiated strategy of collaborating with rivals to explore new markets. Moreover, despite the reduction in subsidies in the country, the company has still been able to maintain its profitability, which we see as favourable for LONGi.
- Recently, JA Solar has been trading at multiples slightly below LONGi. We believe that JA Solar should continue to trade below LONGi, given the latter's better earnings profile and strategies for growth.
- We note that JA Solar's growth strategies are similar to that of Jinko's. However, given JA Solar's increasing focus on downstream, it has been able to generate higher profits than Jinko. This also explains Jinko's relatively low multiple, which we feel is reasonable.
- Trina's Forward multiples are not available for the time period. However, looking at the company's PE based on LTM EPS, which is around 40x, we feel that Trina looks quite expensive. We like Trina's ability to maintain a diversified product base and target developing markets. However, it is possible that the company's profitability might struggle if subsidies do not exist. Thus, with an already lower EBIT margin when compared to peers, the downside risks are quite high for the company. As such, the multiples make the company look quite overvalued.
- CGN New Energy appears to be trading at a discount. The company is quite different to the other players, in the sense that it focuses solely on CSP projects. Moreover, the company appears to be running on government support. Thus, we feel that though profitability is high, it does not look as sustainable. In our opinion, the discount appears justified for CGN.
- Overall, we are more favourably inclined towards LONGi and JA Solar for their attractive fundamentals and ability to capture opportunities in the market. These players all face the risk of subsidy removal. However, as long as they can mitigate the effect by moving to developing countries in time, the negative impact could be minimised.

Our thoughts on the unlisted players

For the unlisted players in our list, we have looked at the strategies they follow, their key opportunities, and risks in the market. We have summarised these in the table below.

Company	Key Product and Technology	Key Strategies & Opportunities	Risks
Tongwei	<ul style="list-style-type: none"> Technology: Mono-crystalline (PERC), polycrystalline A shingled module type Targets: China & international markets 	<ul style="list-style-type: none"> Not a vertically integrated producer Captures growth via different module technologies Continued growth in PV market and demand for shingled module types 	Limited downstream focus Subsidy risk
Suntech	<ul style="list-style-type: none"> Technology: Crystalline technology Heterojunction technology (HJT) Targets: China & international markets, mainly Europe 	<ul style="list-style-type: none"> Investment in upstream, products focusing on downstream Cost-cutting and continuous capacity expansion Premium as well as low-priced products Continued growth in the PV market Possibly targets the APAC region 	Credit default risk
Yingli	<ul style="list-style-type: none"> Technology: Polysilicon and monocrystalline technology Targets: China US Japan 	<ul style="list-style-type: none"> Vertically integrated manufacturing Different strategies for each of its focus countries Growth in the integrated PV market 	Company has filed for insolvency
Vikram Solar	<ul style="list-style-type: none"> Technology: Mono Passivated Emitter and Rear Cell (PERC) technology. Targets: India Australia US 	<ul style="list-style-type: none"> Taps markets beyond India Runs an EPC model Focuses on rooftop solar business in India Recovery in India's PV industry Growth expected for Mono PERCs 	Dependent on government policies

Source: LSR

Key points we highlight for these companies are:

- The Indian companies that are private are doing relatively well. The key strategy for the Indian players like Vikram Solar is the demand for rooftop solar in the country. However, these players generate strong revenue and profit with the help of government support. Thus, if government support reduces, these companies could also follow the path of Suntech and Yingli.
- Suntech and Yingli, though leading the solar market, are struggling financially. Suntech was delisted due to a bond default, while Yingli last year filed for insolvency. The reasons for this were their focus on the upstream while being dependent on subsidies.
- We consider Tongwei to be a rather attractive private company for its business model of purchasing wafers and slicing them to form solar panels, and thus focusing on just part of the value chain. Moreover, the company's shingled module technology is likely to see growth in the future. Subsidy removal or reduction in China is a risk for Tongwei, but we believe that with the strong profitability position now and presence in over 20 countries, the company should be able to eliminate such risks. We like both Vikram and Tongwei, the former for its strong growth potential, and the latter for its business model and shingled module technology.

Summary of Listed Players that Are Not Entirely Solar-Focused

Company	Key Technology & Key Target Markets	Key Strategies & Growth Drivers	I. Revenue CAGR II. OP CAGR III. OPM
Kyocera (Japan)	<ul style="list-style-type: none"> Technology: Silicon ribbon crystal and multicrystalline silicon PV cells using casting technology Targets: China & International markets 	<ul style="list-style-type: none"> Continuous improvement in technology alongside MLCC expertise Targets wider customer base and broad product range Fully-fledged distribution channel Continued PV market growth and possible need to downsize PV modules 	I. -13.2% (5-year) II. Loss-making III. OPM
Sharp (Japan)	<ul style="list-style-type: none"> Technology: Mono-crystalline, poly-crystalline and thin film technology Targets: Japan, Europe, ASEAN 	<ul style="list-style-type: none"> Increasing downstream presence Premium pricing strategy to sustain margins Increasing focus on ASEAN Continued growth in PV market, especially in developing countries 	I. -5.6% II. +26.3% III. 5.0%
Sanyo Electric (Japan)	<ul style="list-style-type: none"> Technology: HIT solar cell technology based on mono-crystalline wafers, and thin film PV technologies Targets: Japan & International markets 	<ul style="list-style-type: none"> Panasonic's support and strong expertise Use of renewable energy for various aspects of its other businesses A restructuring plan placing importance on differentiating its products Continued growth in the PV market 	N/A
Chiyoda (Japan)	<ul style="list-style-type: none"> Technology: CSP plant via Molten Salt Parabolic Trough CSP (MSPT-CSP) technology Targets: Japan & International markets 	<ul style="list-style-type: none"> EPC model Building demonstration projects in new markets (initially) Support from subsidiaries and affiliates overseas to target international markets Potential demand for CSP 	I. 2.1% (5-year) II. N/A III. N/A
Adani	<ul style="list-style-type: none"> Technology: Polycrystalline and thin-film technologies Targets: India 	<ul style="list-style-type: none"> Long-term contracts with secure counterparties EPC model Strong assets allow rapid implementation of projects Untapped demand in India 	N/A

Source: LSR

In Detail: Listed Pure Solar Players: Chinese Players

Jinko Solar

Company Background

Jinko Solar commenced operations in June 2006 and is one of the largest solar module manufacturers in the world. While a majority (95.8% in 2019) of Jinko's operations focus on solar modules, the company also produces and sells silicon wafers and solar cells.

Product & Technology

Jinko Solar adopts the basic monocrystalline technology for its products. Together with this the company adopts three advanced technologies which are used to produce its product types:

- *Half-cell* module technology- halves the amount of electrical current flowing in each busbar so the amount of internal losses in a half-cut module is $\frac{1}{4}$ of a full-sized cell module. The half-cell allows the generation of c. 3% more power than a full cell.
- *Bifacial* module has longer generation times compared to the standard module and features a transparent back sheet technology which allows up to 20% power gain depending on albedo and PV system design. This can be used in various applications including in a sunroom, in desert-covered circumstances, in a highway, carport or on a sun-tracking mount.
- *Tiling Ribbon*, which is unique to the company is used to eliminate the cell gap in order to significantly increase module efficiency.

Investment Thesis

M&A for Growth and Expansion of Facilities

Jinko plans to grow through acquisitions, joint ventures or other strategic alliances with suppliers or other companies in China and overseas along the solar power industry value chain. Given the continued growth in the PV industry, Jinko expects strategic alliances and long-term purchase agreement to secure growth for it.

Continuous Expansion of plants is considered key for growth

As of 31st December 2019, Jinko had agreed contracts of RMB1.73bn for the purchase of additional manufacturing equipment and the expansion of its production capacities. In order to retain its leading position, it is necessary for the company to continue its expansion, which the company appears keen in doing.

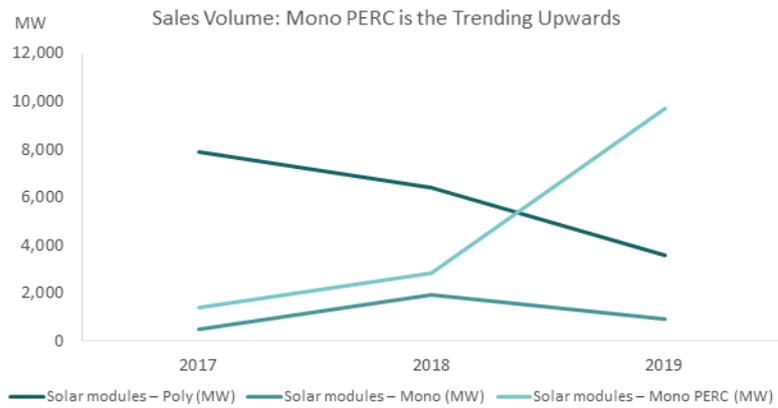
Trade Wars and Increasing Solar Production are Possible Deterrents of Company's Growth

Due to the trade war between China and the US, certain additional duties have been imposed on CSVP cells and modules. Jinko besides China is also exposed to Mexico and US markets. However, as a mitigation, the company opened Ta manufacturing facility in the US and hence is expected to avoid the majority of tariffs. Having said that, the company could still be exposed to tariff risks which could potentially hinder the company's margins. Apart from this, the company is also directly affected by the oversupply in the market, which results in price reduction and in turn profits. Jinko is exposed to upstream risks to a great extent still.

Financial Analysis: A Growing Solar PV Market is The Key Driver of Jinko's Revenues

Jinko grew its revenues at a CAGR of 17.8% over 2015-2019, with the key drivers of the company's revenues being the volumes of solar modules sold and the average selling price of these modules. Jinko's sales volumes of silicon wafers, solar cells and solar modules grew by a CAGR of 111.9%, 29.0% and 35.6% respectively, over 2015-2019 which enabled revenue growth despite declines in the average selling price of the modules due to oversupply of solar power products in the solar PV market.

The company's gross profits grew at a CAGR of 16.7% over 2015-2019 while Gross Profit Margins declined by 70bp over the period. After experiencing declining margins in 2017/2018, margins improved in 2019 due to continued reduction in production costs by using Jinko's integrated cost structure (positioned as Top 3 producer in terms of competitive cost structure) and an increase in self-produced production volume due to a shift towards mono-based production.



Furthermore, while OP grew at a CAGR of 11.4% over the period, and OPM on average was c. 4.6%. However, similar to GPM, OP margins also declined by 140bp over 2015-2019. However, margins improved in 2019 owing to declined investments in R&D in 2019 as a large amount had already been invested in 2018. The large decline in margins in 2017 was largely due to increased shipping costs and warranty costs.

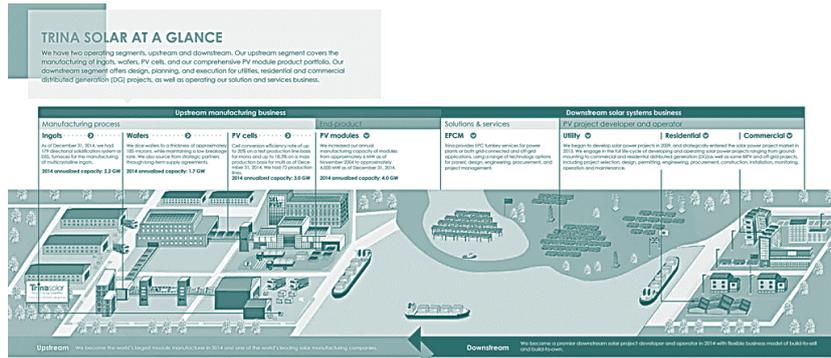


Source: Company disclosures

Trina Solar

Company Background

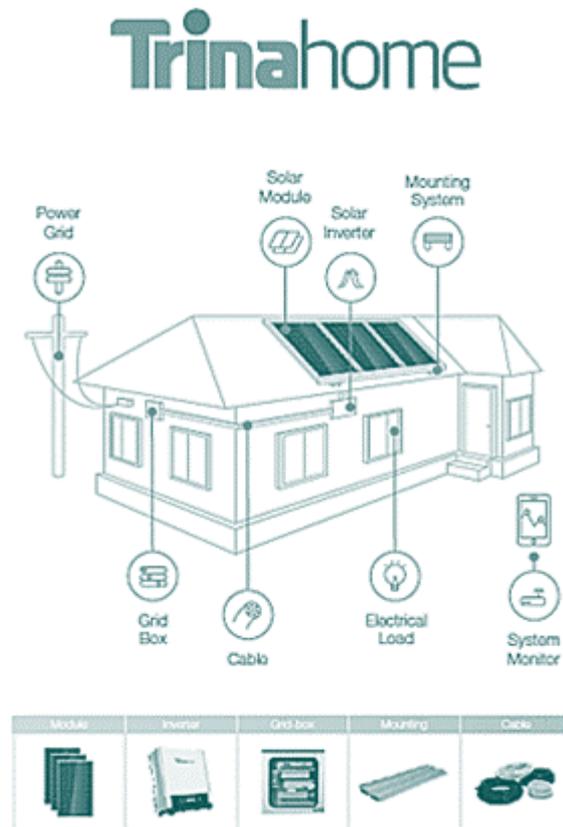
Trina Solar was founded in 1997 in China.



Some of the key milestones achieved by Trina Solar in the recent past include:

- Trina Solar launched TrinaPro and Trinahome in 2018 while working on several high-profile projects in the commercial, industrial, and utility scale sectors.

Trinahome, which is recognised as the ideal solar energy system for residential and SME usage, was launched in India, Australia, Malaysia, Sri Lanka and the Philippines, giving customers the option to install safe, reliable, and cost-effective solar systems on rooftops.



TrinaPro refers to the first smart PV solution that is a combination of Trina Solar's industry leading solar modules, solar tracker systems, and inverters.

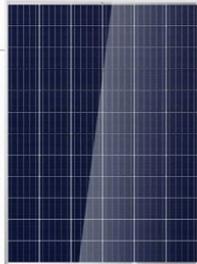
- In 2018, Trina Solar built Indonesia's first utility scale solar system.
- Last year, Trina Solar's Photovoltaic Science and Technology (PVST) set a new record of 25.04% total area efficiency for a large area mono-crystalline silicon solar cell type.
- Rolex Rings, an Indian automotive parts manufacturer, installed a rooftop solar array in Gujarat using 2,079 Trina Solar Tallmax modules.
- Foursun Solar, an EPC company, worked together with Trina Solar to develop a solution for connecting the modules to a power optimizer in order to overcome environmental challenges with energy and carbon savings.
- A major breakthrough and milestone for Trina Solar was when Trina Solar's Vertex 600 W /550 W series ultra-high-power modules passed the comprehensive reliability test conducted by TUV Rheinland. This confirmed the reliability of Trina Solar's products.
- In the beginning of 2020, Trina Solar announced that Trina Solar's State Key Laboratory (SKL) of PVST made a Passivated Emitter and Rear Cell (PERC) technology cell with 23.39% efficiency (generally PERCs are produced with 20.3% efficiency).
- In July 2020, Trina Solar became the first Chinese PV product, PV system and smart energy company to trade on the Shanghai Stock Exchange Science and Technology Board, also known as the STAR market.
- In September 2020, Trina Solar acquired Nclave Renewable S.L to make Nclave a wholly owned subsidiary of Trina solar.

Key Product and Technology

Trina Solar's range of products are used for utility, commercial, and residential applications. The company's modules (TallMax, AllMax, DuoMax) for each of these applications are based on the multicrystalline (i.e. made of polycrystalline silicon which is relatively low efficiency and priced low) and monocrystalline (premium priced solar panels with higher efficiencies) PV technologies. PERC technology the company adopts is different to standard solar cell technology. The former enables improvement in light capture near the rear surface and optimization of electron capture; in other words, it helps achieve higher efficiency. The gain in efficiency enables cost decrease. The challenge with this technology is to be able to scale up the technology while controlling the process. These technologies are used to produce both bi-facial (transforms sunlight into electrical energy on both its top and bottom sides) and mono-facial types of products.

Mono **Multi** Solutions

THE TALLMAX MODULE



72 CELL
MULTICRYSTALLINE MODULE

310-325W
POWER OUTPUT RANGE

16.8%
MAXIMUM EFFICIENCY

0~+5W
POSITIVE POWER TOLERANCE

As a leading global manufacturer of next generation photovoltaic products, we believe close cooperation with our partners is critical to success. With local presence around the globe, Trina is able to provide exceptional service to each customer in each market and supplement our innovative, reliable products with the backing of Trina as a strong, bankable partner. We are committed to building strategic, mutually beneficial collaboration with installers, developers, distributors and other partners as the backbone of our shared success in driving Smart Energy Together.

Trina Solar Limited
www.trinasolar.com



TrinaSolar
Smart Energy Together

- Ideal for large scale installations**
 - High power footprint reduces installation time and BOS costs
 - 1000V UL/1000V IEC certified
- One of the industry's most trusted modules**
 - Best proven performance
 - Strong, reliable supplier
- Highly reliable due to stringent quality control**
 - Over 30 in-house tests (UV, TC, HF, and many more)
 - In-house testing goes well beyond certification requirements
 - 100% EL double inspection
- Certified to withstand challenging environmental conditions**
 - 2400 Pa wind load
 - 5400 Pa snow load
 - 35 mm hail stones at 97 km/h
 - PID resistant

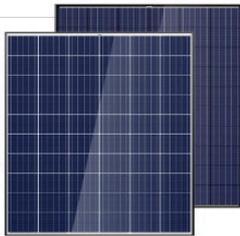
Comprehensive products and system certificates

- IEC 61215/IEC 61730/UL 1703/IEC 61701/IEC 62716
- ISO 9001: Quality Management System
- ISO 14001: Environmental Management System
- ISO 14064: Greenhouse Gases Emissions Verification
- OHSA 18001: Occupation Health and Safety Management System



Mono **Multi** Solutions

THE ALLMAX MODULE



60 CELL
MULTICRYSTALLINE MODULE

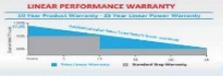
255-270W
POWER OUTPUT RANGE

16.5%
MAXIMUM EFFICIENCY

0~+5W
POSITIVE POWER TOLERANCE

As a leading global manufacturer of next generation photovoltaic products, we believe close cooperation with our partners is critical to success. With local presence around the globe, Trina is able to provide exceptional service to each customer in each market and supplement our innovative, reliable products with the backing of Trina as a strong, bankable partner. We are committed to building strategic, mutually beneficial collaboration with installers, developers, distributors and other partners as the backbone of our shared success in driving Smart Energy Together.

Trina Solar Limited
www.trinasolar.com



TrinaSolar
Smart Energy Together

- Our most versatile product**
 - Compatible with all major BOS components and system designs
 - 1000V UL/1000V IEC certified
- Maximize Limited Space**
 - 60-cell module power output up to 270W
 - Up to 165 W/m² power density
- Highly reliable due to stringent quality control**
 - Over 30 in-house tests (UV, TC, HF, and many more)
 - In-house testing goes well beyond certification requirements
 - PID resistant
 - 100% EL double inspection
- Certified to withstand challenging environmental conditions**
 - 2400 Pa wind load
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- OHSA 18001: Occupation Health and Safety Management System



Source: Company Disclosures

Investment Thesis

Adopting an EPC Model to Capture Growth in the Smart Energy market

The company operates a vertically integrated business model, being thoroughly involved in both the upstream and downstream. Through its EPC model, and innovation in multi and mono crystalline technology, Trina has strengthened its position in the market. The company has developed its smart energy business via its EPC model during the last few years and expects the growing trend for IoT will drive future growth of this segment. Trina is currently focusing on development of products in this area primarily, given the increasing global demand for energy IoT product- such as smart solar/energy solutions. The global Smart Energy market is expected to grow at a CAGR of 15 % over 2018-2025. In our opinion, with Trina being amongst the top three for solar cells and modules, the company is likely capture most of the expected growth in the market.

Emerging Market Focus Could be a Long-Term Driver

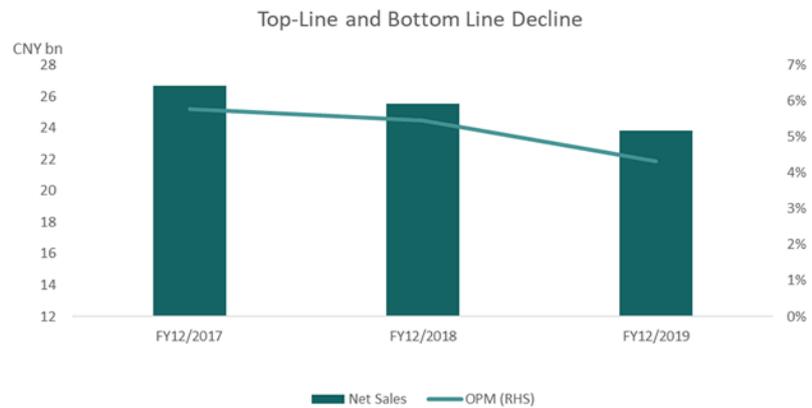
The company's Trinahome product was built mainly focusing the ASEAN markets and developing countries like Sri Lanka. Thus, Trina's recent focus of appears to be to moving into emerging countries like the Maldives as well, where the solar panel is likely to see strong demand. Trina Solar proposed a customised 'PV Power + Energy Storage + Diesel Power' micro grid integrated solution based on the electricity demands of 14 islands in the Maldives. Thus, Trina, while having a solid market share in China, could be capable of growing strongly over the long term if it becomes successful in other developing markets where potential for growth is high.

Reliance on Subsidies is a Concern Alongside Mounting Competition

To begin with, we note that mounting competition in the solar industry is a threat for all players. With new players joining the market especially in the downstream of the supply chain, pricing has become very competitive. Thus, growing competition and its possible effect on margins, is a common threat to all the players in the industry, especially the Asian players who dominate a majority of the solar market. In addition to this, our key concern for Trina is that the company's growth appears to be dependent on China's subsidy policy for solar energy. Since 2018, the company's revenue and profit declined as a result of china's subsidy removal. There is also recent news about China continuing to cut solar subsidies by 50% in 2020. This to an extent explains Trina's intent to target developing markets, and utilise its module expertise for new areas like smart energy products.

Financial Analysis: QoQ Recovery is a Good Sign

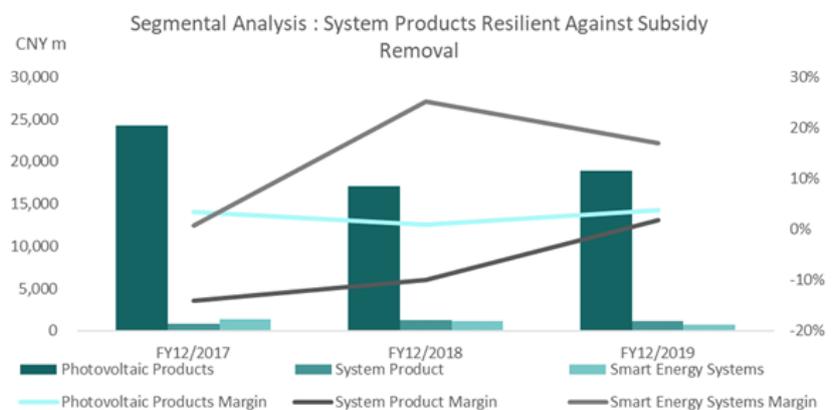
Sales declined during 2017-2019 at a CARC of -5.5% and OP decline at a CAR of -18.3% during the same period. Th company's OPM during the three-year period on average was around 5%.



Source: Company disclosures

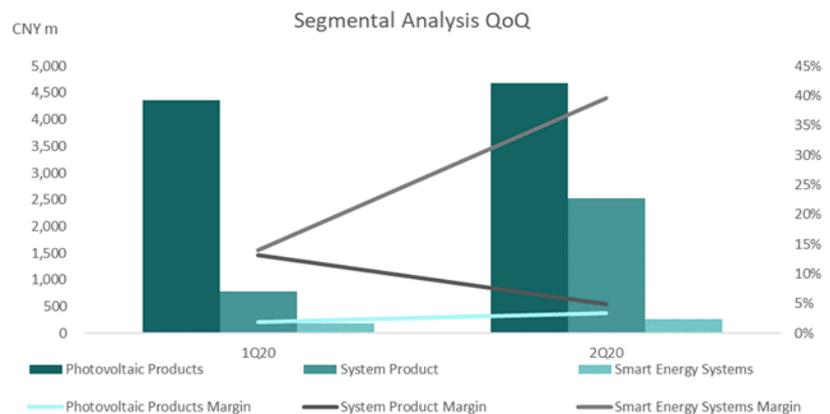
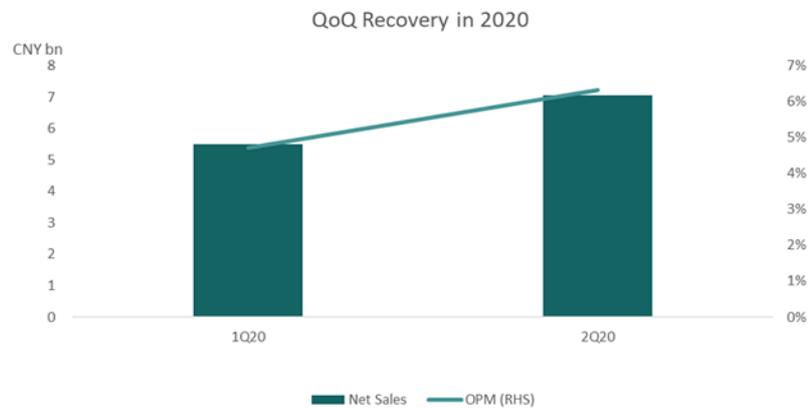
The company operates three segments: PV Modules (81% of FY12/19 revenue), PV System Products (5% of FY12/19 revenue), and Smart Energy Systems (3% of FY12/19 revenue). The PV Modules segments includes the upstream of the value chain, involving wafer and ingots and cell module manufacturing. The PV System segment includes the company’s one-stop smart PV solution like TrinaPro and also the company’s PV power plant business. The Smart Energy segment involves Trina’s energy cloud-platform business, which continued to advance with a number of practical application scenarios and projects in industrial IoT, commercial IoT, and energy IoT sectors.

Sales across PV and Smart Energy system segments declined during the last three years. PV segment revenue declined at a CARC of -7.9%, while Smart Energy Systems segmental revenue declined at -17.8% CARC. China’s abrupt removal of solar subsidies during 2018 was the key reason for the decline in revenue since 2017. The PV System Products segment, however, grew at a CAGR of 13.1% during the same period with the support of TrinaPro, which the company introduced in 2018.



Source: Company disclosures

During 2020, the company states that it actively responded to market changes involving the PV Module business, which saw the crystalline silicon industry trending upwards. The company also took the lead and rapidly deployed 210mm silicon wafer large-size cell and increased module production capacity in Suqian, Yiwu, and Yancheng manufacturing bases in China. The company plans to reach a total cell production capacity of about 26GW by the end of 2021, of which the production capacity of the 210mm cell will account around 70% by the end of 2021. During the first half of 2020, the company’s module shipments reached 5,840MW during the reporting period, increasing 37% over the same period in 2019. The company sells a majority of its products overseas, which has a higher gross margin and thus supported net profit growth during the period. Sales and OP grew QoQ during 2Q FY2020, which we believe is a good sign for the company.



Source: Company disclosures

JA Solar

Founded in 2005, JA Solar is a manufacturer of PV products including silicon wafers, cells, modules and PV power stations. The company has catered to many global solar PV projects in Asia, Europe, North America, Latin America, Africa and Oceania.

Product & Technology

JA Solar also produces large-scale ground-mounted power plants, commercial and industrial rooftop PV systems and residential rooftop PV systems.

Similar to certain other leading peers, JA Solar also sells half-cell modules, Multi Busbar (MBB- are assembled with multi-busbar PERC (Passivated Emitter and Rear Cell) cells and offers higher power output, better temperature-dependant performance) half-cell modules and bifacial mono PERC double glass modules (i.e. a frameless solar module).

Investment Thesis

Increase in Production Capacity and Innovative Products Drive Growth

JA Solar plans to promote the company's new high-efficiency battery and module projects whilst expanding its vertically integrated production capacity. The company would also continue to invest in R&D, especially to optimise its PERC+ monocrystalline battery technology process and improve its conversion efficiency.

Acquisitions and Partnership to explore new markets and boost growth

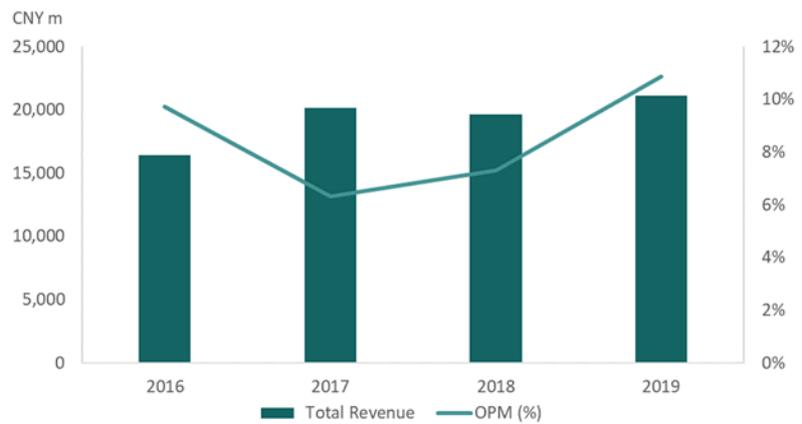
JA Solar has entered into a partnership with Excel Solar, a leading distributor of PV products in Mexico, where the company now has the ability to grow in the Mexican market. Moreover, in 2018, the company Tianye Tonglian Heavy Industry Co, which allowed JA solar to increase PV module shipments and report strong profits in 2019. It appears that JA solar looks forward to do more acquisitions this way and increase profitability while minimizing the downside risks via expansion on scale.

Trade War Impact and Subsidy Removal

Similar to Jinko, JA Solar could also be adversely impacted by the trade wars between China and the US and the trade sanctions imposed therein. The company also provides to North America. Moreover, subsidies reduction is affecting most of the Chinese solar energy company in terms of pricing and in turn profitability. Though the acquisition boosted JA Solar's profits during 2019, we feel that the company is still exposed to risks of subsidy removal unless it becomes successful with the Mexican markets

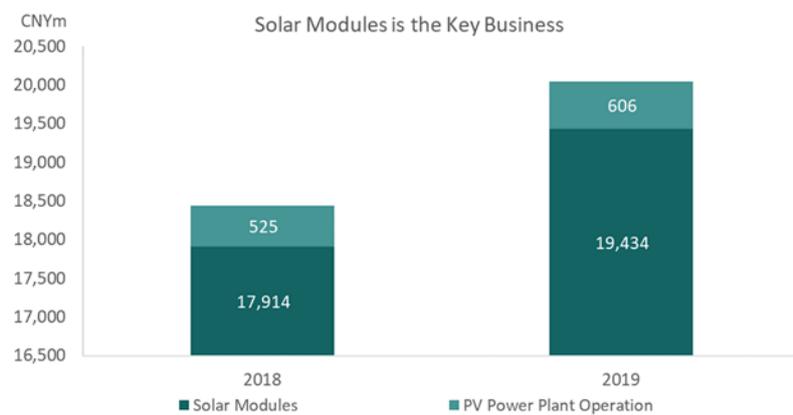
Financial Analysis

Although JA Solar has been in operation since 2005, we will only be using the financial data of the company's recent years due to the inability to verify a majority of the information. Over 2016-2019, the company's revenues and OP grew at a CAGR of 8.8% and 12.9% respectively driven by market growth and overseas expansions. JA Solar's OPM was c. 8.6% on average during the same period and improved by 120bp to 10.9% in 2019. The company improved its margins during 2019, mainly due to the acquisition it made during 2018 alongside improving product efficiency using new technologies and a series of restructuring projects.



Source: CapIQ

JA Solar classifies its revenues into two key product segments.



LONGi

Company Background

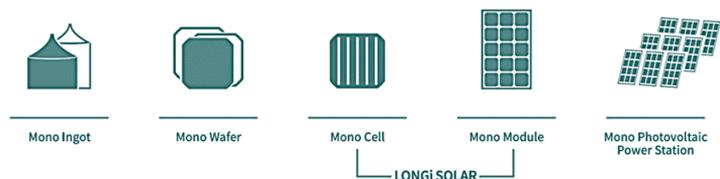
LONGi group is a formation of two key companies- LONGi Green Energy Technology (formerly Xi'an LONGi Silicon Materials Co), which looked into ingot and silicon manufacturing and LONGi Solar (formerly LERRI Solar) which included solar cell and module manufacturing. According to industry estimates, LONGi accounted for 40% of the industry's monocrystalline silicon wafer capacity in 2018, and was listed as a Tier I manufacturer by BNEF.

- Established in: 2000 Year
- Headquarters: Xi'an, Shaanxi, China
- Business: R&D, production and sales & marketing of mono-crystalline silicon products.
- Total Assets: \$8.91 Billion
- Shipment Scale: 9.1 GW
- Revenues: \$4.76 Billion
- Proposed Capacity: Cell 8GW Module 30GW

Year	Milestone
2000	Xi'an LONGi Silicon Material Corps was established
2007 - September	LONGi's wholly owned subsidiary- Ningxia LONGi completed a silicon ingot facility with annual capacity of 1000 tons
2009 - November	Completion of a 350MW silicon slicing plant
2012 - April	Successful IPO at Shanghai stock exchange
2014 - December	Wafer shipment exceeded 2GQ Acquisition of LERRI Solar
2016	Production capacity: Ingot (7.5GW), Wafer (7.5GW), Cell (2.5GW), Module (5GW)
2017	Production capacity: Ingot (15GW), Wafer (15GW), Cell (5.5GW), Module (6.5GW)
2018 - December	Module Shipment: 7.07GW Module Capacity greater than 12GW
2019	Bi-facial Module Shipment: 3.0GW Module Capacity: 16GW

Where LONGi Stands

LONGi INDUSTRY CHAIN



Product and Technology

Technology for Ingot and Wafers

INGOT PULLING

RENDER PERC CELLS WITH HIGH EFFICIENCY AND LOW LID

As a leading company in monocrystalline industry, LONGI focus on reducing production cost by larger silicon loading, higher pulling speed. The RCZ technology was first successfully commercialized by LONGI. Also LONGI has improved the quality of silicon wafers by reducing oxygen content, carbon content and metal impurity, which render PERC cells with high efficiency and low LID.



RCZ Technology



Low LID



High Minority Carrier Lifetime & Low Resistivity

DIAMOND WIRE SLICING

SIGNIFICANTLY INCREASES WAFER OUTPUT PER UNIT MASS

LONGI took the lead in diamond wire slicing technology, which significantly increases wafer output per unit mass. LONGI promoted the M2 (156.75 mm) standardization of monocrystalline wafer in the industry. The 180µm and 150µm wafer with diamond wire slicing technology by LONGI are widely used in the industry. In the future, LONGI will launch thinner mono silicon wafer which can bring more value for customers.



Diamond Wire Slicing



M2 Standardize Wafer



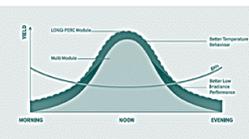
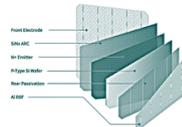
Thinner Wafer Less Price

Technology for Solar Modules

PERC TECHNOLOGY

HIGH EFFICIENCY & MORE ENERGY YIELD

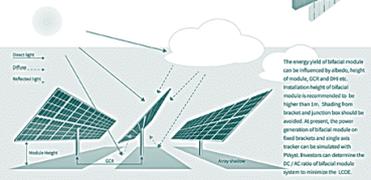
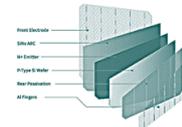
The PERC cell has a passivated rear side and a laser grooving process, which significantly improves the cell efficiency. In 2016, LONGI released the Hi-MO2 module with PERC and Anti-LID technologies. At present, the cell efficiency has been increased from 21% to over 22%.



BIFACIAL PERC TECHNOLOGY

CELL BIFACIALITY OF 75%-80%: HARVEST MORE LIGHT

For a bifacial PERC cell, the Al back surface field is replaced by Al grid, hence render the majority of rear side transparent and attain a bifaciality of 75%-80%. In 2017 LONGI released the Hi-MO2 module with bifacial PERC and double-glass packaging. Hi-MO2 module can absorb light on rear side, thus reduce the LCOE of power plant significantly.



Adopts the Half-Cut Technology for Modules

HALF-CUT TECHNOLOGY

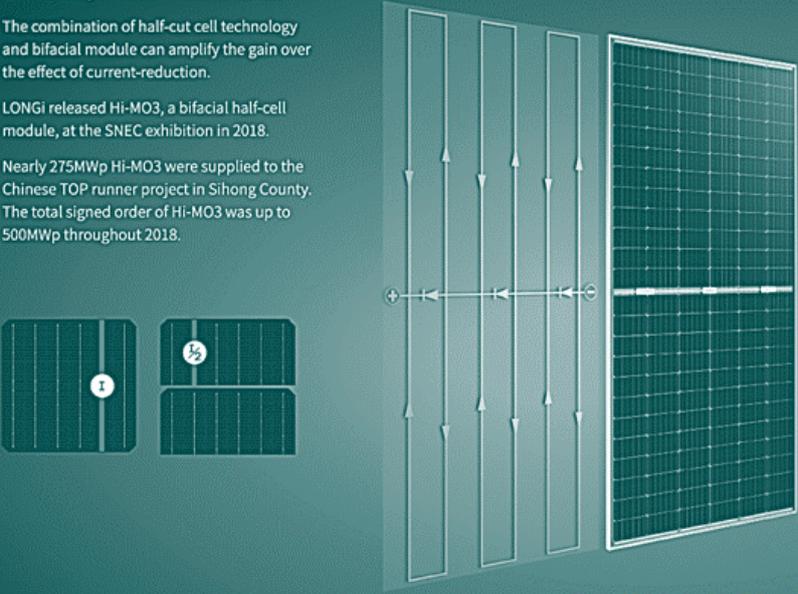
HIGHER POWER & MORE RELIABLE

Half-cut cell technology is to cut the cell into two separate parts by mature infrared laser, hence halve the working current. The thermal loss on the ribbon will be remarkably reduced and the module's power increases by 2%. The reliability of module is also enhanced.

The combination of half-cut cell technology and bifacial module can amplify the gain over the effect of current-reduction.

LONGi released Hi-MO3, a bifacial half-cell module, at the SNEC exhibition in 2018.

Nearly 275MWp Hi-MO3 were supplied to the Chinese TOP runner project in Sihong County. The total signed order of Hi-MO3 was up to 500MWp throughout 2018.



Monofacial or bifacial PERC cell module with half-cut technology has high power, the property of anti-PID, anti-LID (including LeTID), low hot spot temperature, excellent low irradiance performance and low power temperature coefficient.

Investment Thesis

Vertically integrated module maker increasing presence in the downstream

Although LONGi's products involve ingots, wafer which is in the upstream, the company for its cells and modules focuses on providing a customer-engaged service thereby keeping up its presence in the downstream as well. By doing so, LONGi is able to mitigate impacts of oversupply situation while also maintaining profitability.

Acquisitions and collaborations with key rivals

In 2017, the company announced that it, together with Trina Solar and Tongwei, were to form a Joint Venture (JV) to own and operate a 5GW monocrystalline silicon ingot pulling production plant in Lijiang City, Yunnan Province. During the same year, LONGi had also acquired the Malaysia-based mono wafer operations of bankrupt renewables firm

SunEdison in 2016. The company also partnered with Adani Green in 2019 to set-up for supply of modules. This suggests that the company wants to keep its rivals close, which would help the company in possibly standardising the product and pricing, and thereby combat the mounting competition in the industry.

Aggressive capacity expansion and strong demand for bi-facial PV modules

LONGi plans to expand both domestic and overseas in attempt to capture the strong demand for its bi-facial products. Consensus is that over 17% of PV modules will be bi-facial and demand could increase ten-fold over 2019-2024.

Subsidy removal in China is a Key risk

Subsidy removal or reduction in china is a risk for LONGi as well. However, the company's position in the upstream alongside its attempt to standardise products and collaborate with rivals while moving to overseas market should help the company maintain its profitability.

Financial Analysis

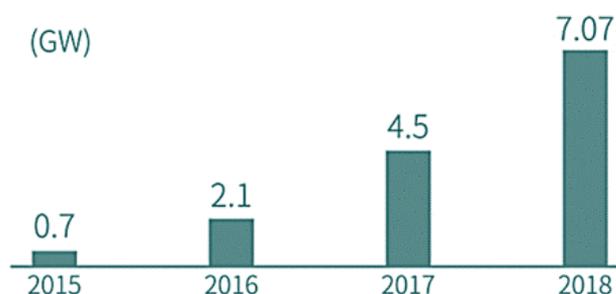
The group's overall revenue grew at a CAGR of 55% through FY12/15-19, while OP grew at a CAGR of 76.3% during the same period. The company's OPM is at around 19.1% as of FY12/19. Silicon and Modules form a major share of revenue. It was reported that 2019, saw an improvement in profits, due to increased manufacturing scale lowering production costs alongside significant growth in LONGi's overseas market demand for its PV modules. Thus, though we do not have the split in revenue for the solar business specifically, it is reasonable to assume that the company's solar business has been doing quite well over the past few years to have supported this strong growth in top line and bottom line for the company.



Source: CapIQ

Continuous growth in Module Shipments

MODULE SHIPMENT OVER THE YEARS OF LONGi SOLAR



Source: Company Disclosures

CGN New Energy Holdings

Company Background

CGN New Energy Holdings is a diversified independent power producer in Asia (in terms of fuel type and geography), with a portfolio of wind, solar, gas-fired, coal-fired, oil-fired, hydrogen and fuel cell power generation projects and a steam project in the PRC and Korea.

The company operates its business through three segments. The power plants in the Korean segment engages in the generation and supply of electricity. It is involved in projects including the Daesan I Power Project, among others. The power plants in the PRC segment engage in the generation and supply of electricity, mainly related to wind power and solar power projects. The Management Companies segment is engaged in the provision of management services to power plants operated by CGN and its subsidiaries.

Product & Technology

Increasing focus on CSP projects now. Started commercial operation of CGN Delingha 50MW parabolic trough concentrated solar power (CSP) plant in China in 2018.

Investment Thesis

Targets high quality parity projects to build revenue – Focus on CSP
Differentiates the company

The company has been targeting various parity (LOCE) projects in China and ensured to attain award for those projects as a key part of its growth journey. The company plans to capture more such projects in attempt to grow the market. While most players in china are targeting the PV solar market CGN, is one company that has been successful in the attempt to explore the CSP technology. This could potentially give the company a boost as CSP technologies become more widespread. In the face of frequent policies and a more competitive external environment, the company takes parity bidding as its core, and has been taking initiatives to strengthen external cooperation with strategic partners to manage the situation.

Expanding and strengthening competitive position through acquisitions

The company acquired the first batch of clean and renewable power generation assets from CGN in 2015. The acquisition includes 13 wind power project companies and 6 solar power project companies, with an aggregate operational installed capacity of approximately 1,400 MW. The acquisition allows the Group to add high-quality wind power and solar power assets to its portfolio, and further highlights the platform's unique advantages for non-nuclear clean and renewable power generation projects that aim to improve the Group's competitiveness.

Reliant on Government Policies

Continuous growth for CGN significantly depends on government policies. The growth and success of CSP projects are based on governmental support. In any situation if the government withdraw from its aim to commercialise the CSP project plans, then CGN would be one of the first companies to be affected.

Financial Analysis: Growing Strong Recently

In 1H FY12/2020, the company generated 9.4% of the total revenue and 22.4% of the total OP (5.9% and 18.0% respectively in 1H FY12/2019) through solar projects in China.

The segment's overall revenue and OP grew at a strong CAGR of 53% and 54% respectively during FY12/15 -19. During FY12/19, both revenue and OP from the solar business increased drastically by 61.6% and 47.3% YoY respectively. The Group's newly-commissioned attributable installed capacity in relation to solar projects amounted to 470.5 MW in 2019, which was the main reason for the increase in revenue. However, during this period, the increase in capex could have been the reason for OPM to deteriorate to 49.6%, compared to 54.4% in FY12/18. However, by 1H FY12/20, both revenue and OP grew significantly by 42.5% and 50.4% (OPM 62.9%) respectively (YoY), compared to 1H FY12/19. Furthermore, we note that in FY12/19, though profitability took a decline, the electricity generated by CGN through solar power increased by 69.4% YoY, reaching 828.7 GWh, and continued growth during 1H FY12/20, increasing by 53.8% YoY, to reach 645 GWh.

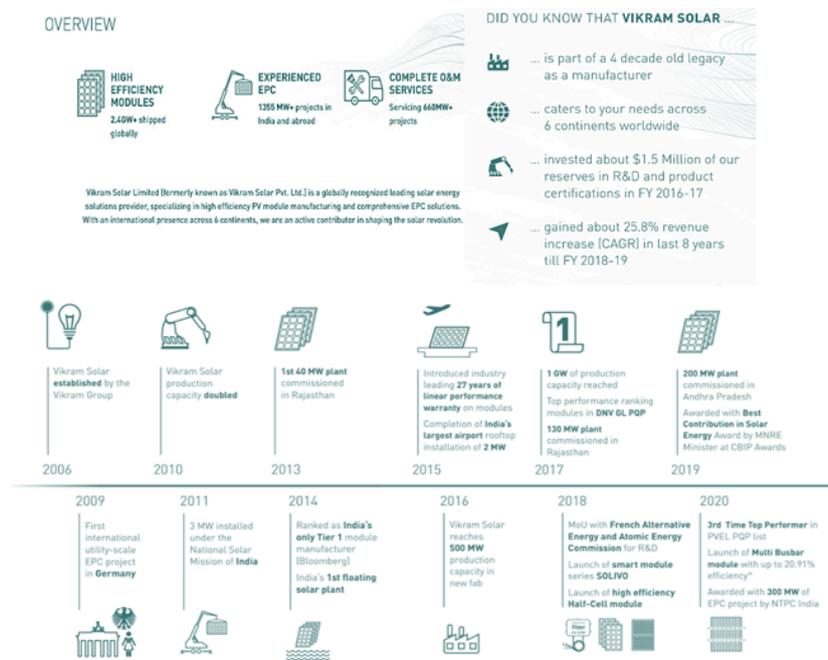
Unlisted Pure Solar Players

Vikram Solar

Company background

Founded in 2006, Vikram Solar is an Indian company and the second-largest solar energy company in India by revenue. The company is a subsidiary of Vikram Group, which also has subsidiaries in the tea processing, textiles, and engineering industries. The company’s business model involves the acquisition of developed sites and the servicing and maintenance of completed solar arrays throughout their lifespan. Vikram Solar is India’s 1st Tier 1 (i.e. big brands who have a good reputation in the industry) brand with strong brand presence in Australia and the US also.

Vikram Solar has four key strategic business units (SBUs): Manufacturing of Solar PV modules, EPC solutions, Rooftop Solar implementation, and Operations & Maintenance (O&M). Over the last five years, the company was reported to have undergone a phase of accelerated revenue and profit growth (unlisted company therefore limited information on numbers).



Year	Achievement
Feb-14	The company was listed as India's only Tier 1 module manufacturer by Bloomberg New Energy Finance.
Oct-15	The company concluded an agreement with British Solar Renewables (BSR) to supply modules with a total output of 30 MW.
Apr-15	Vikram Solar's modules received the "Excellent Performance" certificate.
Dec-15	The company commissioned India's largest rooftop airport installation in Kolkata.
Feb-16	The company partnered with Powertech Africa- an African distributor of energy technology. Was able to enter 14 new markets in Sub-Saharan Africa including Botswana, Zimbabwe and Tanzania. Vikram Solar already operates offices in Kenya, Uganda, and South Africa.
Jun-16	Won the National Excellence Award.
Sep-16	Signed a MoU with Teamtechnik.
Oct-16	Launched a strategic cooperation to enter the Finnish market.
Nov-16	Announced a MoU with the Indian Institute of Engineering Science and Technology (IEST) at the Rashtrapati Bhavan.
Jun-17	Became one of the largest solar module manufacturers in India with a manufacturing capacity of 1 GW
Jul-17	Vikram Solar modules became one of the top performing modules by DNV GL testing standards.
Oct-17	Launched the new monocrystalline product line SOMERA.
Jan-18	Mr. Gyanesh Chaudhary appointed as the Chairman of the Renewable Energy & Energy Storage Division of IEEMA.
Feb-18	Opened a sales office in Massachusetts, US
Mar-18	Vikram Solar tied up with France's CEA to drive innovative technology research and development.
May-18	Vikram Solar opened an office in Gurgaon.
Jun-18	The company announced a Tigo-integrated Smart module called SOLIVO at Intersolar Munich 2018.
Sep-18	Vikram Solar launched a half-cut cell module at REI 2018.
Jan-19	The company won a contract to install a 140 MW Solar Project for the NTPC.

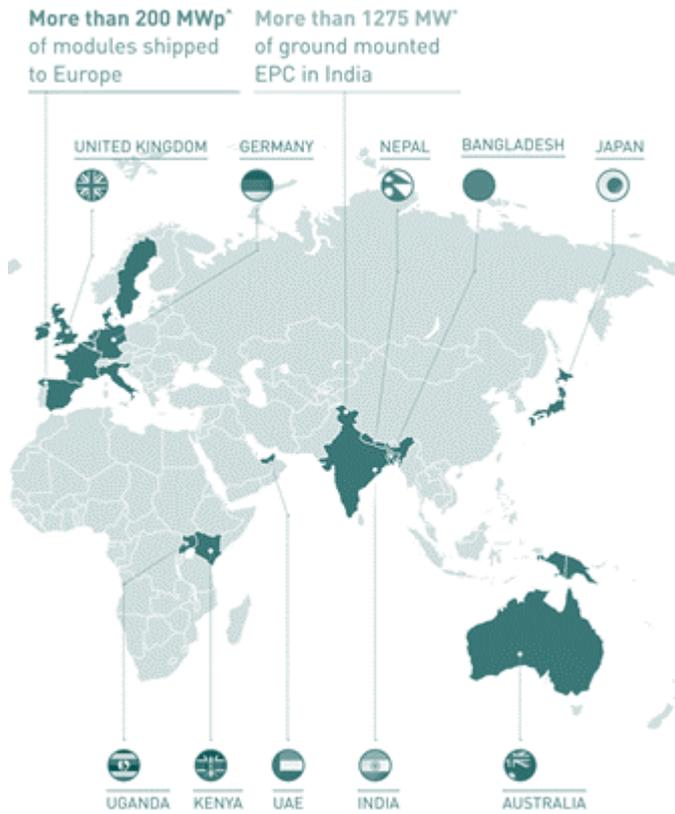
Projects and manufacturing facilities

India	
2018	200 MW- Anatapuramu, Andhra Pradesh
2019	20MW - Ayodhya,Uttar Pradesh
2018	10 MW – Itrasi, Madhya Pradesh
2018	10 MW – Dhaej, Gandhar, Hazira
2018	1461 kW Rooftop – Gujarat
2018	350 kW Rooftop – Cossipore
2018	100 kW Rooftop – Haryana
2017	130 MW – Rajasthan
2017	80 MW – Charanka, Gujarat
2017	20 MW – Karnataka
2017	10 MW – Tirupati, Andhra Pradesh
2017	100 kW Rooftop – Patna
2015	10 kW Floating Solar Plant – Kolkata
Overseas	
Vikram Solar supplied 52.6 MW of Modules to Southern Current, USA.	
4.2 MW project commissioned in the USA with Vikram Solar modules.	
312 kWp solar system installed by Finnwind Oy with Vikram Solar modules at Helsinki-Vantaa Airport.	

Broad Customer Base



Geographic Expansion: Reach Beyond India



Product and Technology

The company's products are based on high-efficiency mono Passivated Emitter and Rear Cell (PERC) technology. The products using the technology are of both bifacial and monofacial types. Similar to other PV players, the company uses mono and poly crystalline in the PERC technology for its product.

Strategy

- **Advanced technology and tapping markets beyond India**

Based on Vikram's technology, its products are expected to last 25-27 years, with quality being the main feature of the product. With its product, which it developed for India, it began to tap markets in Europe, the US, and Australia. It was necessary for the company to target markets beyond India during the initial stages of operation in order to survive in the market.

- **Robust EPC business model instead of capex**

Although the majority of Vikram Solar's revenue comes from manufacturing, the company also built a robust EPC business, focusing on its engineering excellence. The company delivered EPC solutions for both private and public sector clients across India, including a 130 MW implementation for NTPC in Rajasthan and 80 MW for GIPCL in Gujarat.

- **Rooftop solar business is the new focus**

Growth in this business unit has recently been key for Vikram Solar. This SBU has completed 250 projects, including a 2,000 KW solar installation project for the Airport Authority of India (Kolkata). The company expects this unit to witness high growth rates in the upcoming period.

Key Opportunities

- Industry recovery- 2018 was a difficult year for solar power in India, with policy change in China, tender cancellations, and tax/duties being levied upon the domestic solar panels manufacturing sector. According to estimates, nearly 35 GW of solar energy projects were tendered between Jan-September 2018 in India, of which only 13 GW of projects were auctioned at the end of 2018. However, by 2019, the solar panel installation in the country improved. Consensus expected that floating solar power projects would gain priority in 2019, and research indicated that around 80 MW of new floating solar capacity was expected to be added in 2019.
- Mono PERC (passivated emitter rear contact) solar panels were expected to become the new norm in India in 2019, and the energy storage market is expected to be boosted as rooftop solar projects become more viable for industry, commercial, and residential consumers. Government focus on rooftop solar power growth is likely

to further support growth in the sector. States like Rajasthan, Andhra Pradesh, Tamil Nadu and Karnataka will continue to contribute to Indian solar growth, and are expected to account for more than 75% solar capacity addition in 2019. Growth is immense, but is dependent on government policies.

Concerns

- Recent policy deviations are a concern for the solar industry in India, and have had a significant impact on leading players like Vikram. More efforts are needed to continuously support growth in the solar industry in India; this also explains Vikram's gradual shift to other markets.

Financial Analysis

According to available information on financials, the company generated a revenue of INR16.6m in FY 2016-17, growing at a 5-year CAGR of 53.9%. Growth was mainly driven by the company's deep focus on following an EPC model. The recently-appointed CEO aims to generate one billion dollars in revenue by 2022.

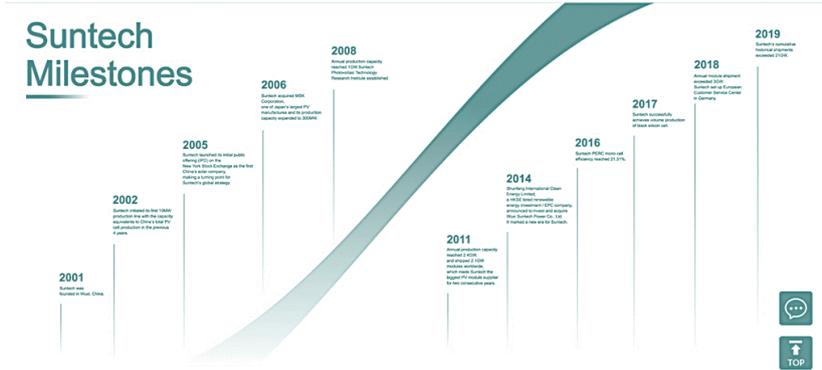
Suntech Power

Company Background

Founded in 2001, China based Suntech has supplied over 22GW photovoltaic modules to more than 100 countries.

The company was doing well until a global supply glut and anti-dumping tariffs impacted the market for solar products, alongside its high debt burden at the time. Following such problems, in 2013, the company was forced to default its U.S. bond payment. The company was then delisted, and is now a private company with a public debt profile. During this time, the company was acquired by Shu-feng International and has continued to progress in solar product development. Despite the debt profile, the company continues to be one of the leading solar cell manufacturers globally, ranking amongst the top 10 on market share.

The company now boasts a strong financial position, which appears possible given the company's product development and ongoing project plans. According to the Bankability 2020 report released by BNEF, Suntech is at the 7th place in the world among the Top 15 PV module brands used in term-loan financed projects .



Amongst the Top 10 Module Manufacturers



Source: SolarEdition

Internationally Established: Has Mostly Focused on Europe



Claims Strong Financial Strength

Solid Financial Strength

5A Rating by
dun & bradstreet

Superior Bankability

- Suntech ranks Tier 1 by Bloomberg.
- Suntech has been ranked one of the world's most bankable PV module brands according to the Bloomberg New Energy Finance (BNEF) "2019 PV Module Bankability Report".
- BlackSearch validated Suntech bankability in a 2016 study.
- Munich Re granted Suntech warranty back up insurance after extreme vetting.



Solar Projects in Place

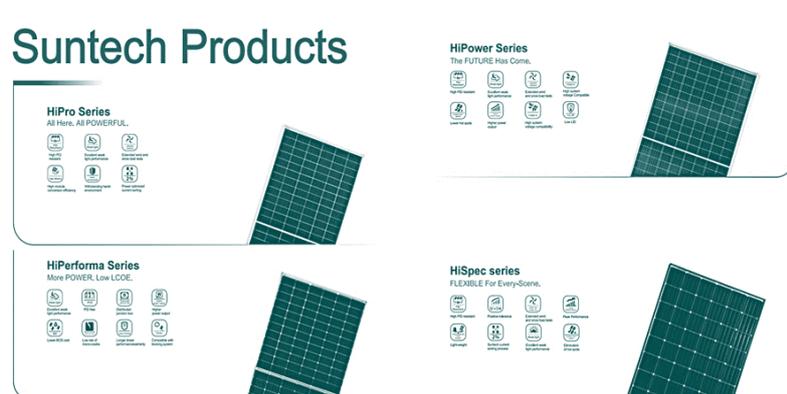
Plant Name	Country	Year	Capacity
Solar Power Plant Projects			
Shell Moerdijk Solar Power Plant	Netherlands	2019	26.6MW
Enlight Kramim Solar Power Plant	Israel	2018	18 MW
Agadyr Solar Power Plant	Kazakhstan	2019	50MW
Solar Power Plant in South Africa	South Africa	2019	250MW
Nunez de Balboa Solar Power Plant	Spain	2019	500MW
Pavagada Solar Power PLant	India	2019	210 MW
Solar Power Plant in Tamil Nadu	India	2016	222.5MW
Baggersee Maiwald Floating Power Plant	Germany	2019	750kW
Distributed Projects			
Beijing Bird's Nest Stadium BIPV Project	China	2008	130kW
San Francisco International Airport Terminal 3 Rooftop Project	USA	2008	450kW
SIEMENS Asia-pacific Headquarter's Rooftop Project	China	2019	308kW
Sydney Opera House Rooftop Project	Australia	2010	384kW
Genk Municipal Rooftop Project	Belgium	2009	239.4kW

Source: Company Disclosures

Product and Technology

The cells produced by Suntech are both monocrystalline and polycrystalline. Using this technology, Suntech provides premium-priced as well as low priced products

According to the president of Suntech, crystalline silicon technology is fully developed and promoted conversion efficiency. In the years ahead, the PV module conversion efficiency is expected to be 25%. Meanwhile, Suntech is also involved in key technologies, such as Heterojunction technology (HJT), which it hopes will set the trend in the future in R&D. HJT is a solar panel production method that has gained stronger recognition over the last decade. The technology is currently considered the solar industry's best option to increase efficiency and power output to the highest levels.



Investment Thesis

Products Focusing Downstream; Partnerships and Investments Upstream: Allow Supply Chain and Profitability Control

Upstream expansion did not work well for Suntech, which has therefore been focusing on mainly expanding product segments downstream. Upstream products have a lower profit margin, which is one of the reasons for the company to now focus more on downstream. However, to keep control of upstream, Suntech has entered into partnerships and invested in upstream suppliers. By maintaining equity interest in upstream suppliers and focusing mainly on downstream via its products, the company has gained a stable hold on the supply chain. In contrast to other module players who are vertically integrated, for Suntech, increasing focus on downstream has helped the company rebound profitability levels. Margins came under pressure following the oversupply and tariffs imposed during 2011. However, by maintaining premium and lower priced products in the downstream, the company claims to have been able to recover and maintain margins.

Improving Production Capacity Helps Suntech Keep Up with Market Growth

The expansion and streamlining of manufacturing facilities is a strength of Suntech, as it is for all solar players. The company has continuously expanded capacity. This also explains the company's debt burden, to a certain extent. However, in order to remain one of the top 10 solar module producers, it is necessary to continuously increase capacity and maintain utilisation rates. The PV market is projected to grow at a CAGR of 18.3% from USD 126.1 billion in 2014 to USD 345.6 billion by 2020. As a region, APAC is likely to see the highest growth. Thus, it is likely that Suntech, from its current focus in Europe, could gradually target the APAC market more. We believe that Suntech could possibly do this given its leadership in the sector despite its troubled past. In May 2020, according to 365 PV, the company reached the "Global Top 20 Companies on PV 2020". Suntech was also awarded "Global Top 20 Companies on PV 2020 (Integrated)", "Chinese Top 20 Companies on PV 2020 (Integrated)" and "Top 20 Chinese Solar Panel Companies on PV Power Plants 2020".

History of Debt Burden and Bond Default are Concerns; However, Being a Private Company Might Help Suntech Maintain Position

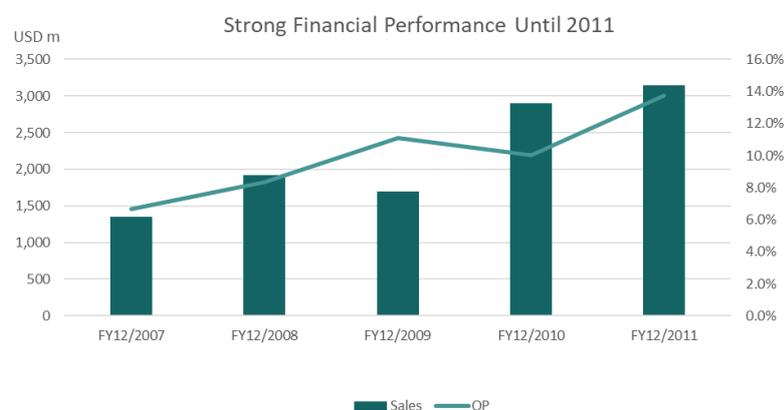
Debt burden and prior history of U.S. bond default are our main concerns for the company. If the market conditions turn out bad either due to oversupply or competition, Suntech could be affected, given debt \$2,263m debt burden (latest available). The company's private nature appears to help the company more. Thus, it is likely that the company might remain private for a while, despite its currently positive progress.

Financial Analysis: A High Gearing Position Likely

Financial information is available only until 2011, and analysing the trend till then, our main comments are that the company's downside performance was mainly due to the volatile market conditions, which it could not manage. During 2007-2011, revenue grew at a CAGR of 24%, while OP grew at a CAGR of 48%, and OP on average was around 10%.

Based on the latest numbers available, (2011), Suntech targeted a module non-silicon cost structure of approximately 55c per watt for 2012, a 30% reduction from the end of 2011. The company was said to streamline operations to eliminate overlap and improve operational and process discipline. Suntech was also stated to be on track to achieved 20% reduction in cost and maintain operations to match market conditions, unlike in 2011.

As of now, the various reports indicate that the company is doing well in terms of growth and financial strength. In terms of revenue, the company should be witnessing a growth rate above the industry given its market position. However, it is difficult to comment on the profitability and gearing. However, we believe that the gearing level should be at the high end of the spectrum for companies like Suntech.



Yingli Green Energy Holding Company Limited

Company Background

Yingli Green Energy Holding Company Limited, also known as Yingli Solar, was founded in 1997 in China, and is currently one of the world's largest solar panel manufacturers. Yingli provides personalised customer services to both the industrial and domestic ends of the market.

Having engaged in small scale solar project operations in China whilst improving PV system installations experience since 2012, by 2015, Yingli Solar had managed to construct 600 MW of PV projects in China. In 2016, 2017, and 2018, PV projects were sold in various stages of development and there was an acceleration in the disposition of downstream PV projects in China.

In 2020, Yingli Solar and China Development Bank Energy Co. Ltd, along with a few other companies, agreed to jointly promote the development of the photovoltaic industry whilst promoting new technologies and the development of power station projects.

However, despite the company's dominance and growth in China's PV market, the company has filed for insolvency and inability to pay its debt. The filings are being processed.

YINGLI GREEN ENERGY HOLDING COMPANY LIMITED
FORM 6-K

Table of Contents
Other Events.
Signature

Other Events.

Yingli Green Energy Holding Company Limited (OTC Pink: YGEHY) ("Yingli Green Energy" or "the Company"), was informed by the administrator (the "Administrator") of Yingli Energy (China) Co., Ltd. ("Yingli China") that it has filed a petition on behalf of Yingli China to the Grand Court of Cayman Islands to liquidate the Company as the Company is insolvent and not able to repay debt owed to Yingli China. In addition, the Administrator of Yingli China requested that EY Cayman Ltd. be appointed as the Insolvency Administrator of the Company to oversee the Company's liquidation process. The Grand Court of Cayman Islands is expected to accept the petition to liquidate the Company around the end of September.

On July 9, 2020, Baoding Municipal Intermediate People's Court in Hebei Province, China, has ruled that the restructuring of Yingli China, Baoding Tianwei Yingli New Energy Resources Co., Ltd., another subsidiary of the Company, and Yingli China's subsidiaries (Hainan Yingli New Energy Resources Co., Ltd., Tianjin Yingli New Energy Resources Co., Ltd., Hengshui Yingli New Energy Resources Co., Ltd., and Lixian Yingli New Energy Resources Co., Ltd.) should be consolidated as one restructuring case. The Court has appointed the Administrator of Yingli China as the administrator of those six companies to administer their restructuring process. The primary goal is to restructure their debt obligations, while continuing their production and operations to meet customer orders and its product warranty obligations. In addition, through the restructuring, more funds will be injected into the restructured companies for the equipment and technique upgrade and the expansion of highly efficient production capacity. However, the restructuring of these six companies is expected to wipe out all equity interests in these companies, and therefore the Company expects to suffer a total loss of all of its direct and indirect investments in these companies.

Given the Company's current assets and liabilities, the Company does not expect there will be any residual assets for distribution to the Company's shareholders upon completion of the Company's liquidation. The Company is expected to be dissolved upon completion of the liquidation process, which will be carried out by the Insolvency Administrator, and all outstanding shares of the Company, including any ADSs representing the Company's ordinary shares, are expected to be cancelled for nil consideration upon completion of the Company's liquidation and dissolution process.

Note: As of September 2020.

Products

The products and services of Yingli Solar include the manufacturing of polysilicon ingots and wafers, PV cells, PV modules and integrated PV systems, and the development of solar projects. Certain products are also based on monocrystalline technology.

Strategy

- **Vertically Integrated Manufacturer**

Similar to its Chinese peers, Yingli also operated a vertically integrated manufacturing systems increasing its downstream presence.

- **Globalisation efforts: Differing focus for each country**

While China is the domestic market, Yingli Solar sells to various other international markets including, but not limited to, Japan, India, Chile, US, Salvador, Germany, Turkey etc.

For Japan, Yingli attempts to grow by providing cost-effective and efficient energy programmes. For the US, Yingli Solar aims to introduce new products whilst entering into partnerships with local companies such as DuPont to develop newer modules. Yingli Solar plans to penetrate the Indian market through the efficient employment of local teams and expertise.

Opportunities

- The global integrated photovoltaic market is expected to grow at a CAGR of 9.78% over the period of 2017 – 2021.

Concerns/Threats

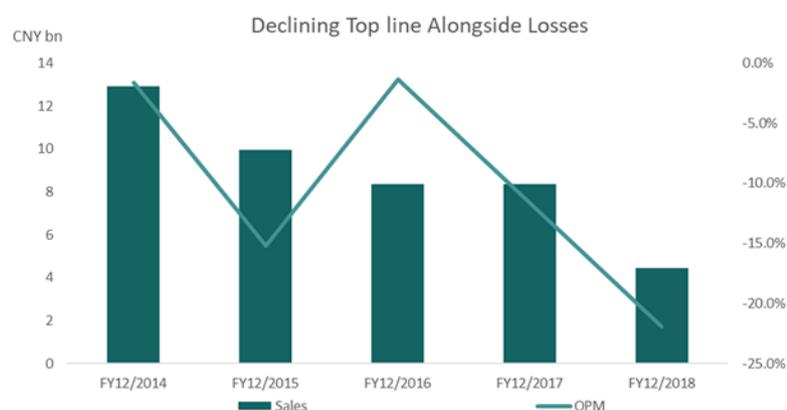
According to Yingli Solar's 2018 annual report, there were significant doubts regarding Yingli's ability to continue as a going concern, owing to a number of reasons including net losses incurred over the years, low liquidity, and shareholders' deficit. Most importantly, increasing loans to fund business expansion had significantly pressured liquidity levels of the company.

Eventually, the company filed for insolvency and noted its inability to repay the debt owed to Yingli China. The company is expected to be restructured and continue to serve consumer needs. However, the company will have enough funding and support to do so will be a concern.

Financial Analysis

Yingli Solar's net revenue has been declining from CNY12.9bn in 2014 to CNY4.5bn in 2018 (financials available only until 2018). This drop in sales adversely affected Yingli's gross profit and net profit over the years. The company was making losses at the operating level, with its % of sales increasing from -1.7% in 2014 to -11.6% in 2017, and to -21.9% in 2018.

It should also be noted that Yingli Solar has higher polysilicon costs than other market players, as it has entered into long-term contracts at fixed prices to purchase polysilicon. In addition, growing debt and related interest expenses are other reasons for the poor profitability profile. The company, similar to Suntech, could become private and might rebound better afterwards. However, despite its well-known brand presence, the company's debt profile and poor financial position only suggest that the other currently-emerging leaders could also in a similarly risky position if borrowing for expansion does not yield results as expected.



Source: Company Disclosures

Tongwei Solar

Company Background

The company is a part of the Tongwei Group, Tongwei Solar currently has four bases (Hefei, Chengdu, Meishan and Jintang).

Tongwei Group Overview



Tongwei Group – Top 500 Chinese Enterprises

A technologically advanced large trans-national enterprise

- ◆ **Employee:**
Approximately 40,000 employees.
- ◆ **Bases:**
Over 200 branch/subsidiary companies
- ◆ **Main business:**
 - **Green Agriculture**
Feed Processing, Intelligent Cultivation, Food Processing.
 - **New energy**
An vertically integrated PV company (High purity silicon production, high performance cell production and PV power station operation). An important participator and main driving force of PV industry in the world.



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P V Industry






Yongxiang

Capacity: 115,000 tons

A circular economy industrial chain where new energy and chemical industry are fully integrated



TONGWEI SOLAR

Anhui	Sichuan
3GW poly	14GW mono
3GW mono	1GW SHJ
1.7GW module	



Tongwei New Energy

The innovative business model of “Fishery & PV Integration” of “clean energy above the water and safe aquatic products under the water”.

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T W Solar Main Business



Solar Cell :

Rank: 1st place with 20GW capacity (Among the global solar cell manufacturing enterprises) by the end of 2019

Enhancing the industry concentration and consolidating the company's scale advantage in the solar cell segment



Solar Module :

Capacity : 3 GW by the end of 2020
(2.6GW is shingled modules)

Export Growth : 100%



Partners





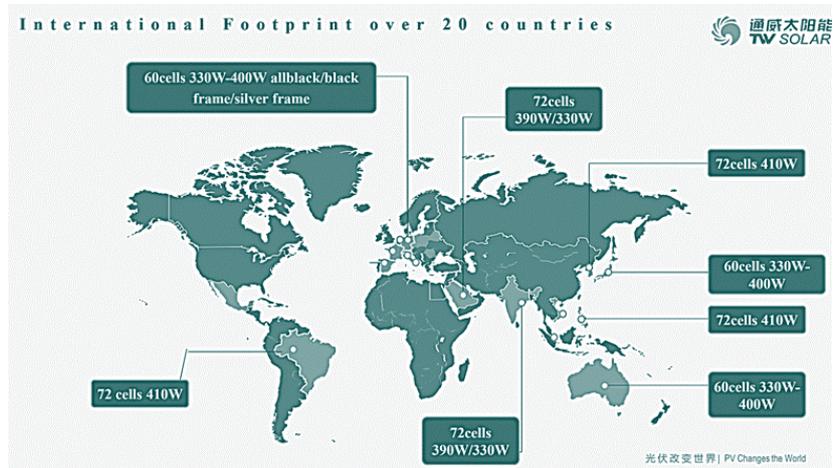








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Product and Technology

The company primarily adopts the crystalline silicon solar cell production. This includes poly cells as well as Mono PERC cells, both mono and bi-facial. The company for its cell modules also resorts to a shingled module type, which it believes has a competitive advantage over the full and half cut cell technology as shown below.

2. Technology

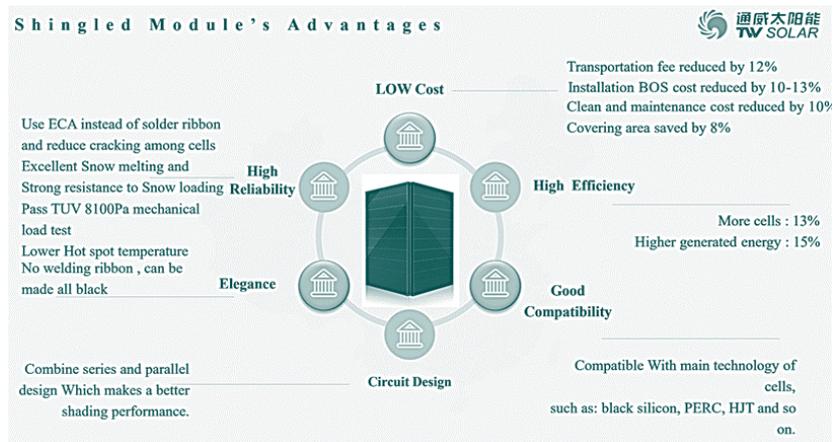
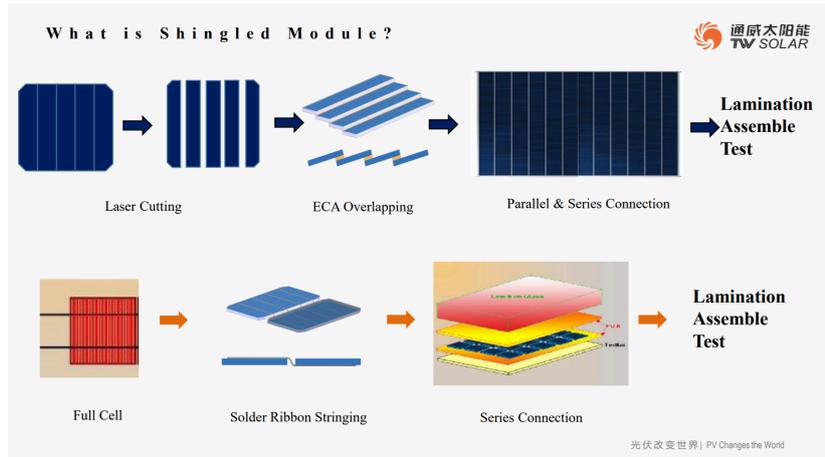
With years of investment on research, Tongwei Solar has developed advanced researching capabilities and accumulated valuable practical experience in multiple products, including P type Perc (main product), Perc+, Topcon, HJT, etc. With different technical routs, the trial capacity for HJT has reached 400MW.

- Product Size

Compatible with 210 and other products listed below (including 166, 163, 158, 156).

- Conversion rate

Technical rout	Conversion rate
Perc (P type)	23%+
Perc+ (P type)	24%-24.5%+
Topcon (N type)	increase 0.8%-1% above p-perc
HJT (N type)	24.5%-25%+



Shingled Module's Advantages - Compared with Different Modules

Type	Cells options	Type	Power			M3 Size (L*W*H)	Efficiency	LCOE	BOS/Land area cost	Unit Price	Life Time	Electric Energy Production	PID Resistance
			M2	G1	M6								
Full Cell	Mono Perc	60	315W	325W	350W	1665*1002*35	☆☆	☆☆	☆☆	☆☆☆	☆☆	☆☆	☆☆
		72	380W	390W	425W	1986*1002*40	☆☆	☆☆	☆☆	☆☆☆	☆☆	☆☆	☆☆
Half Cut	Mono Perc	60	320W	330W	355W	1704*1008*35	☆☆	☆☆	☆☆	☆☆☆	☆☆	☆☆	☆☆
		72	385W	395W	430W	2031*1008*40	☆☆	☆☆	☆☆	☆☆☆	☆☆	☆☆	☆☆
Shingled	Mono Perc /SHJ/HIT /SE PRC	60	350W	360W	390W	1646*1084*35	☆☆☆	☆☆☆	☆☆☆	☆☆	☆☆☆	☆☆☆	☆☆☆
		72	420W	430W	465W	1969*1084*35	☆☆☆	☆☆☆	☆☆☆	☆☆	☆☆☆	☆☆☆	☆☆☆

Shingled Cells Give a Higher Profit

Profit Measurement in Project with Different Solar Modules



No.	Scheme	Area of Land (acre)	Illumination peak hours per day	Investment IRR (%)	Installation Capacity (KW)	Modules Efficiency (%)	Over proportion	Cost of Investment (USD/W)	Modules cost in external system (USD/W)
1	Shingled 405W	3000	1585	8.01	155131.2	19.5	1.306	0.4746	0.1882
2	Mono 365W	3000	1585	8.01	149597.805	18.8	1.294	0.4741	0.1928
3	Poly 330W	3000	1585	8.02	133293.6	17	1.293	0.4718	0.1982
4	HDT 320W	3000	1585	8.02	153216	19.67	1.290	0.4738	0.2014
5	HDT 320W (bi-facial)	3000	1696 (tone-up 7%)	8.02	153216	19.45	1.290	0.5116	0.2014
6	Shingled 405W	3000	1585	8.52	155131.2	19.5	1.306	0.4551	0.1882
7	Mono 365W	3000	1585	8.52	149597.805	18.8	1.294	0.4546	0.1928
8	Poly 330W	3000	1585	8.50	133293.6	17	1.293	0.4536	0.1982
9	HDT 320W	3000	1585	8.50	153216	19.67	1.290	0.4177	0.2014
10	HDT 320W (bi-facial)	3000	1696 (tone-up 7%)	8.50	153216	19.45	1.290	0.4920	0.2014

*150MW project measurement of profit with different solar modules.

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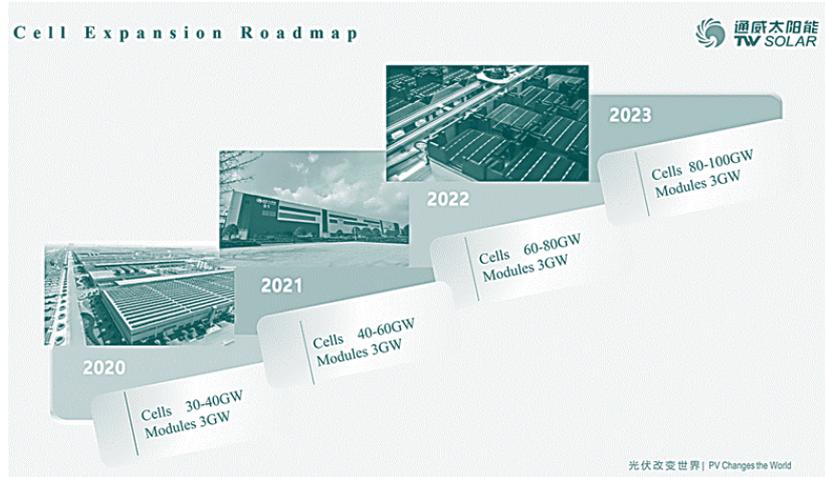
Strategy

- **Not vertically Integrated:** TW solar simply buys ingots and wafers and slices them to produce solar cells. According to the company, this way they will be able to increase production to have 30 GW of cell production capacity to supply over 10% of the worlds demand in another five years' time. Simply focusing on buying the ingots while partnering with players like JA, Jinko, Adani, TW Solar has been able to conveniently increase its capacity and production. The company has in place an aggressive plan for capacity expansion and hence revenue.
- Aggressive Capacity Expansion Plans

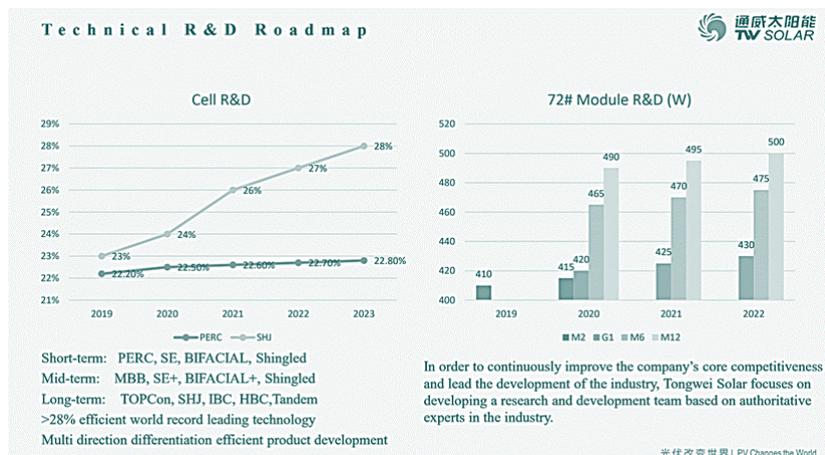
1. Accumulated Capacity Plan

Unit: GW

2020	2021	2022	2023
30-40	40-60	60-80	80-100



- **Focus on Technology Development:** Attempts to improve the technology to carefully capture growth.

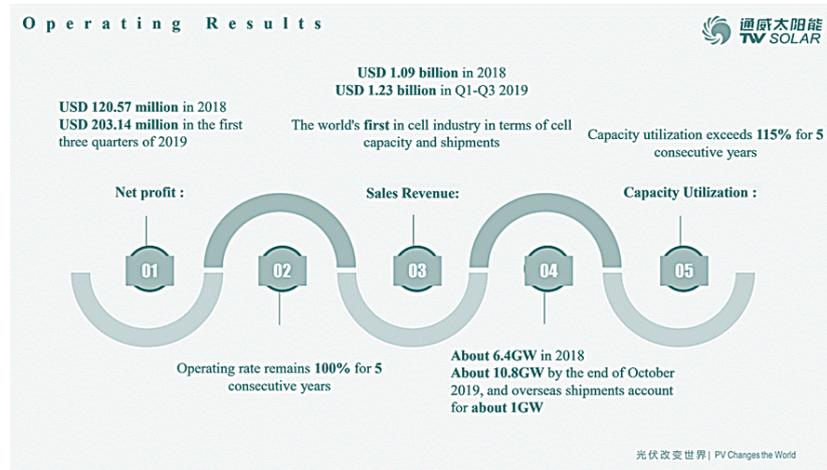


Key Opportunities

- Continued growth in the PV market and demand for Shingled modules

Financial Analysis

Growing Revenue and Strong Profits



Listed But Not Pure Play Solar Players: Mostly Japanese Players

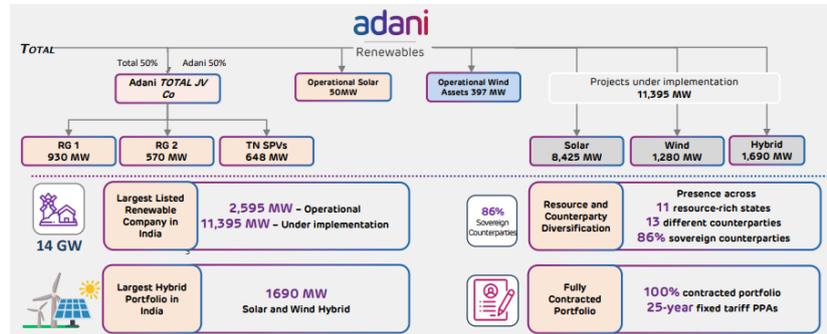
Adani Green Energy Limited

Company Introduction

Adani Green Energy Limited (AGEL), is a part of the diversified Adani Group. The company develops utility-scale grid-connected solar and wind farm projects. The electricity generated is supplied to investment-grade counterparties. As of 31st March 2020, the company's total project portfolio was 13,990 MW and 74% related to Solar while 14% was linked to hybrid projects. The company established its first solar project in 2015 and went public in 2018. With presence across 11 states, a healthy mix of wind and solar power generation capacity and long-term off take agreements, AGEL is one of the largest energy players in India.

With the help of Adani Solar, the Adani Group's separate PV manufacturing arm, AGEL expects to accelerate its journey closer to its target of achieving an installed generation capacity of 25 GW of renewable power by 2025.

Business Overview

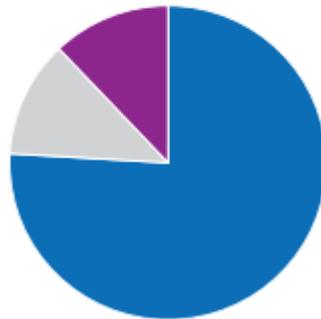


Source: Company Disclosures

Solar Business – Major Revenue generator of the company

Diversified Resource Mix*

- Solar Wind Hybrid 14%
- Solar 74% ● Wind 12%



Resource mix of 13,990 MW

Source: Company Disclosures

Product & Technology

The company deploys the polycrystalline and thin-film technologies in its solar projects.

Strategies

- **Long Term Contracts with Secure counterparties**

Adani Green Energy Limited's business model of focusing on long-term Power Purchase Agreements (PPA) of 25 years with central and state government entities, followed by quick construction of large projects, and partnering with major global integrated energy players to reduce their carbon footprint has enabled the company to expand rapidly.

- **Follows an EPC Model**

The company's engineering capabilities help design cost-efficient solar projects, which are backed by a thorough analysis of the land, solar radiation, grid connection infrastructure and emerging technologies.

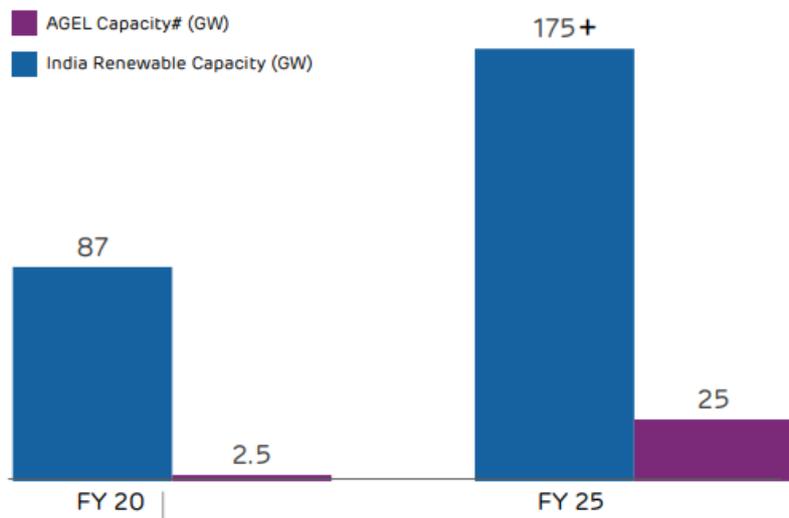
- **Strong Asset Support Rapid Implementation of Solar Projects**

The latest ranking of global solar companies by Mercom Capital ranks the Adani Group as the number one global solar power generation asset owner in terms of operating, under construction and awarded solar projects. Adani's renewable energy portfolio exceeds the total capacity installed by the entire United States solar industry in 2019.

Opportunities

- Untapped demand in India is Adani's greatest opportunities. Partnerships, long term purchase agreements support from the government, makes it easy for AGEL to capture a strong share of the market. The company aims to be the world's largest solar power company by FY25 and the largest renewable power company by FY30.

The company expects to be the largest solar power company in the global market by 2025



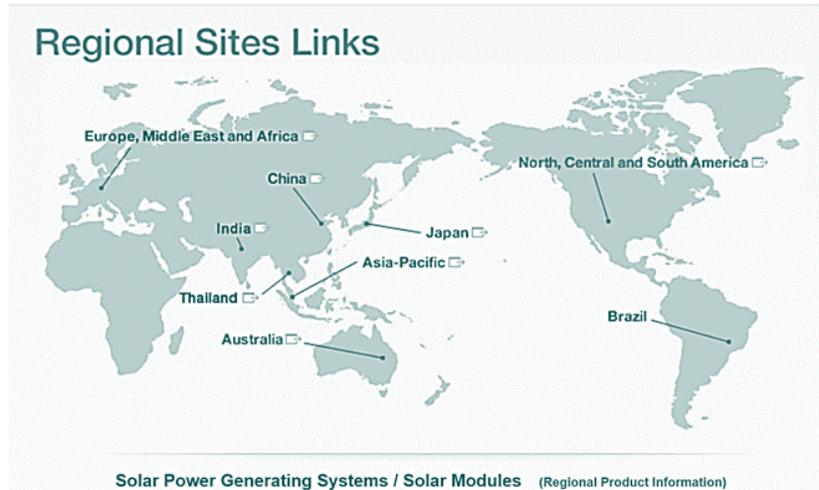
Source: Company Disclosures

Kyocera Solar

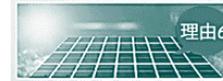
Company Background

Kyocera Solar is a part of the global Kyocera group, and was founded in 1959 in Kyoto. The segment of solar energy is still a small one for Kyocera, but is expected to grow strongly. This Multi-Layer-Ceramic capacitor (MLCC) player is expecting to use its MLCC expertise for the development of energy products that it categorises under its Life & Environment segment. Kyocera Solar serves customers directly, as well as through distributors. The company boasts a wide customer base ranging from industrial customers, such as original equipment manufacturers, to government organisations, utilities, corporate clients, and institutions.

Solar Energy Business Market Growth for Kyocera

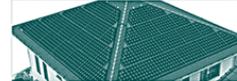


ABOUT
Kyocera Solar/ Six reasons to choose Kyocera Solar Power System

 理由1 Continuous pursuit of the highest quality	 理由2 Stable and durable operating system	 理由3 One-stop service, covering proposal, design, construction, after-sales
 理由4 Excellent and rich installation examples	 理由5 Provide customers with comprehensive and professional service capabilities	 理由6 Establish the most suitable system proposal for megawatt power generation projects

Kyocera Global Products: Solar Energy for Consumers and Businesses Accounted for in the Life & Environment segment

Consumer

 Mobile Phones	 Kitchen Utensils	 Solar Power Generating Systems for Residential Use
 Power Tools (KYOCERA Industrial Tools Corporation)	 Stationery	

Business to Business

Equipment, Services and others



Document Imaging Equipment
(KYOCERA Document Solutions)



Solar Power Generating Systems for
Public / Industrial Use



Information Systems and
Telecommunication Services
(KYOCERA Communication Systems)



Power Tool (KYOCERA Industrial
Tools Corporation)



Medical and Dental Products



M2M Modules

Electronic Components, Devices and Materials



Fine Ceramic Components



Power Devices



Crystal Devices



SAW Devices



Capacitors



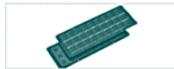
Connectors



Ceramic Packages



Organic Materials



Organic Packages / Printed Wiring
Boards



Cutting Tools (CERATIP)



Printing Devices



Automotive Components



LCDs / Touch Panels



Optical Components (Lenses and
Optical Units)



Synthetic Colored Opals

Kyocera's Solar Business Development Since 1993

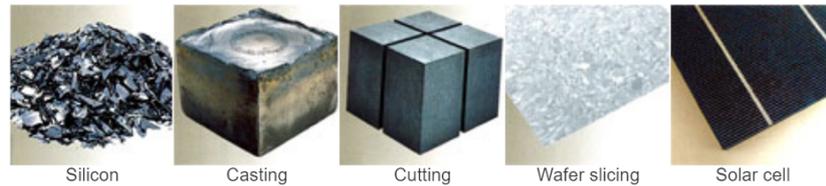
<p>1993 Kyocera's "Son of Sun" solar-powered racing vehicle is developed and finishes third in the World Solar Challenge 1989 Kyocera develops "SEV" solar powered racing car. 1990 Develops short-distance solar powered car "SCV-O" (a model car was manufactured in 1995). 1990 "Blue Eagle" solar powered racing car is produced for the 1990 World Solar Challenge, a trans-continental race across Australia. 1993 "Son of Sun" solar powered racing car places third in 1993 World Solar Challenge.</p> 	<p>2012 Starts sales of Li-ion battery storage units Designed to meet growing demand in Japan following the March 2011 disasters, Kyocera begins sales of a new system which combines solar power generating systems with long-lasting, high-capacity lithium-ion battery storage units. Also, Kyocera began sales of a home energy management system (HEMS), which efficiently controls the use of energy in the home.</p> 
<p>1988 Achieved world's highest conversion efficiency of 15.5% with multicrystalline silicon solar cells (10×10cm). 1990 Achieved a top share in Japan's Ministry of Industry and International Trade special public use solar generation system program. 1993 Achieved world's highest conversion efficiency of 19.5% with monocrystalline silicon solar module components (10×10cm). 1994 Top market shareholder in the Japan solar industry according to the Ministry of Industry and International Trade (MITI) residential solar generation system monitor program. 1995 Established mass-production technology of enlarged multicrystalline silicon solar cells components (10×10cm to 15×15cm).</p>	<p>2013 Kyocera starts operation of 70MW solar power plant, the largest* in Japan Kyocera starts operation of a 70-megawatt (MW) solar power plant in Kagoshima Prefecture, southern Japan. The Kagoshima Nanatsujima Mega Solar Power Plant went online on November 1 and is being operated by a special purpose company established by Kyocera and six other companies to sell the electricity to a local utility under Japan's feed in tariff (FIT) program. Clean safe electricity generated will provide the equivalent power for roughly 22,000 average households. * Largest operating solar power plant in Japan. Based on research by Kyocera (as of November 1, 2013).</p> 
<p>1996 KYOCERA Solar Corporation established in Japan Kyocera Solar Corporation is established, providing an integrated system of sales, installation and maintenance to ensure complete customer satisfaction. In 1990, the Kyocera Solar franchise business is launched as the industry's first business model of its kind.</p> 	<p>2015 Through a joint venture with Century Tokyo Leasing, Kyocera launches its first floating solar power plants at three reservoirs in Japan.</p> 
<p>1998 Kyocera becomes world's No.1 producer of solar modules Kyocera produces more solar modules than any other company in the world, both during 1998 and the following year. In 1999, a 214-kilowatt solar electric generating system installed at Kyocera's newly constructed global headquarters — consisting of 1,896 solar panels and other environmentally friendly features — wins the New Energy Foundation Chairman's Award in the "application example" category of the Third New Energy Grand Prix. 1997 Environmental Preservation Merit Award, Environmental Agency Director-General's Prize 1999 New Energy Grand Prix New Energy Foundation Chairman's Prize</p>	<p>2003 Kyocera (Tianjin) Solar Energy Co., Ltd. Established With the launch of this manufacturing facility, Kyocera became the first Japanese company to mass-produce solar modules in China.</p> 
<p>1996 Kyocera achieves world's highest conversion efficiency of 17.1% in 15×15cm multicrystalline silicon solar cells. 2002 d Blue cells are applied to residential solar modules. A 176W solar module and voltage controller are released. In 2006, Kyocera's 155mm x 150mm solar cells achieve the world's highest* conversion efficiency rate of 18.5%, breaking the company's own previous record. *As of July 2006 based on research by Kyocera</p>	<p>2016 Recognized as a "Top Performer" by DNV GL The Scorecard provides insights into the expected reliability of various brands of solar modules by subjecting them to unparalleled technical comparisons. Kyocera was the only manufacturer to be named as a "Top Performer" across all tests in both editions of the Scorecard.</p> 
<p>2009 Kyocera solar modules used on the Toyota Prius Kyocera supplies solar modules for the Toyota Prius solar ventilation system, an optional feature for the hybrid car introduced by Toyota Motor Corporation. The system ventilates the air inside of the car using the solar module on the rooftop to drive the fans while the car is parked during the daytime.</p> 	
<p>2010 New solar cell manufacturing plant completed in Yatsu City, Shiga Prefecture, Japan Combined with the existing Yonkaichi Plant nearby, the plants serve as Kyocera's solar cell manufacturing complex. With this expansion, Kyocera demonstrates its commitment to local revitalization and economic development as a community-based company, while it continues to expand its solar business.</p> 	<p>2011 First in the world to pass 'Long-term Sequential Test' Kyocera's multicrystalline silicon solar modules are the first in the world to pass all "Long-term Sequential Tests" performed by TÜV Rheinland Japan Ltd (Headquarters, Germany), a third-party institute which independently evaluates the quality and reliability of solar modules.</p> 

Product and Technology

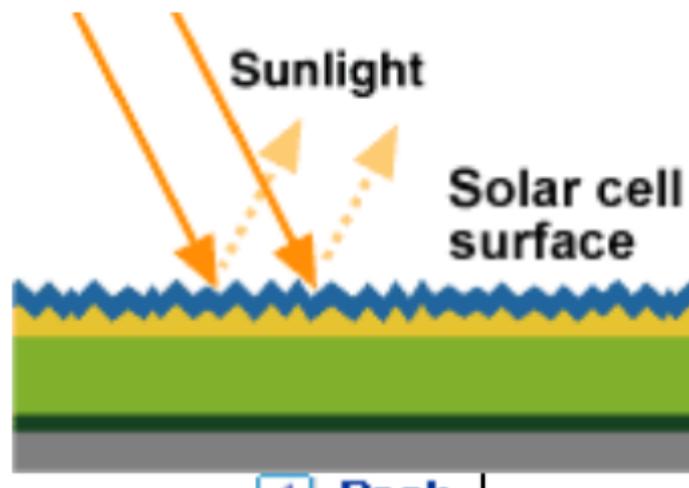
Kyocera's solar technology consists of silicon ribbon crystal and multicrystalline silicon photovoltaic cells using casting technology. The company, however, began in 1975 with the Edge-defined Film-fed Growth (EFG) process, which involves drawing out a sapphire-substrate ribbon.



Multicrystalline silicon technology began in 1986- when the company became aware of using casting techniques to form multicrystalline silicon. Due to its greater productivity, higher conversion rate, and lower cost compared to the EFG method, Kyocera wasted no time in getting research and development underway.



Apart from the casting technology, Kyocera also pioneered in the advanced technology by using plasma and reactive gas in a Reactive Ion Etching (RIE) process to create micron-level ridges on the surface of solar panels. The blue cells harvest more sunlight and help improve efficiency and reduce the amount of energy lost by reflection.



Investment Thesis

Continuous technological development and MLCC expertise To Allow Life & Environment Segment Grow

Kyocera has been developing solar technology since 1975. The company also aims to use its MLCC expertise to suit the needs of the energy market. Given the continued growth in the PV market and future requirements of downsizing PV modules, Kyocera could be one of the first players to capitalise on the opportunity.

Expects to Maintain a Wide customer base and Product Mix to Attain Market share

The company expects to use its advancing technology to develop various kinds of solar products for various purposes. The company believes that this will help maintain market share. According to the company, providing modules at discount and pricing them unsustainably will not allow the company to grow in the long term. Thus, the company believes, that a wide range of customers and products is key to growing in the long term. The company's technology of a Reactive Ion Etching (RIE) process is an example of the company's differentiation strategy for its product when compared to peers.

Segment is yet to attain profitability

Our key concern with Kyocera's solar business is that the segment is still a loss-making one for Kyocera. Kyocera is attempting to change the loss-situation in its Life & Environment segment via its cost-reduction efforts and restructuring.

Financial Analysis

The company's overall revenue grew marginally over FY03/16-20 at a CAGR of nearly 2%, while OP declined at a CARC of -1% during the same period. The slowdown in financial performance was mainly due to the company's telecommunication business segment, which accounts for the largest share in revenue.

That said, the Life & Environment business also saw revenue decline during the period at a CARC of 13.2%. Moreover, the segment generated losses since FY03/18. On the brighter side, the losses have declined over the last three years to reach JPY 11.2 bn in FY03/20 from JPY55.5bn in FY03/18.

The Life & Environment business is likely to be a long-term growth driver for the Kyocera group. After the Document Solution business, the company has been focusing on building a stable business model for power and energy-related business, sensing that this has strong growth prospects, targeting both consumers and industries. Although the segment is currently loss-making, we believe that as power and energy demand accelerates in the long term, the company is likely to experience growth in profits.

Business Segment Reclassification to Emphasise Specifically on Document Solutions and Life & Environment Markets – Solar Falls Under Life & Environment

Change in reporting segment classification

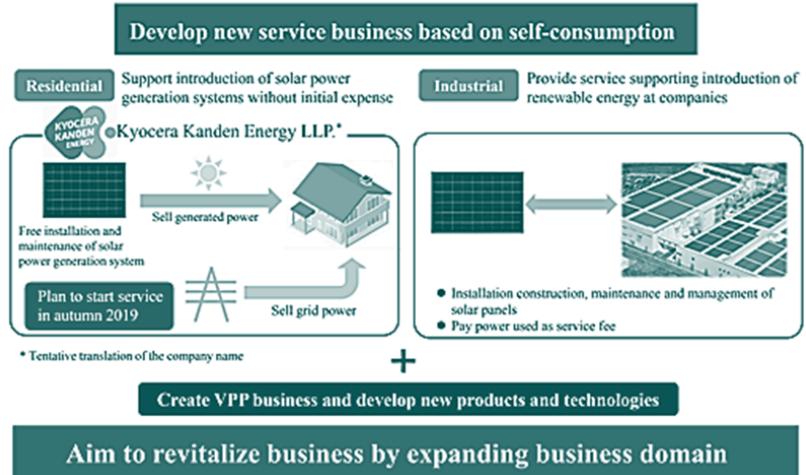
FY3/2017		FY3/2018 onward	
Components Business		Components Business	
Reporting segment classification	Main business and subsidiaries	Reporting segment classification	Main business and subsidiaries
Fine Ceramic Parts Group	Fine Ceramic Components Automotive Components	Industrial & Automotive Components Group	Fine Ceramic Components Automotive Components Liquid Crystal Displays Cutting Tools Optical Components
Semiconductor Parts Group	Ceramic Packages Organic Packages & FWBs		Semiconductor Components Group
Applied Ceramic Products Group	Solar Energy Products Cutting Tools Medical Devices Jewelry and Applied Ceramic Related Products	Electronic Devices Group	Capacitors Functional Devices Crystal Components Connectors AVX Corporation Printing Devices Liquid Crystal Displays
Electronic Device Group	Capacitors Functional Devices Crystal Components Connectors AVX Corporation Printing Devices Liquid Crystal Displays		Life & Environment Group
Equipment Business		Equipment & Systems Business	
Telecommunications Equipment Group	Telecommunications Equipment	Communications Group	Telecommunications Equipment Information systems and Telecommunication Services (KCCS) [Ⓢ]
Information Equipment Group	Information Equipment	Document Solutions Group	Information Equipment
Others	Information systems and Telecommunication Services (KCCS) [Ⓢ] Optical Components Other subsidiaries etc.	Life & Environment Group	Solar Energy Products Medical Devices Jewelry and Applied Ceramic Related Products
		Others	Other subsidiaries etc.

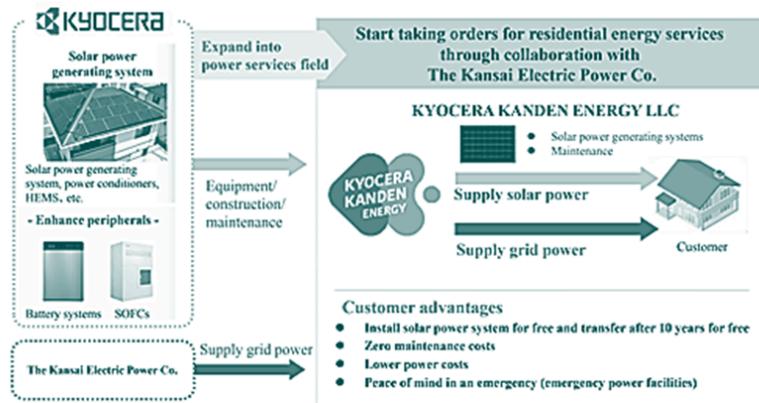
ⓈKCCS: Kyocera Communication Systems Co., Ltd.

Source: Company Disclosures

Life and Science Environment Business Model Likely to Benefit Over the Long Term

3. Change Solar Energy Business Model





Source: Company Disclosures



Source: Company Disclosures

Sharp

Company Background

Sharp was one of the first companies in the world to start R&D into solar cell devices. The company’s solar products are used in many areas: homes, extreme environments (such as lighthouses and artificial satellites), and in megawatt-scale solar power plants around the world. The company also operates in other areas such as consumer electronics and industrial electronic products. Solar energy falls under Sharp’s energy solution business, which is accounted for under the Smart Life Segment.

Sharps’ solar business, similar to Suntech’s, was hurt during 2013. The downfall was mainly seen in European markets. The yen depreciation alongside oversupply in the market forced the company to shut down one of

its factories in Europe at the time. Following this, in 2015, there was news about the company possibly looking to sell its solar business. Inside information in the PV magazine stated that various business entities within Sharp's solar operations on the whole were unprofitable – despite the company's extremely strong brand presence and impressive domestic market share. However, these remained rumours, and the company has been growing its solar business till date. The company highlighted that the business structure itself is not loss-making, and that the yen depreciation and market conditions were the key reasons for the downfall.

Solar Business Falls Under the Smart Life Segment

Business Group			
	Smart Life Masahiro Okitsu*1	8K Ecosystem Fujikazu Nakayama*1	ICT Youichi Tsusue*1
Sharp Corporation	Smart appliances & solutions	Business solutions TV systems Corporate research & development	Mobile communication Health, Medical Business
Brand/R&D			
Services/ Platforms	Sharp Energy Solutions Corporation Sharp Cocoro Life Inc.	COCORO OFFICE	AIoT Cloud Inc. Dynabook Inc.
Consolidated Companies			
Devices	Camera module*2 Kantatsu Co., Ltd. Sharp Fukuyama Semiconductor Co., Ltd. Sharp Fukuyama Laser Co., Ltd.	Display device*2	

Sharp's Solar Business Development

1959: Started development of solar cells
1963: Began mass production of solar cells
1963: First to supply Ocean Buoy with solar power cells
1966: Installed solar on lighthouse
1967: Began development of solar space applications
1976: "Ume" satellite successfully launched with solar cells on board
1980: Released first solar calculator
1981: Began operations at Shinjo Plant (now Katsuragi)
1988: Reached 11.5% cell conversion for amorphous silicon solar cells
1992: Reached 17.1% cell conversion for polycrystalline solar cells
1992: Achieved world's highest cell conversion efficiency of 22%
1994: Commercialization of residential solar power system (grid-connected)
2000: Became the global leader in solar cell manufacturing
2001: Obtained UL (U.S.) and TUV (EU) certification for PV modules
2002: Developed the industry's first string power conditioner
2003: Space PV module installed on Satellite Observatory "Free Flyer" (SFU)
2003: Began producing PV modules in the United States
2003: Began producing PV modules in Europe
2005: Developed solar cells that admit light and can be used as building materials for windows
2005: Began mass-producing [thin film solar cells](#)
2006: Katsuragi plant expands its annual production capacity to 600 megawatts, the world's highest at that time
2007: Expanded production capacity of PV modules to 200 megawatts in Europe
2008: Became the first PV manufacturer in the

world to achieve cumulative production of 2 GW **2008:** Achieved the industry's highest conversion efficiency for a polycrystalline PV module of 14.4% **2009:** Launched thin film modules globally. **2010:** Launched the world's highest efficiency Solar PV panel with greater than 32.5% efficiency

2012: Utility Scale Power Plant Built in Thailand.

2013: Started Independent Power Producer (IPP) business in Japan using megawatt-scale solar power.

2014: Sharp Solar cells installed in Daichi 2 Advanced Land Observation satellite of the Japan Aerospace Exploration Agency (JAXA).

2015: Released BLACKSOLAR panels which use monocrystalline solar cells to achieve 19.1% module conversion efficiency.

2016: Achieved 31.17% conversion efficiency, the world's highest in solar modules using triple junction compound solar cells.

2017: Rooftop solar system order received in Thailand for a supermarket.

2018: Achieved 25.09% conversion efficiency for a 6-inch monocrystalline solar cell.

2018: Began operations at Vietnam's first megawatt-scale solar power plant.

Some of the recent solar power achievements



Product and technology

Sharp manufactures a large, diversified range of solar modules, including mono-crystalline, poly-crystalline and thin film technologies. As we mentioned in our Value Chain analysis section, thin film products are cheaper than mono and poly. However, thin films are the least efficient in terms of power production when compared to the other two.

Key Strategies

- **Downstream Presence**

Despite producing product that is in the early stages of the value chain, Sharp is focused on helping clients navigate the complex solar installation and support them throughout its operations. Thus, similar to other players, Sharp looks into strengthening its downstream presence and providing more than just solar modules.

- **Premium Pricing Strategy in Japan**

Most Japanese companies, like Sharp, retain premium pricing within Japan. This also explains the company's decision to shut down operations of fab modules in Europe amidst yen depreciation. The company follows the strategy of setting high prices and leaving markets in which it cannot retain high prices.

- **Increasing focus on ASEAN**

It now appears that the company is focusing more on the Asian market by investing in factories in ASEAN like Vietnam and Thailand. Nevertheless, according to the company, UK is still a key market for the company.

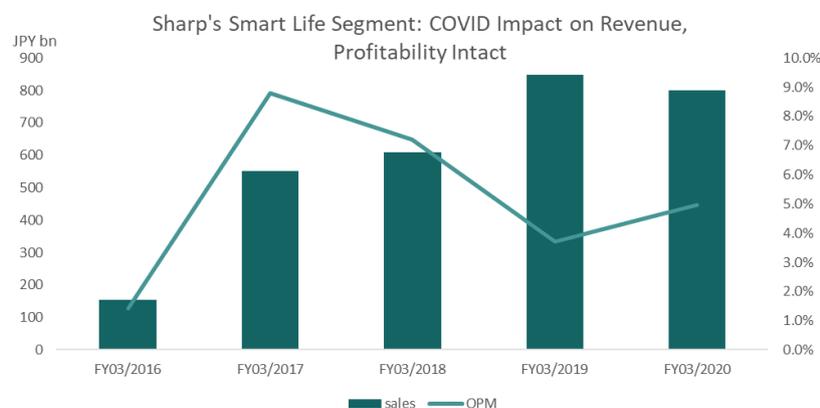
Key Opportunities and Concerns

- As with Suntech and other players, the opportunities are immense, with strong growth rates expected in the PV market. However, increasing competition, especially in China and India, is a concern for the leading Japanese manufacturer. The shrinking margins despite the strategy of premium pricing are a concern for the company.

Financial Analysis:

Sharp's solar business currently falls under the Smart Life segment, but the business segment has seen some reorganisation in the past. Regardless, the solar business, which initially came under the Energy Solutions segment, and is now under the Smart Life segment, saw revenue decline by 5.6% YoY in FY03/20, while OP from the segment continued to grow by 26.3% YoY (unable to calculate CAGR given the business segment changes during the recent past). The OPM of the segment is currently around 5% and is recovering from the hit in FY03/18. Overall, it appears that the company's

premium price strategy is helping margins to be maintained. Given the positive outlook for the PV industries for mono and poly, it is likely that Sharp's Solar business will continue its growth rates. Competition could, however, limit significant margin upside.



Note: Business segment changes have taken place during these five years

Chiyoda

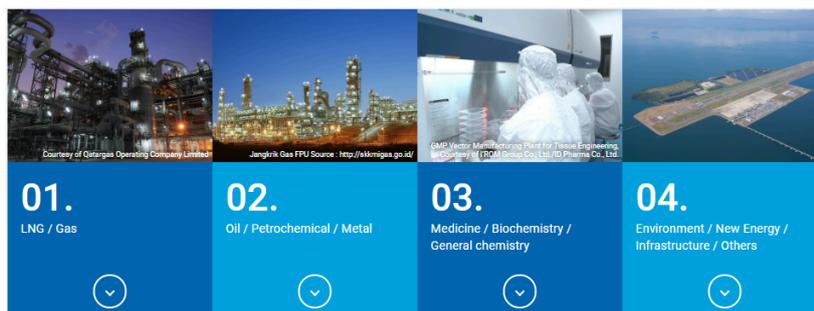
Company Introduction

Chiyoda Corporation is a Japan-based company engaged in the integrated engineering business. Solar energy business falls under the company's Engineering segment. Solar Photovoltaic (PV) and Concentrated Solar Power (CSP) falls under the Environment/New Energy/Infrastructure segment, which contributed 10.3% of total revenue as of FY03/20 and increased marginally by 0.3% in 1Q FY03/21. We will discuss both services in detail below.

Established	January 20, 1948
Paid-in Capital	15,014 Million Yen (as of August 7, 2020)
Representative	Kazushi Okawa, Chairman of the Board & CEO
Number of Employees	5,649 people (Consolidated and Equity Method Companies), 1,641 people (Non-consolidated) (as of March 31, 2020)
Head Office Location	Yokohama, Japan

Source: Company Disclosures

The Engineering segment is categorised into four main business segments, as shown below: Solar Falls Under Environment



Source: Company Disclosures

Major PV power plant projects thus far Focusing Around Japan Only

Client	Type of Plant	Capacity	Location	Scope of Work	Year of Completion
Solar Frontier K.K.	CIS Photovoltaic Power Plant (Rooftop)	2,000kW	Miyazaki, Japan	E.P.C.	2011
INPEX CORPORATION	CIS Photovoltaic Power Plant (On Ground)	2,300kW	Niigata, Japan	E.P.C.	2013
AIKAWA PRESS INDUSTRY Co., LTD.	CIS Photovoltaic Power Plant (On Ground)	1,800kW	Yamanashi, Japan	E.P.C.	2013
SHOWA SHELL SEKIYU K.K.	CIS Photovoltaic Power Plant (Rooftop)	2,400kW	Miyazaki, Japan	E.P.C.	2013
Sanco Real Estate Co., Ltd.	CIS Photovoltaic Power Plant (On Ground)	5,200kW	Mie, Japan	E.P.C.	2013
Sanco Real Estate Co., Ltd.	CIS Photovoltaic Power Plant (On Ground)	2,500kW	Mie, Japan	E.P.C.	2013
OR Solar Co., Ltd.	CIS Photovoltaic Power Plant (On Ground)	2,500kW	Toyama, Japan	E.P.C.	2013
LM Sun Power Co., Ltd.	CIS Photovoltaic Power Plant (On Ground)	2,500kW	Ibaraki, Japan	E.P.C.	2013
LM Sun Power Co., Ltd.	CIS Photovoltaic Power Plant (On Ground)	2,600kW	Fukui, Japan	E.P.C.	2013
LM Sun Power Co., Ltd.	CIS Photovoltaic Power Plant (On Ground)	2,600kW	Fukuoka, Japan	E.P.C.	2014
Japan Petroleum Exploration Co., Ltd.	CIS Photovoltaic Power Plant (On Ground)	2,400kW	Hokkaido, Japan	E.P.C.	2014
Seibu Oil Company Co., Ltd.	CIS Photovoltaic Power Plant (On Ground)	10,400kW	Yamaguchi, Japan	E.P.C.	2014
Sanco Real Estate Co., Ltd.	CIS Photovoltaic Power Plant (On Ground)	2,400kW	Mie, Japan	E.P.C.	2014
mitsui & Co., Ltd	CIS Photovoltaic Power Plant (On Ground)	19,600kW	Aichi, Japan	E.P.C.	2014
Solar Frontier K.K.	CIS Photovoltaic Power Plant (On Ground)	880kW	Miyazaki, Japan	E.P.C.	2014
AIDEX CO., LTD.	CIS Photovoltaic Power Plant (On Ground)	2,600kW	Yamaguchi, Japan	E.P.C.	2015
Sanco Real Estate Co., Ltd.	CIS Photovoltaic Power Plant (On Ground)	4,500kW	Mie, Japan	E.P.C.	2015
Sanco Real Estate Co., Ltd.	CIS Photovoltaic Power Plant (On Ground)	2,900kW	Mie, Japan	E.P.C.	2015
INPEX LOGISTICS (JAPAN) CO.,LTD.	CIS Photovoltaic Power Plant (On Ground)	2,500kW	Niigata, Japan	E.P.C.	2015
LM Sun Power Co., Ltd.	CIS Photovoltaic Power Plant (On Ground)	8,800kW	Miyagi, Japan	E.P.C.	2015
Sanco Real Estate Co., Ltd.	CIS Photovoltaic Power Plant (On Ground)	15,500kW	Mie, Japan	E.P.C.	2015
Niigata Shimami Solar Park LLC.	CIS Photovoltaic Power Plant (On Ground)	14,200kW	Niigata, Japan	E.P.C.	2016
Nagasaki Solar Energy Godo Kaisha	CIS Photovoltaic Power Plant (On Ground)	29,700kW	Nagasaki, Japan	E.P.C.	2016
LM Sun Power Co., Ltd.	CIS Photovoltaic Power Plant (On Ground)	8,200kW	Fukushima, Japan	E.P.C.	2016
Sanco Real Estate Co., Ltd.	CIS Photovoltaic Power Plant (On Ground)	14,000kW	Mie, Japan	E.P.C.	2017
Sanco Real Estate Co., Ltd.	CIS Photovoltaic Power Plant (On Ground)	12,800kW	Mie, Japan	E.P.C.	2017
Solar Frontier K.K.	CIS Photovoltaic Power Plant (On Ground)	13,000kW	Iwate, Japan	E.P.C.	2017
SDT Solar Power K.K.	CIS Photovoltaic Power Plant (On Ground)	17,300kW	Yamaguchi, Japan	E.P.C.	2017
Ube Nishioki Solar Energy LLC	CIS Photovoltaic Power Plant (On Ground)	18,500kW	Yamaguchi, Japan	E.P.C.	2019
Pacifico Energy Toyota LLC	Photovoltaic Power Plant (On Ground)	62,000kW	Aichi, Japan	E.P.C.	(2020)
GK JRE Takashima	Photovoltaic Power Plant (On Ground)	13,200kW	Shiga, Japan	E.P.C.	(2020)
FS Japan Project 18 G.K.	Photovoltaic Power Plant (On Ground)	16,800kW	Ibaraki, Japan	E.P.C.	(2021)
FS Japan Project 6 G.K.	Photovoltaic Power Plant (On Ground)	60,500kW	Kyoto&Mie, Japan	E.P.C.	(2020)

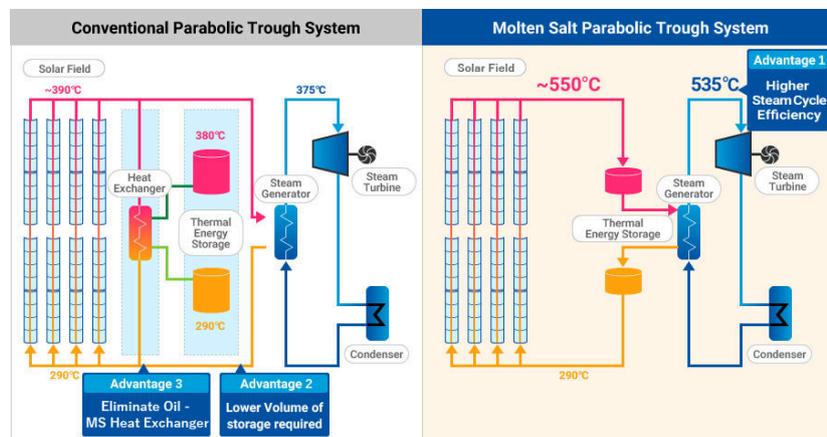
Source: Company Disclosures

Product & Technology

A CSP Plant produces electricity by using mirrors to concentrate sunlight onto receivers which produce steam to generate electricity. Chiyoda adopts its new Molten Salt Parabolic Trough CSP (MSPT-CSP) technology for its CSP plants.

The CSP System consists of three major units:

- Solar Field: Converts solar energy into thermal energy
- Heat Storage: Stores thermal energy using molten salt as a heat-storage medium.
- Power Block: Generates electricity through a steam turbine with steam produced through solar energy.



Source: Company Disclosures

Strategy

- **Follows an EPC Model**

Chiyoda group provides an overall business plan for projects, such as Feasibility Study, Applications for FIT authorization, EPC and Operation and Maintenance (O&M).

- **Enter international markets via its subsidiaries and affiliated companies**

Chiyoda plans to enter the worldwide solar PV market with Chiyoda's overseas subsidiaries and affiliated companies.

- **Build demonstration plants for CSP projects at initial stages to gain more CSP projects in future**

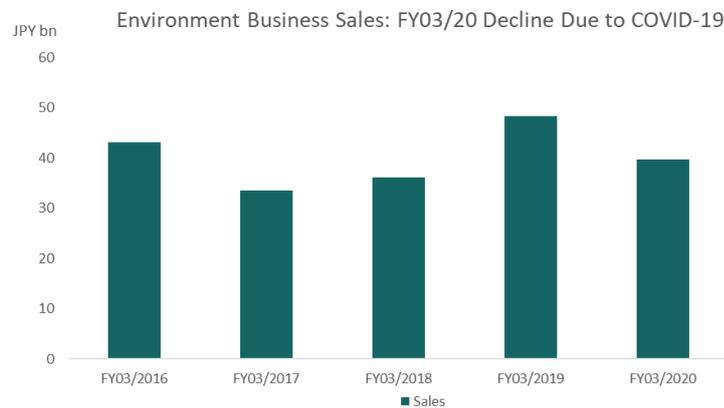
Chiyoda built a demonstration plant in Italy to develop its new generation CSP technology- MSPT-CSP. The demonstration plant was built in 2013 and operations were completed in 2015 after successful data acquisition. Chiyoda plans to continue to develop CSP projects based on experience gained through the demonstration plant.

Opportunities

- Expected growth in CSP technology for solar energy

Financial analysis of the solar and CSP businesses

Chiyoda's total revenue declined during both the FY03/2020 and 1Q FY03/2021 periods, mainly due to the impact of COVID-19, which caused a sharp decrease in energy demand. Environment/New Energy/ Infrastructure segment revenue decreased by 18% and 4% YoY in FY03/2020 and 1Q FY03/2021 respectively. Furthermore, new contracts received in the segment also decreased in both periods by 78% and 4% YoY respectively. This was further reflected in the backlog of contracts, where both decreased by 17% and 18% YoY respectively for the same periods.

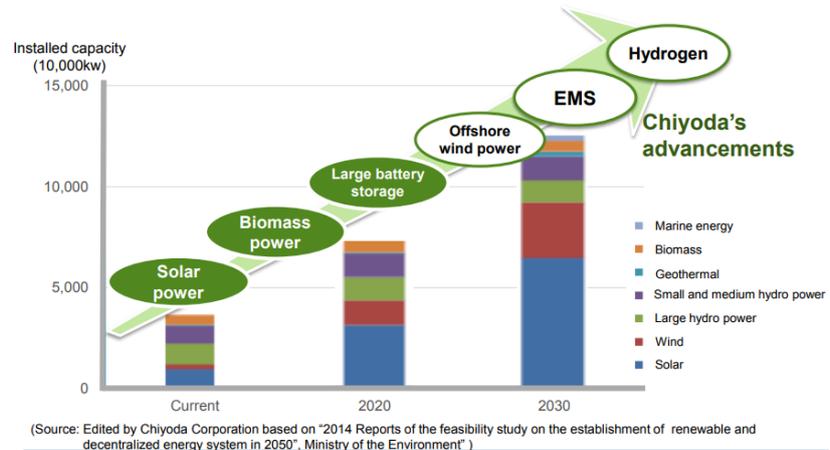


Note: OP not provided segment wise.

We note that the company has revised its revenue forecast to JPY280k (which is a 27% reduction compared to actual total revenue in 2019), due to the severe deterioration of the business environment of the company. This includes the drastic decrease in energy demand and the stagnant global economy due to the spread of COVID-19.

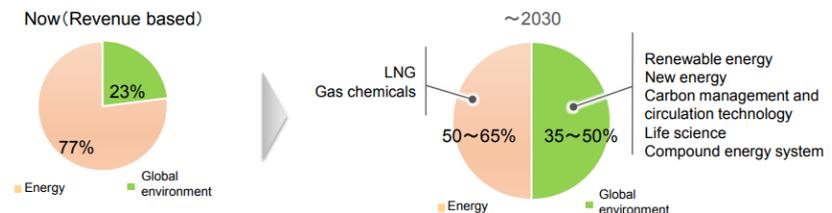
While the pandemic has affected most business during the year, Chiyoda continues to focus on its plan to grow in the renewable energy business. In May 2019, Chiyoda launched a new medium-term management plan that

emphasises the importance of moving towards global environment services. As shown below, the capacity created by solar power is expected to grow drastically in the future.



Source: Company Disclosures

As this shift takes place, Chiyoda expects to increase revenue from the solar business. The company currently focuses on the LNG, gas, and chemicals businesses, which contribute around 77% of the total revenue as of 2019, and the remainder comes from the global environment, which includes renewable energy, new energy etc., as shown below. However, in the new medium-term management plan, higher emphasis is given to environmental protection and global warming, and the company has shifted its strategic direction towards services related to the global environment, where the company plans to generate 35%-50% of the total revenue by 2030.



Source: Company Disclosures

Disclosure & Certification

- I/We have no position(s) in the any of securities referenced in this insight
- Views expressed in this insight accurately reflects my/our personal opinion(s) about the referenced securities and issuers and/or other subject matter as appropriate.
- This insight does not contain and is not based on any non-public, material information.
- To the best of my/our knowledge, the views expressed in this insight comply with Singapore law as well as applicable law in the country from which it is posted
- I/We have not been commissioned to write this insight or hold any specific opinion on the securities referenced therein
- I/We have signed the Insight Provider Agreement and this insight does not violate any of the terms specified therein.

— *Aqila Ali (30 Sep 2020)*



David Blennerhassett

Pan-Asia Catalysts/
Events | Quiddity
Advisors

David Blennerhassett is a highly experienced sell-side analyst covering Asia Pacific equities. For the past 13 years he has been immersed in event strategies encompassing M&A risk arbitrage, directional long/short, stub trades, and restructuring.

Areas of Expertise

- Primary Asset Class: Equities
- Geography: Asia Pacific
- Countries: Generalist
- Sectors: Generalist

Content Verticals

- Event-Driven

Wilmar International | Event-Driven

Wilmar Is A Buy After YKA's Listing

By David Blennerhassett | 16 Oct 2020

EXECUTIVE SUMMARY

Yesterday, [Wilmar International \(WIL SP\)](#)'s [Yihai Kerry Arawana Holdings Co Ltd \(YKA CH\)](#) (YKA) commenced trading on the Shenzhen Stock Exchange (ChiNext Board). Priced at RMB25.70/share, shares closed at RMB56/share. Shares are currently changing hands at RMB49. That backs out a trailing PER of ~59x.

And Wilmar's reaction yesterday? Down 6.4% in what appears to be a "sell the news" trade.

I see Wilmar's discount to NAV at 55%. Shares haven't retested near-term highs since [Archer Daniels Midland Co \(ADM US\)](#)'s placement in August. But since that placement, uncertainty over YKA's IPO has been removed. Wilmar is cheap here.

As always, more below the fold.

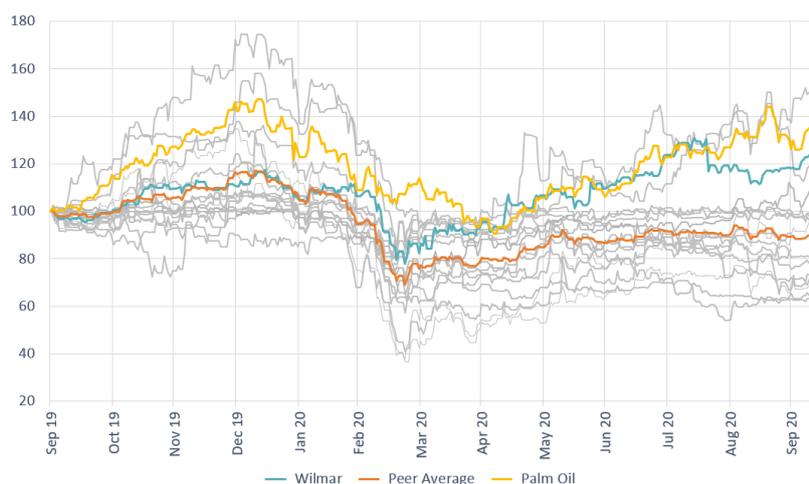
For some background history on YKA's IPO, please refer to past insights below:

Date	Insight
17-Sep-20	Wilmar: China Ops IPO One Step Closer
29-Sep-20	Wilmar: YKA's Pricing & Cheap Rump Stake

DETAIL

Conclusions First

- Since Wilmar's shares rolled over after the ADM placement and EB issuance in August, the uncertainty as to the timing of YKA's IPO has been removed; as has the valuation for YKA. CPO prices (accounting for ~20% of Wilmar's operating profit) are also up and re-testing pre-COVID levels.



Source: CapIQ. CPO, Wilmar, plantation peers and the average in Base 100 from a year ago.

- Why did ADM sell?** ADM had steadily added to its position over the years, into what has been a profitable investment. The sell-down may be premised on a number of factors, such as shoring up ADM's balance sheet to fund repurchases; general market uncertainty; and striking while Wilmar was up ahead of YKA's IPO. ADM still holds 20%, maintaining its board seat. I don't view the sell-down as being Wilmar-specific - more one of profit-taking. The ADM equity placement and EB offering may have snuffed out some flow demand, however, sidelining long onlies until the Q320 earnings are released.
- Wilmar's chairman has been buying shares ahead of the earnings blackout.** Kuok purchased another 2.15mm share at 4.41 on [30-Sep](#), his largest purchase this year, and the largest since 2018. That suggests a relatively bullish signal ahead of the 3Q20 results, for both Wilmar and YKA.
- YKA's share price pop was to be expected.** The offline investor portion of RMB5.8bn was 600x [over-subscribed](#). The online retail investor portion to raise RMB3.9bn was ~1,750x over-subscribed. In addition, from the list of [47 peers](#) cited on the ChiNext, only three of the 47 have a market cap >RMB100bn and 9 above RMB33bn (US\$5bn). Only one ([Henan Shuanghui Investment & Development \(000895 CH\)](#)) has a market cap larger than YKA's indicative value. Their average trailing PER is 59x for these larger cap peers (>US\$5bn), roughly in line with YKA's.
- I estimate the discount to NAV at 55%, with the holding in **YKA accounting for 174% of Wilmar's market cap**. There will be some price gyrations in YKA until some degree of normalcy arrives - but Wilmar looks outright cheap here, even for a cross-border, possibly-difficult-to-short subsidiary, Holdco situation. But it is a very clean holding company structure, Wilmar appears inexpensive here.

The Trade: I'd buy Wilmar here. I think shares can easily retest their recent high of S\$4.86 back in August (~11%).

For the reason above, this insight is labeled bullish.

Shareholders

542.2mn new shares were issued in YKA's IPO, reducing Wilmar's stake to 89.99%.

Shareholder	Before IPO		After IPO	
	Shares (mn)	% Held	Shares (mn)	% Held
Wilmar	4,878.9	99.99%	4,878.9	89.99%
Shanghai Broad Ocean Investment	487.9	0.01%	487.9	0.01%
Public	0.0	-	542.2	10.00%
Total	4,879.4	100.00%	542.2	100.00%

Page 134 of the [PDF](#)

- Strategic investors, including mainly State-owned funds, sovereign wealth funds, and insurance companies, will subscribe for ~30% of the IPO Shares. This is believed to include GIC, China Life Insurance Co Ltd, China Structural Reform Fund, and Rongze Investment Company. These strategic investors are subject to a one-year lock-up.
- The amount raised at the IPO was RMB13.933bn.

Wilmar vs. Peers

Overall, Wilmar is trading at a slight discount to listed plantations, oilseeds, and sugar peers.

Trading Comps	Mkt Cap (SGDm)	PER (T)	PER (E)	EV/ EBITDA (E)	P/B
Plantation Peers					
Singapore					
Bumitama Agri Ltd.	208	11.9x	9.2x	7.7x	0.0x

First Resources Limited	576	16.6x	13.0x	7.2x	1.9x
Golden Agri-Resources Ltd	65	7.0x	NM	9.7x	0.4x
Indofood Agri Resources Ltd.	135	NM	NM	NA	
Average	246	11.9x	11.1x	8.2x	0.8x
Indo					
PT Astra Agro Lestari Tbk	461	94.7x	25.5x	9.7x	0.0x
PT Perusahaan Perkebunan	39	23.7x	18.0x	6.6x	0.0x
PT Sawit Sumbermas Sarana Tbk.	35	637.8x	15.7x	NA	0.0x
PT Dharma Satya Nusantara Tbk	20	26.6x	11.8x	NA	
PT Eagle High Plantations Tbk	4	NM	NM	12.9x	
Average	112	195.7x	17.7x	9.8x	0.0x
Malaysia					
FGV Holdings Berhad	160	NM	NM	17.1x	0.3x
Genting Plantations Berhad	1,453	58.3x	40.0x	19.7x	0.6x
IJM Corporation Berhad	214	20.6x	21.4x	11.6x	0.2x
IOI Corporation Berhad	647	45.5x	37.5x	21.8x	1.0x
Kuala Lumpur Kepong Berhad	3,281	37.5x	27.5x	19.3x	0.7x
Sime Darby Berhad	357	19.9x	18.4x	6.8x	0.3x
Hap Seng Consolidated Berhad	1,106	15.8x	NM	NA	
Average	1,031	32.9x	29.0x	16.0x	0.5x
Average for plantations	548	78.1x	21.6x	12.5x	0.5x
Oilseed Peers					
Archer-Daniels-Midland Company	31,054	20.7x	15.9x	11.4x	2.0x
Fuji Oil Holdings Inc.	19,549	17.0x	22.0x	11.2x	0.0x
Nisshin Seifun Group Inc.	9,881	21.7x	27.8x	10.1x	0.0x
GrainCorp Limited	1,783	NM	NM	15.2x	0.8x
Nippon Flour Mills Co., Ltd.	10,241	16.7x	17.6x	NA	
PPB Group Berhad	2,921	24.0x	27.9x	79.3x	0.4x
Heilongjiang Agriculture	1,773	42.1x	30.9x	22.6x	0.9x
Godrej Consumer Products Limited	5,775	45.7x	44.9x	31.9x	0.1x
CPMC Holdings Limited	271	11.9x	10.9x	7.9x	0.1x
Average	9,250	25.0x	24.7x	23.7x	0.5x
Sugar Peers					
MSM Malaysia Holdings Berhad	70	NM	NM	13.5x	0.1x

Cosan S.A.	7,800	8.4x	31.8x	7.0x	0.6x
São Martinho S.A.	2,476	10.8x	15.2x	6.8x	0.5x
Südzucker AG	9,677	NM	38.8x	8.6x	1.5x
Khon Kaen Sugar Industry	46	11.9x	31.2x	17.4x	0.0x
Tate & Lyle plc	5,127	12.2x	12.0x	7.4x	3.6x
Average	4,199	10.8x	25.8x	10.1x	1.0x
Max	31,054	637.8x	44.9x	79.3x	3.6x
Median	647	20.6x	21.7x	11.3x	0.4x
Min	4	7.0x	9.2x	6.6x	0.0x
Mean	3,781	50.4x	23.5x	15.4x	0.6x
Wilmar	Mkt Cap (SGDm)	PER (T)	PER (E)	EV/ EBITDA (E)	PBV
Current Price SGD 4.36	27,731	16.2x	16.2x	14.5x	1.6x

Source: CapIQ

Share Price Performance vs Peers

Wilmar's shares came off the boil on the 20 August, after [Archer Daniels Midland Co \(ADM US\)](#) announced it would sell ~2.4% of Wilmar.



Source: CapIQ

Wilmar has generally outperformed its peers over the last year.

Trading Comps	One-Mth	Three-Mth	YTD	One-YR
Plantation Peers				
Singapore				
Bumitama Agri Ltd.	-10%	-3%	-43%	-19%
First Resources Limited	-4%	-9%	-34%	-19%
Golden Agri-Resources Ltd	1%	-7%	-39%	-32%
Indofood Agri Resources Ltd.	0%	0%	-9%	-8%
Average	-3%	-5%	-31%	-19%
Indo				
PT Astra Agro Lestari Tbk	2%	17%	-29%	-1%
PT Perusahaan Perkebunan	-5%	-3%	-41%	-27%
PT Sawit Sumbermas Sarana Tbk.	-1%	-2%	-7%	-11%
PT Dharma Satya Nusantara Tbk	5%	37%	-2%	37%
PT Eagle High Plantations Tbk	-2%	3%	-26%	-11%
Average	0%	10%	-21%	-3%
Malaysia				
FGV Holdings Berhad	-15%	-6%	-30%	-1%
Genting Plantations Berhad	-2%	-2%	-8%	-3%
IJM Corporation Berhad	2%	-14%	-34%	-35%
IOI Corporation Berhad	-3%	-4%	-6%	-1%
Kuala Lumpur Kepong Berhad	-4%	-3%	-12%	2%
Sime Darby Berhad	-4%	-6%	-18%	-8%
Hap Seng Consolidated Berhad	-4%	-6%	-18%	-8%
Average	-4%	-6%	-18%	-8%
Average for Plantations	-3%	0%	-22%	-9%
Oilseeds Peers				
Archer-Daniels-Midland Company	5%	19%	9%	25%
Fuji Oil Holdings Inc.	2%	14%	18%	7%
Nisshin Seifun Group Inc.	-2%	4%	-8%	-16%
GrainCorp Limited	1%	3%	-46%	-47%
Nippon Flour Mills Co., Ltd.	2%	1%	7%	3%
PPB Group Berhad	4%	5%	3%	9%
Heilongjiang Agriculture Company Limited	3%	13%	106%	110%
Godrej Consumer Products Limited	-3%	-3%	-2%	-8%
CPMC Holdings Limited	8%	-1%	1%	8%
Average	2%	6%	10%	10%
Sugar Peers				
MSM Malaysia Holdings Berhad	-6%	-20%	-47%	-53%
Cosan S.A.	-13%	-20%	-27%	-9%
São Martinho S.A.	-12%	-2%	-32%	-7%

Südzucker AG	-22%	-12%	-15%	13%
Khon Kaen Sugar Industry Public	15%	15%	-1%	2%
Tate & Lyle plc	-8%	-1%	-17%	-7%
Average	-8%	-7%	-23%	-10%
Max	15%	37%	106%	110%
Median	-2%	-2%	-15%	-7%
Min	-22%	-20%	-47%	-53%
Mean	-2%	0%	-13%	-4%
Wilmar International Limited	1%	1%	6%	22%

Source: CapIQ

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— David Blennerhassett (15 Oct 2020)



Olivier Desbarres

Founder | 4X Global
Research

Olivier Desbarres has over 21 years of experience in the finance industry, including 15 years as a senior Economist, Rates and FX strategist for Credit Suisse and Barclays in Moscow, London, and Singapore.

Areas of Expertise

- Primary Asset Class: FX & Rates
- Geography: Asia Pacific
- Countries: Generalist
- Sectors: Generalist

Content Verticals

- FX & Rates,
Macroeconomics

CNY | FX & Rates

PBoC Likely to Keep Renminbi on Tight Leash

By Olivier Desbarres | 22 Oct 2020

EXECUTIVE SUMMARY

Only four currencies have appreciated by more than 4% versus US Dollar since end-July: the high-yielding South African Rand (4.6%) and Mexican Peso (5.8%), the Chinese Renminbi (4.4%) and Korean Won (5.2%).

The Renminbi's steady pace of appreciation will, all other things equal, put further downward pressure on Chinese headline CPI-inflation (1.7% yoy in September) and dent export competitiveness. This has led to growing speculation that the People's Bank of China (PBoC) could take (potent) measures to reverse the Renminbi's climb.

We have greater sympathy with the more benign near-term view that the PBoC is more likely in a first instance to slow the pace of Renminbi appreciation and ultimately arrest the currency's climb.

For starters the more relevant Renminbi Nominal Effective Exchange Rate has only appreciated 4.1% in the past three months, with its current monthly pace of increase (about 1.5%) commensurate with its historical pattern.

Moreover, the PBoC is after all facing considerable speculative FX inflows and foreign direct investment into China, attracted by China's economic outperformance, and a rising merchandise trade surplus spurred by a surge in export growth.

Beyond the 3rd November the Renminbi's path is clouded by the outcome of the (still uncertain?) US Presidential elections but precedent suggests that the PBoC will want to keep its currency on a tight leash.

DETAIL

In a world of limited FX directionality Renminbi's (modest) outperformance stands out

We noted in [Event risk and market volatility: Partners in crime](#) (8th October 2020) that market volatility had been reasonably subdued in recent weeks, despite or more likely because of acute event (and macro data) risk in the next month. Moreover, we argued that “major currencies, including the Dollar, Euro, Sterling, Yen and Swiss Franc have shown little directionality since late-July. Headwinds and tailwinds for these reserve currencies have either tended to cancel each other or simply fade, leaving market participants in two-minds and opting for the path of least regret”. Indeed since 31st July, the majority of currencies have depreciated or appreciated by less than 4% versus the US Dollar (see Figure 1).

Only four currencies have appreciated by more than 4% – the high-yielding South African Rand (4.6%) and Mexican Peso (5.8%), the Chinese Renminbi (4.4%) and Korean Won (5.2%) – even if their paths have differed. While the Peso has treaded water versus the Dollar since mid-September and the pace of Rand appreciation has slowed materially, the Won's appreciation has accelerated.

Figure 1: Chinese Renminbi and Korean Won have outperformed since end-July and in past six weeks

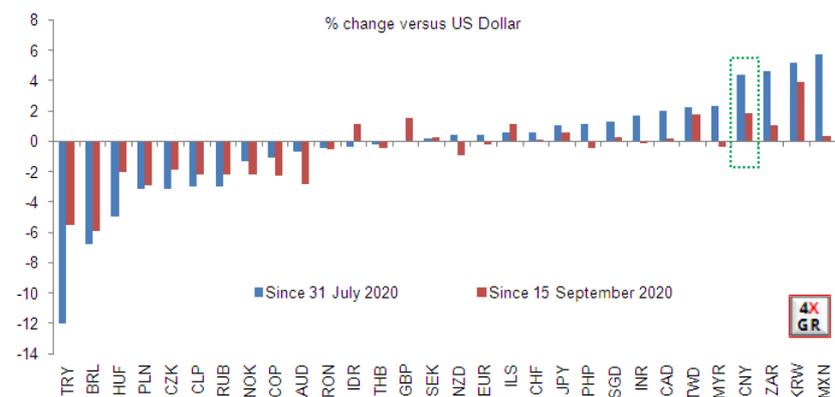


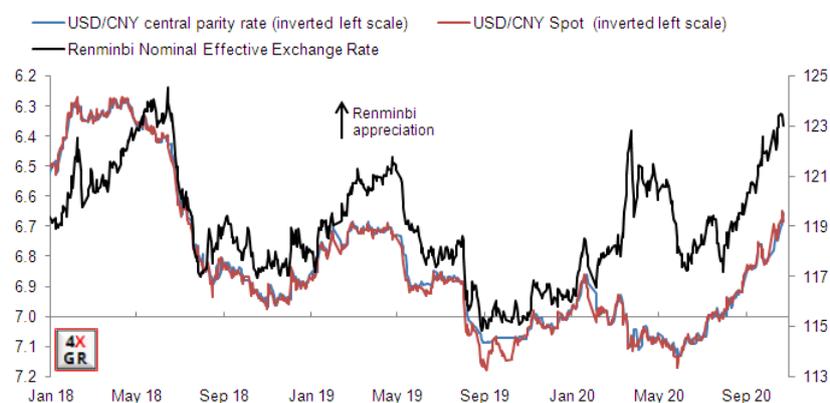
Figure 1: 4X Global Research, investing.com

The Renminbi's pace of appreciation versus the Dollar has been remarkably consistent (see Figure 2). All other things equal a stronger Renminbi will put further downward pressure on Chinese headline CPI-inflation which fell from 2.4% yoy in August to 1.7% yoy in September – its lowest level since February 2019. Moreover, Renminbi appreciation will erode export competitiveness at a time when global economic growth remains weak ([Global growth: Collapse, Recovery, Slowdown...repeat?](#), 24 September 2020).

Magnitude of Renminbi climb needs to be put in context

This has led to growing speculation that the People's Bank of China (PBoC) could take (potent) measures to reverse the Renminbi's climb. We have greater sympathy with the more benign near-term view that in the face of considerable FX inflows into China, the PBoC is more likely in a first instance to slow the pace of Renminbi appreciation and ultimately arrest the currency's climb. Beyond the 3rd November the Renminbi's path is clouded by the outcome of the (still uncertain?) US Presidential elections but precedent suggests that the PBoC will want to keep its currency on a tight leash.

Figure 2: PBoC has fixed CNY stronger and allowed Renminbi NEER to appreciate to 28-month high



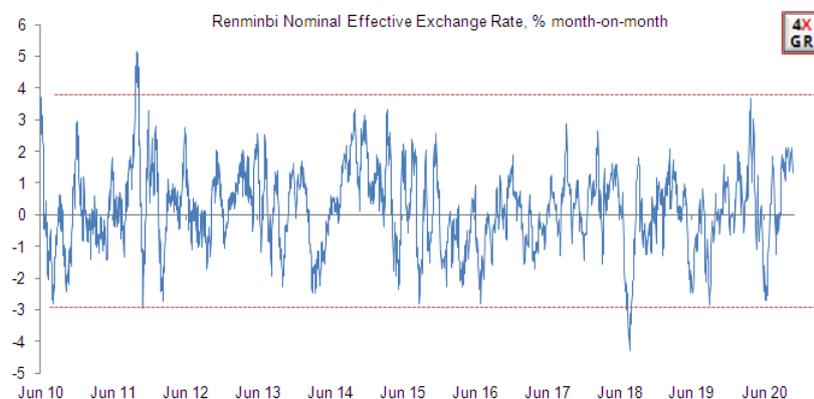
Source: 4X Global Research, BIS, China Foreign Exchange Trade System, investing.com

For starters, markets and the media have mainly focussed on the easy-to-track Dollar-Renminbi exchange rate, which as noted as above has fallen 4.4% since end-July, but the US accounts for only about 20% of Chinese trade in goods. The more relevant Renminbi Nominal Effective Exchange Rate (NEER) – a trade weighted index of the Renminbi versus the currencies of China’s main trading partners – has appreciated “only” 4.1% since end-July (see Figure 2) as the likes of the Korean Won and Taiwan Dollar have also made decent gains versus the US Dollar since end-July (see Figure 1).

The Renminbi NEER is a far more accurate measure than the USD/CNY cross of overall Chinese export competitiveness and of the currency’s potential impact on Chinese imported inflation. It is not without reason that in December 2015 the China Foreign Exchange Trade System (CFETS), a sub-institutional organization of the PBoC, introduced a new exchange rate index which values the Renminbi against a basket of 13 trade-weighted currencies.

Moreover, the monthly pace of Renminbi NEER appreciation in recent weeks (about 1.5-2.0%) has not been particularly rapid by historical standards (see Figure 3).

Figure 3: Monthly pace of Renminbi NEER appreciation in line with long-term historical pattern



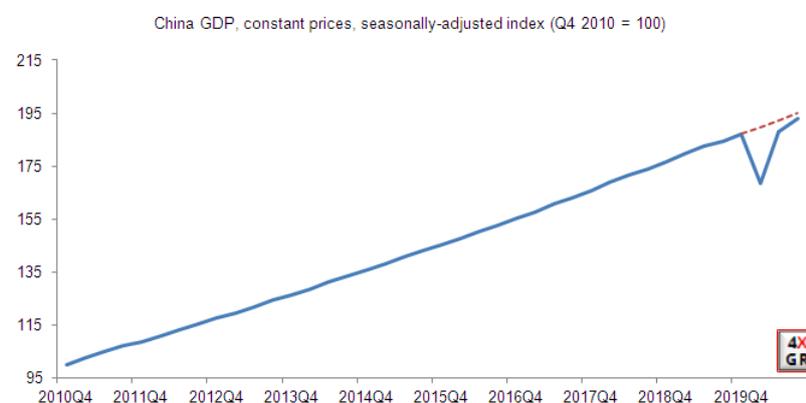
Source 4X Global Research, BIS, investing.com

Renminbi drivers: speculative inflows, rising trade surplus and FDI inflows

The drivers behind the Renminbi's gradual appreciation in the past three months are arguably as important, if not more so than its magnitude per se, in understanding what the PBoC may do next and why.

Speculative FX inflows into China, attracted by the country's rapid economic recovery, have undoubtedly played their part in putting the Renminbi under appreciation pressure. Our analysis suggests that GDP growth in major economies, including the United States, United Kingdom and Eurozone, and at a global level surged and peaked in May-June but has since lost considerable momentum and was negligible in September (see [Global growth: Collapse, Recovery, Slowdown...repeat?](#), 24 September 2020). In contrast Chinese GDP (seasonally-adjusted) rose 11.7% and 2.7% qoq in Q2 and Q3, respectively. As a result, we estimate that China's real GDP (level) was only 1% lower in Q3 2020 than it would have been had GDP growth continued to trend at 1.4% qoq in Q1, Q2 and Q3 2020 (see Figure 4).

Figure 4: Chinese GDP has rapidly rebounded back to trend, defying global trend of rapidly slowing growth

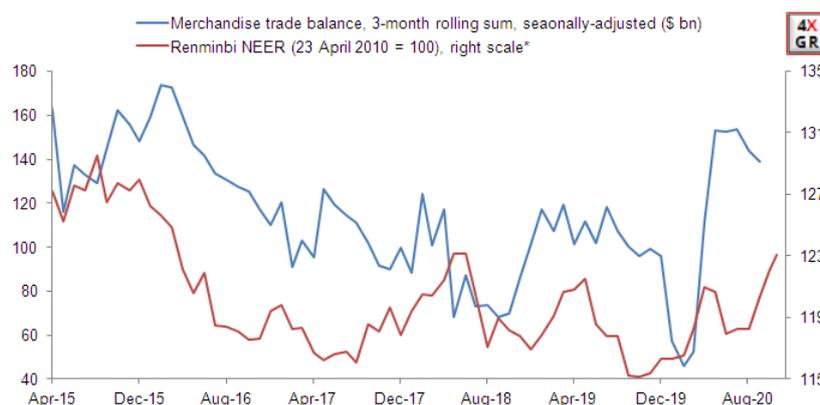


Source: 4X Global Research, National Bureau of Statistics of China. **Note:** *Red line is trendline (i.e. what GDP level would have been had Chinese GDP continued to rise by 1.4% qoq in Q1, Q2 and Q3 2020).

But speculative FX inflows into China are only part of the Renminbi-rally story – a rising merchandise trade surplus and foreign direct investment into China have also played their part.

China's goods trade surplus has surged since March – when the world's major economies went into lockdown and global trade collapsed – with the 3-month seasonally-adjusted rolling surplus hitting \$139bn in September, according to our estimates (see Figure 5). Unsurprisingly perhaps, a large Chinese trade surplus has historically been associated with Renminbi appreciation

Figure 5: China's trade surplus has surged since world went into lockdown, supporting Renminbi



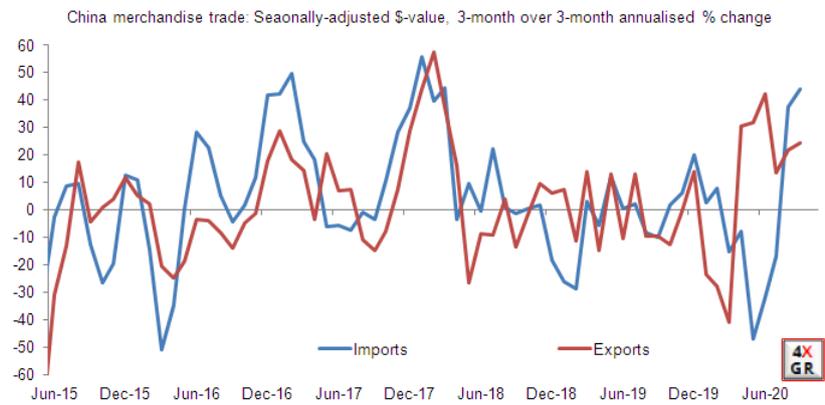
Source: 4X Global Research, BIS, National Bureau of Statistics of China.

***Note:** NEER is Nominal Effective Exchange Rate

Importantly from Chinese policy-makers' perspective, the trade surplus has risen despite a rapid acceleration in import growth, not because of a collapse in economic growth, demand and imports (see Figure 6). Indeed we estimate that Chinese merchandise exports rose at a quarter-on-quarter seasonally-adjusted annualised rate of almost 25% in Q3. Chinese exporters have gained market share as many of their competitors, particularly outside of Asia, have seen their productive capacity diminished by national lockdowns and associated social distancing and other measures. The Renminbi's appreciation since end-July has seemingly so far had little impact on export competitiveness.

Finally, foreign direct investment in China – which had flat lined at around \$135bn in 2019 – rose rapidly in Q3, with FDI in September up nearly 25% year-on-year (see Figure 7). International investors, starved of global investment opportunities, have seemingly been turning their attention to China.

Figure 6: Both import and export growth has surged thanks to strong domestic and international demand



Source: 4X Global Research, National Bureau of Statistics of China

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Figure 7: FDI into China has picked up rapidly in recent months



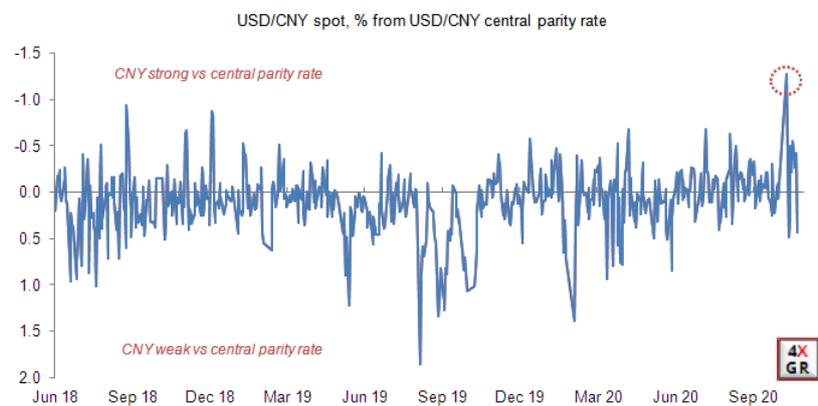
Source: 4X Global Research, National Bureau of Statistics of China

PBoC has allowed Renminbi appreciation but kept currency on constant leash

The fact that FX inflows into China have not just been “speculative” explains in part, in our view, why the PBoC has seemingly been comfortable, so far, in allowing the Renminbi to appreciate – or put differently why it has not tried to neutralise let alone reverse these flows.

It is indeed important to remember that the PBoC fixes the daily USD/CNY central parity rate around which spot can trade 2% either side. If USD/CNY spot hits either the strong or weak end of the band the PBoC has to intervene in the FX market (buying or selling Dollars). So the PBoC in effect dictates the Renminbi’s direction, taking into consideration the broader economic costs and benefits of an appreciating or depreciating currency in the context of underlying demand for the Renminbi and thus China’s balance of payment flows^[1].

Figure 8: PBoC has seemingly been eager for USD/CNY parity rate to reflect underlying Renminbi strength



Source: 4X Global Research, China Foreign Exchange Trade System, investing.com

The PBoC has consistently fixed USD/CNY lower (i.e. Renminbi stronger) since late-May, whether or not the Dollar has been weakening (as has been the case in recent weeks) – see Figure 2. Our interpretation is that the PBoC has effectively set the central parity rate to reflect underlying Renminbi appreciation and keep the Renminbi within its +/-2% trading band versus the Dollar with minimal FX intervention (buying Dollars/selling Renminbi).

USD/CNY spot has materially deviated from the central parity rate on only one occasion in recent months. On 9th October USD/CNY spot closed 1.3% from the central rate (or 0.7% from the strong end of the band), according to our estimates. In the following trading session the PBoC fixed USD/CNY 1% lower (see Figure 8) and announced that it would cut the cost of betting against the Renminbi (by lowering the reserve requirement ratio to zero from 20% for financial institutions when conducting some foreign exchange forwards).

One way to think about it is that speculative and non-speculative FX inflows into China have dragged the Renminbi higher but the PBoC has kept it on a broadly constant leash.

PBoC more likely to favour light-touch to stabilise Renminbi near-term

We do not think that the case for the PBoC to weaken the Renminbi is particularly compelling at this juncture given the underlying strength of the domestic economy and export sector. Moreover, a strong(er) Renminbi has the advantage of lowering the cost of servicing USD-denominated debt for the public sector, corporates and households.

However, the PBoC cannot ignore the deflationary impact of the Renminbi NEER's appreciation to only 0.4% from the 28-month high hit on 19th October, according to our estimates and we would note that the NEER has treaded water for the past six trading sessions (see Figure 2). What remains unclear is whether this has been due to weaker FX inflows into China, greater PBoC FX intervention or both.

In any case, we think that near-term – i.e. between now and the US presidential elections on 3rd November – the PBoC will opt to keep the Renminbi NEER broadly stable. This would translate into slower month-on-month appreciation, which would in turn be commensurate with the historical pattern of a reasonably rapid pace of appreciation preceding slower appreciation and eventually month-on-month depreciation (see Figure 3).



[1] For example if the market is a net-seller of Renminbi (and the currency under depreciation pressure) the PBoC has to sell Dollars (FX reserves) in order to stop the Renminbi from weakening. Conversely, if market demand for the Renminbi is strong, the PBoC has to buy Dollars (and sell Renminbi) to stop the currency from appreciating, which may in turn contribute to domestic inflationary pressures.

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— Olivier Desbarres (22 Oct 2020)



Shifara Samsudeen, ACMA, CGMA

Equity Analyst |
LightStream Research

Shifara Samsudeen is a chartered management accountant with more than 10 years of rich experience in investment research and financial analysis. She is experienced in fundamental equity research, industry research, commodity studies, forensic accounting, and due diligence reviews.

Areas of Expertise

- Primary Asset Class: Equities
- Geography: Asia Pacific
- Countries: Japan
- Sectors: Industrials

Content Verticals

- Equity Bottom-Up, Equity Capital Markets

Kuaishou Technology | Equity Capital Markets

Kuaishou IPO: Advertising and E-Commerce Businesses to Drive Future Growth

By Shifara Samsudeen, ACMA, CGMA | 16 Nov 2020

EXECUTIVE SUMMARY

ByteDance's Chinese rival [Beijing Kuaishou Technology Co Ltd \(1496219D CH\)](#) has filed for an IPO to list its shares on the Hong Kong Stock Exchange ahead of its rival Douyin. The company aims to raise up to US\$5bn at a rumoured valuation of over US\$50bn.

Kuaishou's platform offers its users to create content through short videos and livestreams as well as sell and purchase products. On the other hand, it allows businesses to advertise and sell their products to the users of the platform.

China has the world's largest internet population which accounted for about 23% of mobile internet users globally. The internet users in China have been increasingly spending time on video-based social and entertainment platforms.

These short video and live streaming platforms offer monetisation opportunities through virtual gifting and online marketing services. According to iResearch, both virtual gifting and mobile advertising through short videos and livestreaming will grow at a CAGR of 19.9% and 33.7% respectively through 2020-25E.

The company generates a majority of its revenues from live streaming (through virtual gifting) however, online marketing services and other services (e-commerce and other services) have been growing at higher rates over the last two years which we believe should drive future growth for Kuaishou.

In this insight, we examine the company's business model, the industry and the revenue channels. We will be covering the company's financials in detail in a follow-up insight.

DETAIL

Company Background

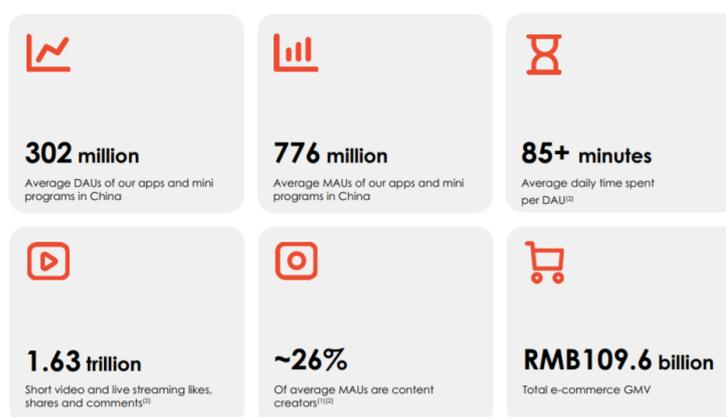
- Kuaishou is a leading content community and social platform globally. According to the company's IPO prospectus, it is the world's second largest short video platform by average DAUs and the second largest livestreaming e-commerce platform by GMV as of June 2020.
- The company's original mobile app Kuaishou was launched in 2011 as a tool for users to create and share animated images (known as GIFs). Through the application of a series of technologies, the company launched its video sharing app in 2013. In 2016, Kuaishou launched its video social platform with livestreaming as a natural extension to the platform.
- With growth in user engagement, the company launched e-commerce to facilitate transactions within the ecosystem.
- The users of the company's platform get access to its content, create short videos or livestreams, sell and purchase products. The platform offers the users to build and grow a following and monetise through their content.



Source: Company Disclosures

- On the other hand, the businesses can advertise and sell their products and services on the company's platform. Kuaishou provides businesses with online marketing solutions and an e-commerce marketplace to reach and engage with their target customers.

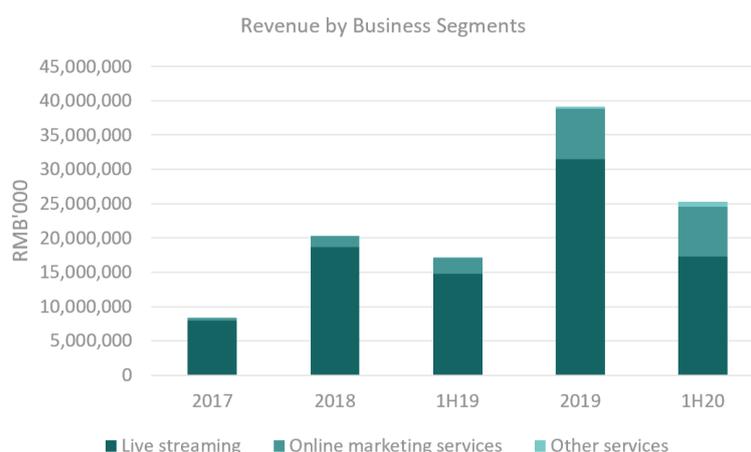
User Metrics as of June 2020



Source: Company Disclosures

Livestreaming is the Largest Revenue Producer for Kuaishou

- The company generates a majority of its revenues from live streaming which accounted for about 68.5% of total revenues in 1H2020. The segment’s contribution to total revenues has declined overtime with expansion in online marketing services that currently accounts for 28.3% (in 1H2020) of total revenues compared to 19% in 2019.
- In addition to live streaming and online marketing services, the company also generates a negligible share of revenues from other services including e-commerce, online gaming and online knowledge sharing.

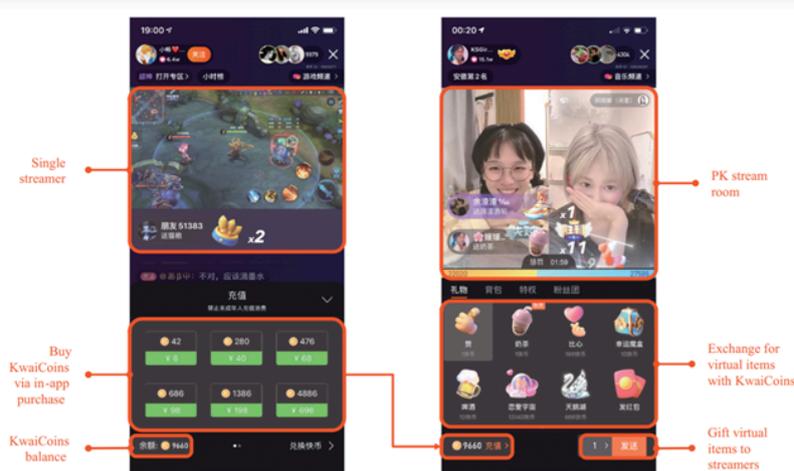


Source: Company Disclosures

- The access to the company's platform is free for all users and the company monetises primarily through the sale of virtual items, provision of various forms of online marketing services and commissions from e-commerce sales on the platform.
- The company has been actively looking for additional monetisation opportunities to diversify its revenues through online games, online knowledge-sharing and other products and services.

Live Streaming

- A majority of Kuaishou's live streaming revenues includes virtual gifting by viewers to streamers. According to iResearch, the company was ranked the world's largest live streaming platform by gross billings from virtual gifting and average live streaming MPUs (monthly paying users) in 1H2020.



Source: Company Disclosures

Online Marketing Services

- Kuaishou's online marketing services cover a full suite of online marketing solutions for its ecosystem partners. The company's online marketing services mainly comprised of advertising services which include short video advertisements, display advertisements, verbal endorsements and promotional campaigns.

Other Services

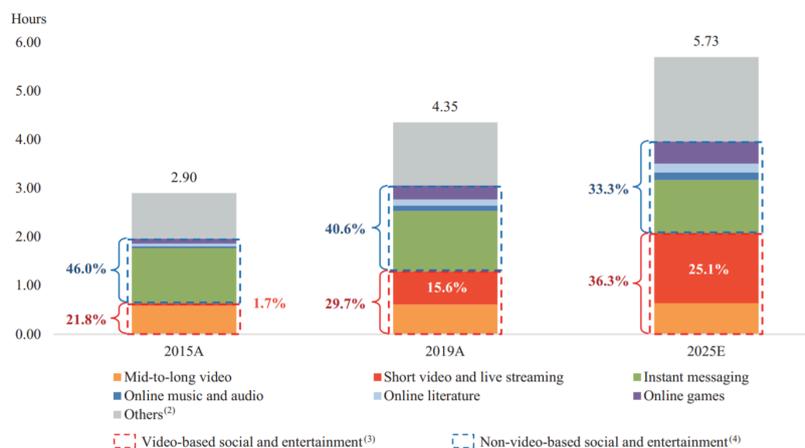
Other services include e-commerce, online games and online knowledge-sharing content.

- ◦ **E-commerce:** This mainly includes e-commerce revenues where users purchased products within the company's app or third-party e-commerce platforms via links provided within a live stream, short-video or user profile page. Kuaishou receives a commission based on the price and type of products sold. Live streaming e-commerce content has been a major driver of growth for the company's e-commerce business. The company has its own e-commerce marketplace (kwai shop) as well as offers third-party e-commerce platforms to sell their products through its platform.
- **Online Games:** The company began curating and offering mobile games on the platform in 2018. These games are either developed by the company or third-party developers. The company generates revenues from in-game purchases by users that includes virtual currency or virtual items that enhance the in-game experience. Many of the company's games allow users to connect and play with other users on the platform in real-time.
- **Knowledge-Sharing Content:** This includes skill-based and other educational content shared by ordinary users which can be in the form of both pre-recorded and live formats.

Increasing Video-Based Mobile Experience in China - Key Driver of Growth for Kuaishou

- Video has become an increasingly popular content for online experience in China which is leading the video-based mobile experience globally.
- China had a total mobile internet population of 873m in 2019, representing a 62.4% penetration rate. According to iResearch, the mobile internet population in China is expected to increase to 1.12bn by 2025E, expanding the penetration rate to 78.5% in 2025E.
- Of the total time spent on online each day, approximately 29.7% of that time was spent on video-based social and entertainment platforms in 2019 and is expected to reach 36.3% by 2025E.

China mobile internet users' average daily time spent online by core app function⁽¹⁾, 2015A vs. 2019A vs. 2025E



Source: Company Disclosures

- Short video and live streaming have become a growing trend in China driven by rising mobile internet penetration, better engagement through short-videos and live streaming, lower cost of content creation and social recognition.
- China has led the rapid commercialisation of live streaming globally and had the largest user base of live streaming, representing about 50% of users of live streaming platforms globally in 2019.

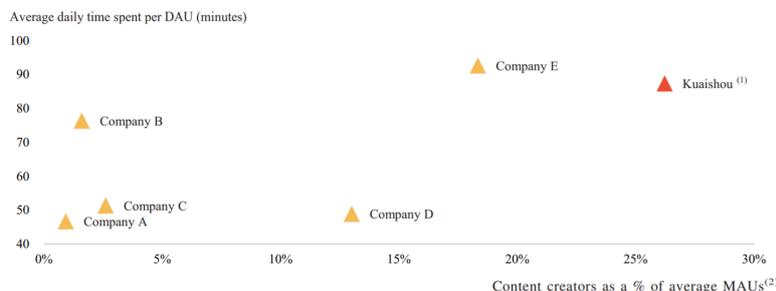
China live streaming platform average DAUs and average daily time spent per DAU, 2015A-2025E

	2015A	2016A	2017A	2018A	2019A	2020E	2021E	2022E	2023E	2024E	2025E	2015A-2019A CAGR	2019A-2025E CAGR
Live streaming platform average DAUs (in millions)	35.7	56.5	93.1	135.1	213.4	304.5	355.6	401.7	442.1	479.3	512.8	56.4%	15.7%
Average daily time spent per DAU (minutes)	19.5	23.1	26.4	29.8	33.2	35.7	39.2	42.8	46.5	49.6	51.9	14.2%	7.7%

Source: Company Disclosures

- As at the end of 2019, Kuaishou had an average DAU (daily active users) base of 175.6m for both short-video and livestreaming. Live Streaming platforms had an average DAU base of 213.4m, while short-video platforms had average DAUs of 495.7m in in China in 2019. Kuaishou's 175.6m DAU base represents a market share of 24.8% (on the total live streaming + short video).

Comparison of Short Video and Live Streaming Platforms in China in the Six Months Ended June 30, 2020



Source: Company Disclosures

- As we discussed earlier, video-based social platforms offer several monetisation opportunities for platforms such as Kuaishou including virtual gifting, online marketing services, e-commerce and online gaming.
- Kuaishou generated live streaming revenues of RMB31.4bn in 2019, that represented about 22.5% of the total live streaming virtual gifting market of RMB140bn in China in 2019. The company’s market share has expanded by 1% in 2019 from 21.5% in 2018, and the revenues have grown at a higher rate of 68.9% in 2019 compared to industry growth of 61.7% in 2019.
- Short video and live streaming have become increasingly popular channels for mobile advertising in China which accounted for 15% of the mobile advertising market in 2019. Kuaishou generated approx. RMB7.42bn revenues from online marketing services in 2019, about 9.1% of the total short video and livestreaming advertising market.
- During 1H2020, the company’s online marketing services revenues have grown 222% YoY to RMB7.2bn from RMB2.2bn a year ago.

China mobile advertising market size by revenue

(RMB in billions)	2015A	2016A	2017A	2018A	2019A	2020E	2021E	2022E	2023E	2024E	2025E	2015A-2019A CAGR	2019A-2025E CAGR
Overall Mobile Advertising Market Size	99.8	175.0	255.0	366.3	541.5	678.7	853.2	1,051.3	1,261.0	1,478.6	1,706.1	52.6%	21.1%
Mobile Advertising Through Short Video and Live Streaming Platforms	0.1	1.6	3.2	20.1	81.4	135.1	197.1	267.8	336.0	397.3	465.3	399.3%	33.7%
As % of total market size	0.1%	0.9%	1.2%	5.5%	15.0%	19.9%	23.1%	25.5%	26.6%	26.9%	27.3%		

Source: Company Disclosures

- The live streaming e-commerce on short video and live streaming based social platforms is becoming more common in China. The GMV of livestreaming e-commerce is expected to grow at a CAGR of 57.7% between 2020-25E to RMB6,417bn from RMB416bn in 2019. Kuaishou's e-commerce GMV in 2019 was RMB59.6bn, approximately 14.3% of the total livestreaming GMV in 2019. ***If we go by the industry estimates, we believe there is significant potential for Kuaishou to expand its top line through the growth in livestreaming e-commerce in China.***
- ***Given the livestreaming and video-based social platforms offer large monetisation opportunities for video content sharing platforms such as Kuaishou, we expect the company to continue to benefit from the positive trends in the industry.***

We will be examining the company's financials in detail in a follow-up insight.

Disclosure & Certification

- I/We have no position(s) in the any of securities referenced in this insight
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- I/We have signed the Insight Provider Agreement and this insight does not violate any of the terms specified therein.

— Shifara Samsudeen, ACMA, CGMA (16 Nov 2020)



Michael J. Howell

Cross-Asset Liquidity Strategist | CrossBorder Capital

CrossBorder Capital is an investment advisory firm specialising in macro-investing. Founded in 1996 with an international client base, CrossBorder focuses on monitoring and understanding global liquidity and capital flows.

Areas of Expertise

- Primary Asset Class: Multi-Asset
- Geography: Global
- Countries: Generalist
- Sectors: Generalist

Content Verticals

- Cross Asset Strategy, Macroeconomics

Cross Asset Strategy

Could China Boom Again In 2021?

By Michael J. Howell | 05 Dec 2020

EXECUTIVE SUMMARY

- Combination of **low US inventories and strong Chinese liquidity**
- **Shadow Banks** the new policy-lever?
- **People's Bank** balance sheet flat-lining a distraction
- Stocks at 0.18x are lowly priced versus **liquidity** measures

DETAIL

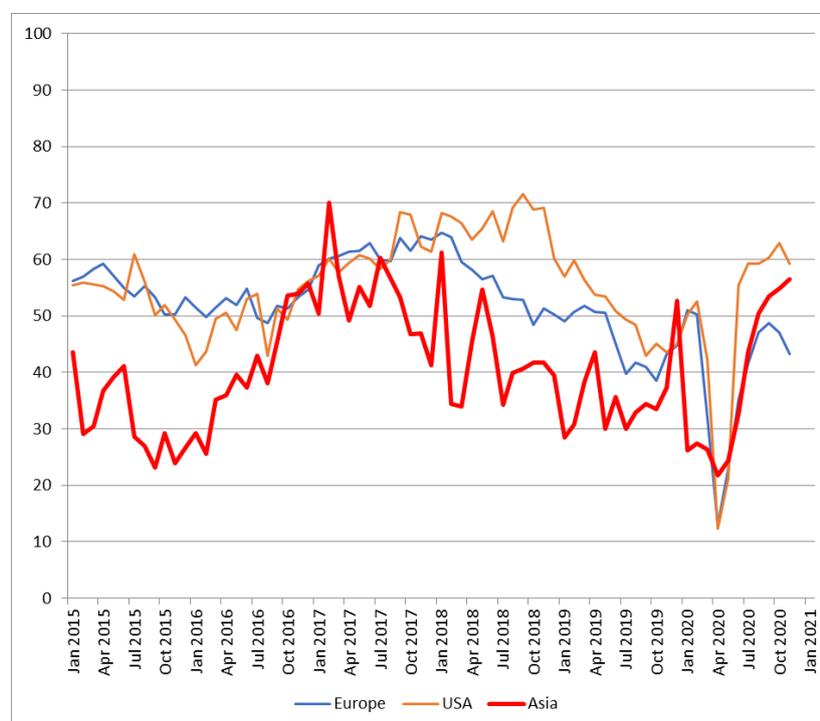


An' the dawn comes up like thunder outer China 'crost the Bay!
(Kipling)

Latest Chinese PMIs have been reported with surprise in the West. They should not be: China's economy is in recovery. Chart 1 reports the broader picture for the Asian region in order to take-in China's large economic footprint. Asia is enjoying its fastest rebound for 5-years. With consumers and producers Worldwide already primed with some US\$20 trillion of extra **Global Liquidity** (or some 25% of World GDP) and inventories (e.g. in the US) pared to the bone, **Asian export performance** could rocket still higher in 2021.

Indeed, **beneath the surface** in China things are also changing. In November, President Xi Jinping visited Nantong, the hometown of Zhang Jian, a pioneering 19th century Chinese capitalist. Xi remarkably described Zhang as a "sage and role model" for China's entrepreneurs (and only days after Jack Ma was slapped down). In the 1980s and 1990s, when Deng Xiaoping was encouraging market-oriented reforms, Zhang was similarly celebrated by the Communist Party (CCP): these piecemeal celebrations seem to be **symbolic**. CCP policy may be set to favour the economy in 2021?

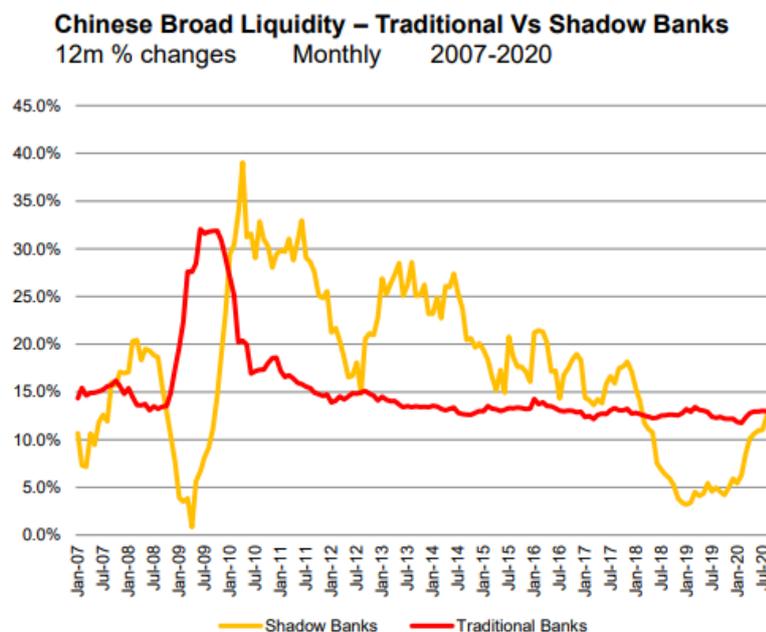
Chart 1: World Business Surveys – By Major Region, 2015-2020



But there is another key change going on: **the revival of the once rapacious Chinese shadow banks**. At their peak, they supplied around one-third of overall credit in China and lent notably to the small and medium-sized enterprises that often prove critical for GDP growth. Chart 2 highlights that shadow bank lending has recently surged once again and now exceeds the steady, consistent pace of State bank (SoBs) credits. Given the close control exercised by the PBoC, this surely must be a deliberate policy move? **We must start to think of shadow bank credit as being a new and important Chinese monetary policy lever alongside traditional PBoC actions.**

Curiously, the People’s Bank is maintaining a relative restrained monetary stance and has lately even allowed the monetary base to contract. However, we have previously argued that these moves are aimed at supporting the RMB in the forex markets, and they are not an untypical response by Chinese policy-makers during major ‘risk off’ periods in the World economy.

Chart 2: Chinese Broad Liquidity Growth – Traditional Vs Shadow Banks, 2007-20



The broad liquidity picture ultimately matters more and latest data evidence it has strengthened. What will this mean for the Chinese markets in 2021? A straightforward way to judge is by comparing the holdings of Chinese equities to the pool of liquidity. Chart 3 highlights the equity-to-liquidity ratio.

Chart 3: Chinese Equity Holdings to Liquidity Ratio, 1993-2020 (Times)



There are three things to note about the chart: (1) there is **no evidence of a bubble**, or certainly nothing like those experienced in 2008 and 2015; (2) compared to recent ratio data **Chinese equities look well-supported by rising liquidity** (we project a further 15% rise in liquidity thru end-2021), and (3) compared to the prevailing World average equity/ liquidity ratio of 0.51 times and the Wall Street figure on 1.02, the **0.18 times ratio for China appears absurdly low**.

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— Michael J. Howell (05 Dec 2020)



Nicolas Van Broekhoven

Insight Provider |
CrossASEAN Research

Nicolas Van Broekhoven is a generalist investor with a preference for small and mid-cap companies and special situations. He grew up in Europe, went to university in the US, and lives in Singapore, which has given him a broad scope on the world and investing in general.

Areas of Expertise

- Primary Asset Class: Equities
- Geography: ASEAN
- Countries: Singapore
- Sectors: Generalist

Content Verticals

- Equity Bottom-Up

Straits Trading | Equity Bottom-Up

Straits Trading: Discounted Way into 2021 SGX's Hottest IPO

By Nicolas Van Broekhoven | 15 Dec 2020

EXECUTIVE SUMMARY

[Straits Trading \(STRTR SP\)](#) was written up as a privatization candidate almost two months ago. [Straits Trading - Ripe For Privatisation](#) by [David Blennerhassett](#).

We agree with David that Straits Trading is interesting but doubt a privatization is on the table. Straits Trading has been publicly traded since 1979 and the SGX listing is actually useful for the family behind TeCity (controlling shareholder is itself a family office).

The crown jewel of Straits Trading is its 22% stake in [ARA Asset Management \(ARA SP\)](#). ARA was delisted from the SGX by founder John Lim, Warburg Pincus, and Straits Trading in February 2017. **We believe ARA gets relisted on the SGX between 2Q21 and 2Q22.**

Assuming 120-150 billion SGD Assets Under Management at the time of IPO ARA could be valued between 6-7.5 billion SGD. This market cap would lead to entry into the STI Index relatively quickly.

Assuming the above Straits Trading's 22% stake in ARA is potentially worth 1.32-1.65 billion SGD. Compare this to the current market cap of Straits Trading at 754 million SGD. Admittedly, there are some "if" and "but" that applies as we don't know the leverage of ARA at the time of IPO, the cost of its debt, and if markets will again apply an EV/AUM ratio of 5% (similar to its delisting in 2017). Still, risk/reward seems heavily skewed to the upside.

Conclusion: if investment bank "ABC" approached you to invest in SGX's hottest 2021 IPO at a +/- 50% discount to its likely list price (with additional assets thrown in for free!) would you take the call?

+ Free upside comes from its tin, real estate, and hospitality assets. While you wait the stock pays you a 3% dividend yield.

DETAIL

For background on [Straits Trading \(STRTR SP\)](#) please read [David Blennerhassett](#) piece from October. Our intent is not to rehash the other assets that Straits Trading owns and its investment merits.

We think these are largely irrelevant as the real catalyst is the IPO of ARA on the SGX. Our guess is this IPO happens between 2Q21 and 2Q22.

ARA has not communicated officially it will seek a re-listing but we advise investors to accumulate Straits Trading before the announcement. As investors, we want to skate to where the puck is going, not where it has been.

We are certain an IPO will happen as Warburg Pincus is involved and their mandates are to create value and realize value for their LPs.

2017 vs 2021

When ARA delisted from the SGX in 2017 it told investors it wanted to go on an aggressive expansion phase and it convinced minority investors this was best done as a private company.

The below overview compares ARA in 2017 to ARA by the middle of this year.



Since June we learn from ARA's website the group has been on a buying binge. When do these buying binges happen? If assets need to be bulked up prior to listing on an exchange.

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Nov 25, 2020	ARA Named Best Sustainable REIT Fund Manager, APAC 2020 and Performs Well in GRESB 2020
Nov 11, 2020	ARA and Chelsfield Secure \$5385.8 Million Green Loan for 5One Central
Nov 10, 2020	ARA-Managed Fund Acquires Landmark Office Tower in Seoul, Korea
Oct 18, 2020	ARA Group Awarded 3 Billion Pound Affordable Housing Guarantee Scheme to Support Delivery of Critical Housing in the UK
Oct 16, 2020	3 Billion Pound Affordable Housing Guarantee Scheme Awarded to ARA Venn
Oct 08, 2020	ARA Dunedin Accelerates Transaction Momentum In The UK With Two New Acquisitions Worth Over 500M Pounds
Sep 10, 2020	ARA Venn Prices Its Sixth RMBS Transaction
Jul 07, 2020	ARA Venn Funds 250 Million Pounds Across 6 Loans in the Second Quarter Under the 3.5 Billion Pound PRS Government Guarantee Scheme
Jul 01, 2020	ARA Venn Raises EUR200 Million For The First Close Of Its Latest Whole Loan European Real Estate Debt Fund

Hence, our estimate that AUM will reach between 120-150 billion SGD at the time of its IPO next year.

In 2017 the company was delisted at a 1.3 billion SGD valuation, or 1.78 SGD/share.

SCHEME DOCUMENT

DATED 28 FEBRUARY 2017



ARA ASSET MANAGEMENT LIMITED
(Incorporated in Bermuda)
(Company Registration No.: 32278)

PROPOSED ACQUISITION OF ARA
ASSET MANAGEMENT LIMITED

by

ATHENA INVESTMENT COMPANY
(CAYMAN) LIMITED

Scheme
Consideration

\$1.78

for each
Scheme Share

The Scheme Consideration
is Final

Submit your vote in
person or by proxy

Now that its AUM has grown from +/- 40 billion to 120-150 billion (200%-275% larger) we assume that investors will at least award it with the same EV/AUM % as five years ago. Investors who are more bullish/bearish can fiddle with their own assumptions. We prefer to be approximately right than precisely wrong.

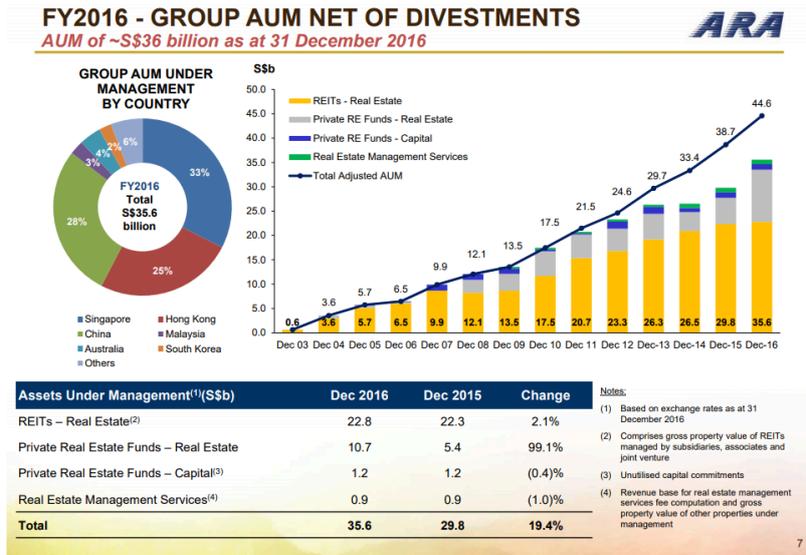
4 Implied multiples compare favourably to historical averages

The Scheme Consideration implies a P/E, EV/EBITDA and EV/AUM of 20.7x, 17.5x and 5.0% respectively, which compare favourably to the Company's historical averages.

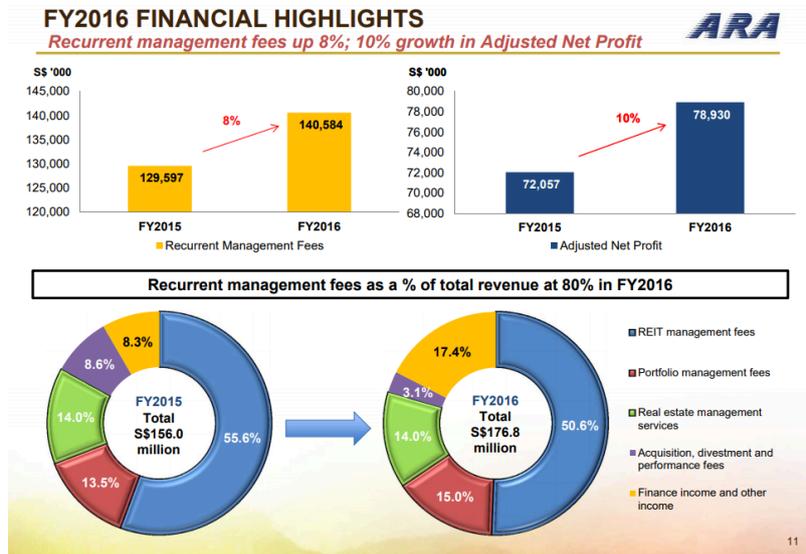
Implied Valuation Multiples vs. Historical Averages



The big IF is how much debt will be carried on the new list-co and what the interest rate on this debt will be. The big advantage that investors will have in analyzing ARA's IPO is that its entire track record since its founding in 2003 is still available in the public domain.



The asset/country mix in 2021 will surely have changed but knowing John Lim the recurring nature of its revenues will look very much like 2016 (or be potentially even better). This will be a magnet for the whole fund manager gang who wake up every day and say "I can only buy great compounding businesses".



Depending on its final size the market cap will be between 6-7.5 billion SGX which will mean ARA will be included in the STI index on the first review.

Final Thoughts

If investment bank "ABC" approached you to invest in SGX's hottest 2021 IPO at a +/- 50% discount to its likely list price (with additional assets thrown in for free!) would you take the call?

+ Free upside comes from its tin, real estate, and hospitality assets. While you wait the stock pays you a 3% dividend yield.

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— *Nicolas Van Broekhoven (15 Dec 2020)*



Angus Mackintosh

ASEAN Insight Provider |
CrossASEAN Research

Angus Mackintosh has been in Equity Sales and Research for more than 25 years covering Asian markets. He possesses in-depth knowledge of a wide range of companies, economies, and markets in Asia.

Areas of Expertise

- Primary Asset Class: Equities
- Geography: ASEAN
- Countries: Indonesia
- Sectors: Generalist

Content Verticals

- Equity Bottom-Up, Thematic (Sector/ Industry)

Tokopedia PT | Private Capital Markets

Tokopedia PT (1087142D IJ) - From Private to Public by Hook or by Crook

By Angus Mackintosh | 19 Dec 2020

EXECUTIVE SUMMARY

[Tokopedia PT \(1087142D IJ\)](#) has confirmed that it has hired Morgan Stanley and Citigroup as advisers to help accelerate its plan to go public. The company has not yet decided which route to take to come to market, whether through a straightforward IPO or a SPAC listing, potentially through Richard Li and Peter Thiel's Bridgetown Holdings Ltd.

The company had previously stated that it would definitely seek a listing in its home market of Indonesia, with a potential dual listing in the US, although these statements were made pre-pandemic.

Valuations for [Tokopedia PT \(1087142D IJ\)](#) range from US\$8-10bn, although after the last round of funding it was valued at US\$7.5bn, making it Indonesia's second most valuation start-up after [Gojek \(1379371D IJ\)](#), which was last valued at US\$10bn.

An IPO would help the company realize a higher valuation, providing a currency to drive future growth, given it would be an alternative to [Sea Ltd \(SE US\)](#), as the number 2 e-commerce player in Indonesia. [Sea Ltd \(SE US\)](#) trades at 13x FY21E EV/Sales currently and just raised more than US\$2bn through a placement of new ADS's. We look at [Tokopedia PT \(1087142D IJ\)](#) and its positioning in more detail below the fold.

DETAIL

A changeable environment

The landscape for e-commerce in Indonesia is constantly changing shape, driven by the larger players access to funding and velocity and appetite for promotions, as cash burns in the form of subsidies, discounts through payments players, and free deliveries ebbs and flow. Market share numbers are not easy to obtain but industry sources suggest that Shopee and [Tokopedia PT \(1087142D IJ\)](#) have around 20%-25% each with Lazada and then Bulapak in 3rd and 4th position but the top 4 probably make up 70%-80% of the formal market.

Who are the players?

As of 1Q2020, Shopee ([Sea Ltd \(SE US\)](#)) ranked No.1 in Indonesia in terms of the most clicked on e-commerce site, followed by Tokopedia, Bukalapak, and Lazada. Shopee's tactics have often been to copy competitor's promotions (monthly promos etc) and front-run on ideas, which has been quite successful in driving engagement and gaining market share. Shopee's sale period campaigns such as 11.11 and 12.12 yielded strong results last year. It is reported to have moved ahead of [Tokopedia PT \(1087142D IJ\)](#) in 4Q2019. Behind these top three come Lazada, BliBli, JD.id, Orami, Bhinneka, Sociolla, and Zalora.

3Q2020 Indonesian e-commerce market share

Merchant	Monthly Web Visits	AppStore Rank	PlayStore Rank	Twitter	Instagram	Facebook	Number of Employees
1  Shopee	96,532,300	#1	#1	486,100	5,965,200	18,870,500	7,000
2  Tokopedia	84,997,100	#2	#4	611,900	2,120,700	6,385,100	4,300
3  Bukalapak	31,409,200	#4	#5	193,800	1,123,600	2,501,900	2,300
4  Lazada	22,674,700	#3	#3	398,300	2,327,200	30,072,000	3,500
5  Blibli	18,695,000	#5	#6	504,500	1,334,500	8,568,100	1,900
6  JD ID	4,785,800	#8	#7	32,100	492,000	781,300	1,100
7  Orami	3,071,900	#27	n/a	6,000	n/a	352,800	183
8  Bhinneka	2,803,800	#20	#20	6,900	41,800	1,051,400	605
9  Sociolla	1,986,700	#7	#2	3,200	907,500	10,900	392
10  Zalora	1,828,500	#6	#8	900	619,100	7,843,300	562

Source: iPrice

From local sellers to branded goods

Pretty much all major players across the e-commerce space in Indonesia now have branded stores on their platforms as principles. The advantage of these customers is that discounts are often funded by the brands and not the platform. This allows the brands to have control over pricing versus SMEs and individual sellers where there is no control. This space includes a multitude of brands but also includes a mixture of offline retailers such as [Ramayana Lestari Sentosa \(RALS IJ\)](#) and FMCG companies such as [Unilever Indonesia \(UNVR IJ\)](#) or [Procter & Gamble Co \(PG US\)](#). Platforms do not take commission from this type of seller but rather make money from advertising fees and promotion on rankings. This is still a relatively small portion of GMV at around 15% of the total but is growing in importance, as offline players are increasing the emphasis on online channels and online players look at ways to gain share.

It's all about the funding

A key determining factor for success in Indonesia is access to funding and the willingness to use it for promotions and free deliveries. 2019 saw a step-change in this activity from Shopee ([Sea Ltd \(SE US\)](#)) with the introduction of free-delivery in mid-2019, a game-changer for the company. What has made this possible is the company's ability to generate significant amounts of cash through its gaming business to finance its cash-burn in e-commerce plus its access to capital markets given [Sea Ltd \(SE US\)](#) is listed. The company recently raised over US\$2bn through a placement of ADSs, which was also well-received, underlining the investors' confidence in its strategy. [Tokopedia PT \(1087142D IJ\)](#) has become less aggressive likely due to the travails of the Softbank Vision Fund and is thought to have reduced its cash-burn by 50%-60% from the peak.

Steady-state with less cash-burn

We are now likely to see the market finding more of a steady-state in terms of share with Shopee also reducing its loss per order. Bukapalac also significantly reduced its cash burn last year and even further since the beginning of 2020. [Lazada Group \(LAZADA SP\)](#) has ample funding from [Alibaba Group \(BABA US\)](#) and has the advantage of being able to source more SKUs from China, given its natural affiliation with Taobao.

Ride-Hailing - Fuelling the fire

Two key drivers for e-commerce come in the shape of delivery and payments. Both these aspects of the business are catered for in Indonesia by the two leading ride-hailing companies [Gojek \(1379371D IJ\)](#) and [Grab \(0967655D SP\)](#). Both are involved in e-commerce deliveries when the merchants and customers are in the same city. Using Gojek or Grab for deliveries only makes sense for express same-day delivery for orders above IDR150,000 within a 4km to 5km radius, which would cost IDR15,000-18,000 or 10% of the total value.

Otherwise, most players will opt to use JNE, which is cheap but slow, or J&T, which is much faster but more expensive. Most platforms provide a multitude of different delivery options, with some players such as [Lazada Group \(LAZADA SP\)](#) and BliBli providing more in-house delivery. Both ride-hailing companies have payment capabilities, [Gojek \(1379371D IJ\)](#) directly through GoPay and [Grab \(0967655D SP\)](#) indirectly through 39% owned OVO, which is co-owned by [Tokopedia PT \(1087142D IJ\)](#) (41%) and Lippo Group. These two elements make ride-hailing companies inextricably entwined with the e-commerce landscape.

[Tokopedia PT \(1087142D IJ\)](#) an early starter in Indonesia's e-commerce

Founded in 2009 by William Tanuwijaya and Leontinue Alpha Edison, [Tokopedia PT \(1087142D IJ\)](#) is the largest Indonesia focused e-commerce marketplace, with a community of more than 9.9m sellers currently (versus 5.0m in 2018 and 7.9m in 2019) offering more than 200m curated products. Out of its sellers around 94% are described as ultra-micro. It generated a total GMV of US\$15.9bn in 2019 or 1.5% of Indonesia's GDP. The tagline of the company from its early days has been to "democratize e-commerce through technology", helping first-time entrepreneurs get their products to market online, as well as allowing consumers to access products, wherever they are in Indonesia. It is more focused on everyday products versus its competitors as well as being slightly more male-orientated in its product mix, although it has been trying to attract more female customers through an affiliation in late 2019 with a K-Pop boy band called BTS.



More than **90 million Indonesians** are waiting for your superior goods in **Tokopedia**

[Open a Free Store](#)

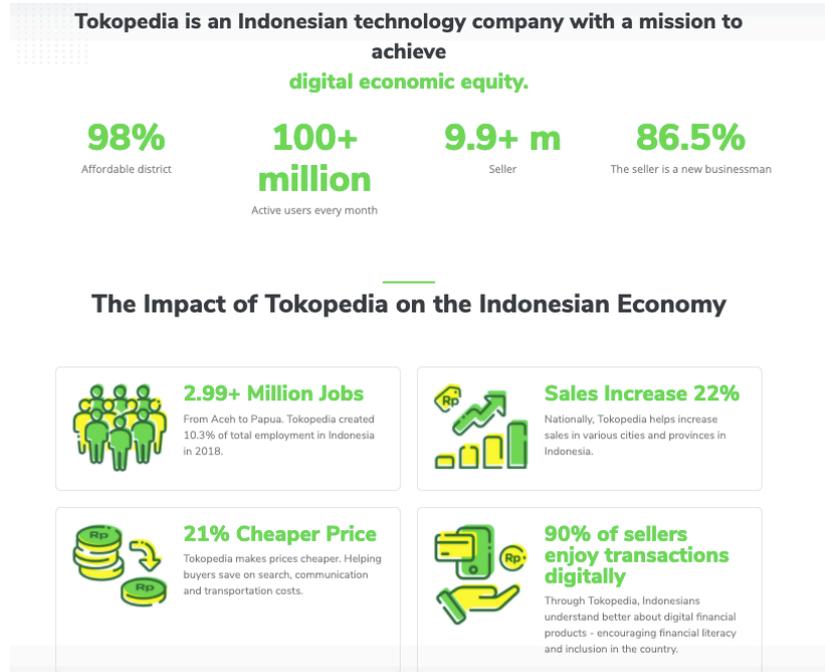
Why Tokopedia?

- FREE! Free of charge**
 Selling on Tokopedia is free of charge.
- Coverage throughout Indonesia**
 Potential potential buyers in 97% of Indonesia.
- Complete Logistics**
 Complete logistics options for shipping to all corners of Indonesia.
- Many Supporting Features**
 Various features that can help & increase your sales.

Source: [Tokopedia PT \(1087142D IJ\)](#)

Democratising e-commerce

[Tokopedia PT \(1087142D IJ\)](#) started life as a C2C platform, allowing small scale merchants to sell their products to other consumers online but has since developed its B2C business, with landing pages for offline retailers such as [Ramayana Lestari Sentosa \(RALS IJ\)](#) or FMCG players such as [Unilever Indonesia \(UNVR IJ\)](#) and [Procter & Gamble Co \(PG US\)](#), allowing them to set up a virtual shop on the platform to sell their products. However, the C2C business still accounts for more than 80% of total GMV, providing a market place for a massive range of products from electronics to clothing to health-care items but also sites for buying flight and train tickets, digital products topping up mobile-phone plans, utility payments, games vouchers, and much more. Digital products have become increasingly important for the company.



Source: [Tokopedia PT \(1087142D IJ\)](#)

Enabling first-time entrepreneurs

[Tokopedia PT \(1087142D IJ\)](#) is a household name in Indonesia and it has made its name by selling products at lower prices than anywhere else and it is often the case if you cannot find something on [Tokopedia PT \(1087142D IJ\)](#) then you cannot buy it in Indonesia. The company quantifies this claiming to be -21% cheaper than anywhere else. It has also been a massive enabler for MSMEs in Indonesia, giving small merchants a platform to sell their products and creating nearly 3m jobs in Indonesia. The company had a market share of around 25% of the Indonesian e-commerce market in 3Q19, now with 100m plus monthly active users (MAU). Over 85% of its merchants are first-time entrepreneurs and 89% do not own a physical store. This allies the company with the government's efforts to encourage MSMEs which helps to support millions of people and their families.

Supporting warungs through Mitra Tokopedia

Through its rapidly growing Mitra Tokopedia offering, the company provides support for around 350,000 kiosks, assisting them with their supply chains as well as in the financing of inventories. Mitra Tokopedia is an application that was created for shop owners, stalls, and individuals who want to increase their income by selling digital products while simplifying the process of shopping for stores or food stalls using the online wholesale feature. Being part of the platform allows subscribers to order stock through the App, with decent pricing and logistics.



Source: [Tokopedia PT \(1087142D IJ\)](#)

Tied into payments through OVO

[Tokopedia PT \(1087142D IJ\)](#) also has around a 39% stake in payments platform OVO, which supports the growth in digital payments in Indonesia. OVO is now the leading payments platform ahead of [Gojek \(1379371D IJ\)](#)'s GoPay but has seen some competition coming from Shopee Pay, which is backed by [Sea Ltd \(SE US\)](#). Its natural advantage is in its use case by driver-partners from [Grab \(0967655D SP\)](#) plus all the merchants under GrabFood, making it immediately a multi-channel digital payments product. [Tokopedia PT \(1087142D IJ\)](#) has expanded its product offering to include financial products, which include digital wallets through OVO, investments, business capital loans, virtual credit cards, and protection products, to name a few. No doubt that digital payments are becoming rapidly more important, especially since the onset of COVID-19.

Funding has continued apace

[Tokopedia PT \(1087142D IJ\)](#) is by no means an underdog on funding. The company raised over US\$1.1bn from Softbank and [Alibaba Group \(BABA US\)](#) in December 2018, at an estimated valuation of US\$7 billion, with those two companies estimated to now have around a 45% stake. Joe Tsai, co-founder and executive chairman of [Alibaba Group \(BABA US\)](#), also sits on Tokopedia's board. The firm's CEO and co-founder William Tanuwijaya has said the startup he co-founded 10 years ago is aiming to break even next year. Its gross merchandise value (GMV) tripled to as much as IDR222 tN (just under US\$16 billion) in 2019. Revenue is also growing faster than GMV, while its community of sellers has risen to 9.9m versus 7.9m last year versus 5.0m in 2018. There was some talk since October 2019 of a further fund-raising of US\$1bn plus, likely the last before an IPO but this was likely been delayed due to COVID-19. It was recently confirmed that the company had confirmed another US\$350m in funding from Temasek valuing the platform at US\$7.5bn.

Date Funding Closed	Funding Round	Funding amount	Lead Investors	Valuation
November 16th, 2020	Series H	US\$350m	Temasek and Alphabet Inc Cl C (GOOG US)	US\$7.5bn
November 21st, 2018	Series G	US\$1.1bn	Alibaba Group (BABA US) and Softbank Vision Fund	US\$7bn
August 17th, 2017	Series F	US\$1.1bn	Alibaba Group (BABA US)	-
April 11th, 2016	Series E	US\$147m		-
October 21st, 2014	Series E	US\$100m	Softbank Telecom Group	-
June 12th, 2013	Series D	-	Softbank Ventures Asia	-
April 4th, 2012	Series C	-	Beenos Partners	-
April 19th, 2011	Series B	US\$700,000	CyberAgent Capital	-
March 15th, 2010	Series A	-	East Ventures	-
February 6th 2009	Seed Round	-	Indonusa Dwitama	-

Source: Crunch base

Broad range of Valuations

Given the lack of clarity on valuations, we can more point towards a range for [Tokopedia PT \(1087142D IJ\)](#), which is more likely to be closer to regional listed peers rather than the lofty numbers achieved by [Sea Ltd \(SE US\)](#) and a lot will be dependent on the assumptions for net revenues and growth. [Tokopedia PT \(1087142D IJ\)](#) achieved a gross merchandise value of US\$16bn in 2019, and if we assume +22% growth in 2020 (company YTD indication), then we get to a GMV of US\$20bn and net revenue of US\$1.2bn (assuming 6% of GMV as net revenue). This would give the company a valuation range of 6.6x - 8.4x, which makes it look relatively attractive versus peers below. If we assume +20% growth in FY21E then those numbers come down to 5.5x - 6.9x.

Still unclear on the route to market

[Tokopedia PT \(1087142D IJ\)](#) has confirmed that it has hired Morgan Stanley and Citigroup as advisers to help accelerate its plan to go public. The company has not yet decided which route to take to come to market, whether through a straightforward IPO or a SPAC listing, potentially through Richard Li and Peter Thiel's Bridgetown Holdings Ltd. The company had previously stated that it would definitely seek a listing in its home market of Indonesia, with a potential dual listing in the US, although these statements were made pre-pandemic. It would certainly be very positive for the Indonesian market to have [Tokopedia PT \(1087142D IJ\)](#) listed locally, and indeed there may be some pressure to do so, given its importance to the local economy.

Value enhancement

Valuations for [Tokopedia PT \(1087142D IJ\)](#) range from US\$8-10bn, although after the last round of funding it was valued at US\$7.5bn, making it Indonesia's second most valuation start-up after [Gojek \(1379371D IJ\)](#), which was last valued at US\$10bn. An IPO would help the company realize a higher valuation, providing a currency to drive future growth, and it would be an alternative to [Sea Ltd \(SE US\)](#), as the number two e-commerce player in Indonesia. [Sea Ltd \(SE US\)](#) trades at 13x FY21E EV/Sales currently and just successfully raised more than US\$2bn through a placement of new ADS's. There is no doubt that there would be a strong appetite for a [Tokopedia PT \(1087142D IJ\)](#) IPO, in whatever shape or form it takes.

	FY20E EV/Sales	FY21E EV/Sales	FY22E EV/Sales	FY21E Sales growth
Alibaba Group (BABA US)	6.5x	4.8x	4.7x	+37.1%
Tencent Holdings (700 HK)	9.3x	7.3x	5.8x	+23.5%
NetEase Inc (NTES US)	4.8x	4.0x	3.4x	+16.2%
Sea Ltd (SE US)	19.4x	13.1x	9.4x	+53%
Average	10.0x	7.3x	5.8x	

Source: Capital IQ

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— Angus Mackintosh (18 Dec 2020)



Kyle Rudden

Alpha-Centric ESG Research

Kyle Rudden is an ESG analyst with an alpha-centric approach to ESG research. He believes global sustainability is imperative, and private-sector capital is its cornerstone. The Triple Bottom Line: People, Planet, AND Profit.

Areas of Expertise

- Primary Asset Class: Equities
- Geography: Global
- Countries: United States
- Sectors: Utilities, Energy

Content Verticals

- ESG, Quantitative Analysis

SGX | ESG

SGX FIRST Puts SGX First in the Ranks of Asia's Most Sustainable Stock Exchanges

By Kyle Rudden | 21 Dec 2020

EXECUTIVE SUMMARY

Last week, [Singapore Exchange \(SGX SP\)](#) made a momentous [announcement](#) in the sphere of Asian sustainable/ESG finance and investing. [SGX FIRST](#) is its new multi-partner sustainability initiative. The acronym, FIRST, is for "Future in Reshaping Sustainability Together," but it says so much more.

SGX FIRST, puts SGX first, in the ranks of Asia's most sustainable stock exchanges.

This is different. SGX FIRST is a well-conceived, high-level, strategic sustainability initiative on an entirely different plane than the many "platform" launches of late. It is indeed part platform, but to view it as *only* that misses its essence entirely. SGX FIRST stands out in three interrelated ways:

1. **Intelligent:** Unlike "me-too" ESG portals, SGX FIRST is an integrated strategic plan leveraging existing strengths, products, and relationships. It's making progress, not even a week out.
2. **Impactful:** Intelligent design and synergies-galore should translate into real impact; the ability for SGX FIRST to foster and shape sustainable capital markets in Singapore, and APAC.
3. **Profitable:** Yet to be seen, but likely. This is the stuff of virtuous cycles, from establishing ESG domain authority to licensing fees and other incomes. Altruistic capitalism, but *capitalism*.

In this game of ESG "platforms," SGX is playing chess, whilst others chew on checkers.

In light of pandemic-induced hard times for SGX, this may be what the doctor ordered.

DETAIL

SGX FIRST Is a High-Level Strategic Sustainability Plan

First, what is SGX FIRST, aside from a stroke of branding brilliance? First and foremost, SGX FIRST is a high-level strategic initiative, conceived on an altogether different plane than the multitude of "platform" launches of late. It's a platform too but to view it as only that misses its essence entirely. SGX FIRST is a multi-faceted, multi-partner, multi-asset, strategic sustainability plan.

Strategic Integration Means Impact and Profit

I avoid being overly-critical of *any* exchange-led initiatives aiming to advance sustainable and ESG investing. Suffice it to say that most sustainability/ESG "portals" are a bit light on substance. There are, however, two exceptions: 1) SGX FIRST, and 2) [HKEX \(388 HK\)](#)'s [STAGE](#). Those two – and SGX first and foremost – stand out above all others for three fundamental and interrelated reasons:

1. **Strategic Integration:** Unlike the "me-too" portals, SGX FIRST (HKEX STAGE as well) are well-conceived *strategic* plans. SGX FIRST integrates and leverages existing strengths, products, and relationships. I loathe to use such a cliché word, but it works quite well here – synergies!
2. **Prospective Influence:** Strategic integration precipitates substance, and by "substance" I mean the potential (or perhaps, the likelihood) for SGX FIRST to truly shape the future of sustainable capital markets in Singapore, as well throughout the greater Asian and even APAC region.
3. **Shareholder Returns:** There is always an element of altruism in these sorts of things, but even altruistic capitalism is capitalism, and there had better be some financial upside when it's listed exchanges being the altruistic capitalists. There is for SGX FIRST (discussed more later).

HKEX STAGE When HKEX announced STAGE (Sustainable and Green Exchange) in June 2020, I published [HKEX's Sustainable and Green Exchange Is a Great Plan With Huge Potential, Now It's Time to Execute](#). At the time, STAGE was an idea awaiting launch and execution. Early this month HKEX [announced](#) the official launch. There is more substance – mainly in terms of product listings – but it is still evolving. Thus, the above Insight is largely up to date and relevant.

Proof of Substance Can Be Found in the Details

As a segue into the details, I make this observation. There *are* details! These announcements tend to be jargon-laden fluff with little stuff, glitter but no gold, all mouth and no trousers. Details are usually lacking or non-existent, because there just aren't any – too superficial of a platform, or too early of a press release, or both. Commendable intentions, but forgettable after the initial read.

Once again, SGX is the exception to the rule. The press release alone is detail-dense and additional information is provided on the website (I was pleasantly surprised, as these things usually link to a landing page). SGX is investing SGD 20 million in SGX FIRST – half for its internal corporate social responsibility (CSR) initiatives, and half for development of new ESG products and services.

- **Internal CSR:** SGX will continue its carbon reduction program, and other sustainability-related efforts (e.g., it just hired a Head of Sustainability and Sustainable Finance, a rarity in Asia).
- **Equities:** SGX FIRST will expand SGX's existing offering of equity-related ESG products, with a focus on sustainability- and ESG-themed indices, ESG ratings, and other related data.
- **Fixed Income:** SGX is already a leader in green, social, and sustainable bonds but plans to take its status to a new level, in part by leveraging existing relationships with [Nasdaq \(NDAQ US\)](#).
- **Other Products:** ESG risk management and other products are part of the SGX FIRST plan, and include derivatives, ESG futures, and hedging instruments for ESG-tracking investments.

Equity-Related ESG Products Include Indices, Ratings

Sustainability- and ESG-themed equity indices and related data (e.g., ESG ratings) are likely to be among the near-term announcements due to SGX's existing "infrastructure." This product/service category goes a long way in establishing or increasing domain authority but also has the potential for substantial revenue in the way of licensing fees and other indirect exchange income streams.

Sustainability/ESG Equity Indices Are a Given

SGX foresees expanding its family of [iEdge ESG Indices](#), as well as a deeper integration of Scientific Beta's (SGX owns 93%) abilities, including the development of indices to manage climate risk. SGX expects to launch, in January 2021, four ESG futures contracts based on FTSE Russell indices: FTSE Emerging Markets, FTSE Asia ex-Japan, FTSE Emerging Markets Asia, and FTSE Blossom (Japan).

ESG Ratings Products Are Ripe for Expansion

SGX relationships with [MSCI \(MSCI US\)](#) and [Sustainalytics](#) (owned by Morningstar) already deliver [ESG ratings](#) to the platform. ESG-ratings related product offerings are particularly ripe for further expansion, given that: 1) SGX-listed issuers are, on the whole, undercovered, and 3) the quality of ESG reporting has increased dramatically in the three years since SGX's ESG [disclosure rule](#).

Solidifying a Dominant Position in Sustainable Bonds

Pound-for-pound, SGX is a force to be reckoned with in the sustainability bond ecosystem. It has a *dedicated* [Green, Social, and Sustainability](#) bond segment and 140+ issues worth over US\$61 billion. More than half of all APAC listed international sustainability bonds are on SGX. Here are anecdotal statistics to put SGX's outsized market position into perspective:

- Of 35 APAC exchanges – down to and including tiny bourses in faraway places – just six have a substantive sustainable bond segment, four (SGX, HKEX, JPX, BSE) are listed exchanges.
- SGX's sustainable bonds total 7.8% of its total equity market cap. KRX is 4.0% but then it ranges from 0.03-0.29%. A bit apples-to-oranges, but lacking uniform bond data, it tells the story.
- SGX has one of the most diverse offerings. Roughly 70%, 20%, and 10% green, sustainability, and social bonds, respectively. In comparison, HKEX is about 90%, 5%, 5%. Most are green-only.

SGX and Nasdaq Sustainable Bond Network

SGX is Nasdaq's exclusive partner in Asia for the Nasdaq Sustainable Bond Network ([NSBN](#)), a one-stop shop for global green, social, and sustainability bonds (listed and unlisted) as well as related information. NSBN covers about 4,500 issues, mostly in Europe and North America, but has tapped SGX to bring more APAC issues into the network. A powerful combination, in a huge market.

Concluding Thoughts

To be sure, there is some yet-to-be-seen to this SGX FIRST announcement, but by all indications it is far more of a reality at the time of announcement than other launches of a "similar" (careful with that word) sort. SGX FIRST is a strategic plan, but not *merely* a plan. Already we are seeing tangible progress (e.g., ESG ratings), and barely out of the gate. Minor, in the grand scheme of things, but it is more than, "*we have a grand plan but we'll tell you about it later.*" That is the rule, not exception.

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— Kyle Rudden (21 Dec 2020)



Osbert Tang, CFA

China Analyst - Onshore
Credit, Equity Long-Short

Osbert Tang is an equity analyst with over 20 years of experience focusing on China's transport, infrastructure, industrials, and utilities sectors. He has been based in Shanghai since 2003, accumulating more than 15 years of on-ground knowledge on the Chinese economy and financial markets, and has a wealth of contacts with China corporates and government entities.

Areas of Expertise

- Primary Asset Class: Equities
- Geography: Asia Pacific
- Countries: Hong Kong, China
- Sectors: Industrials, Utilities

Content Verticals

- Equity Bottom-Up, Thematic (Sector/ Industry)

Kunlun Energy | Equity Bottom-Up

Kunlun Energy (135 HK): Very Favourable Valuation for Pipeline and Dalian LNG Disposals

By Osbert Tang, CFA | 23 Dec 2020

EXECUTIVE SUMMARY

[Kunlun Energy \(135 HK\)](#) finally concluded the sale of its 60% equity interest in Beijing Pipeline and 75% equity interest in Dalian LNG to PipeChina at a very favourable 1.9x P/B multiple. This is significantly better than 1.21x and 1.43x that [Petrochina Co Ltd H \(857 HK\)](#) and [China Petroleum & Chemical \(386 HK\)](#) got from their deals with PipeChina, respectively.

With net cash inflow of Rmb37bn, or HK\$4.94/share (ie 77% of current share price), Kunlun intends to pay out 50% of such cash. That said, the overall dividend yield for FY21F will reach 40.5%. After the transaction, based on sum-of-the-parts valuation, we place Kunlun at HK\$10.58, meaning that it trades on a steep 39% discount. We believe Kunlun will escalate its expansion into the downstream gas sales business going forward, and this should narrow its valuation discount to gas utilities peers.

DETAIL

Finally concluded the pipeline disposal, very favourably

On 22 Dec, [Kunlun Energy \(135 HK\)](#) concluded its long-awaited negotiation with China Oil & Gas Pipeline Network Corporation (PipeChina) on the disposals of its 60% equity interest in Beijing Pipeline and 75% equity interest in Dalian LNG. The total consideration amounted to Rmb40.886bn, representing a significant 1.9x relative to a book value of Rmb19.648bn. This compared very favourably against the 1.21x P/B that [Petrochina Co Ltd H \(857 HK\)](#) and 1.43x P/B that [China Petroleum & Chemical \(386 HK\)](#)

concluded with PipeChina in Jul as we discussed in [Kunlun Energy \(135 HK\): Positive Implications from PetroChina and Sinopec Pipelines Disposal](#). As a result, we take Kunlun's valuation for the deal positively.

Besides the good valuation, Kunlun also fares very well as the consideration will be received totally in cash, unlike a mixture of cash and equity in PipeChina as for PetroChina and Sinopec (Figure 1). Based on Kunlun's estimate, the net proceeds of the transaction will amount to Rmb37bn, being net of FY19 dividend distributed by Beijing Pipeline to Kunlun of Rmb2.7bn, about Rmb1.2bn of taxes and other transaction costs of Rmb18m.

Figure 1: Comparison of disposals

	Kunlun	PetroChina	Sinopec
Total consideration (Rmb bn)	40.9	268.7	122.6
Gross cash to be received (Rmb bn)	40.9	119.2	52.6
Proportion in cash	100.0%	44.4%	42.9%
Proportion in equity of PipeChina	0.0%	55.6%	57.1%
Resultant stake in PipeChina	0.0%	29.9%	14.0%
Book value of pipeline assets (Rmb bn)	21.4	222.9	86.1
Valuation of disposal (P/B)	1.909x	1.206x	1.425x
Pre-tax gain from disposal (Rmb bn)	19.5	45.8	36.5

Source: Kunlun, PetroChina, Sinopec

What does the deal mean for Kunlun?

The deal is very positive to Kunlun and the valuation is much higher than the valuation fetched by Sinopec. Accounting-wise, Kunlun will be able to book a pre-tax gain of Rmb19.5bn, or about Rmb18.3bn net of taxes. This is equivalent to a significant 3.3x of its full-year earnings for FY19. Since the transaction will need to go through approval in a special general meeting, the disposal and gain will only take effect in FY21, in our view.

Kunlun will get a net cash inflow of Rmb37bn which will be paid in two installment: the first within 20 days after the Closing Date and the second within 15 Business Days after the completion of the Closing Audit. Kunlun's net cash inflow is equivalent to HK\$4.94/share, or some 77% of the current share price. Kunlun intends that the net proceeds will be used as below:

- about 50% for dividend distribution to shareholders
- about 40% for developing the natural gas end-user sales business
- about 10% for repayment of debts and its general operations

On such basis, the dividend from the disposal alone will equal to a dividend yield of 38.4% and if we include the dividend from ordinary operations (but excluding that of the disposed assets), overall dividend yield will reach 40.5% for FY21.

What is the future for Kunlun?

The disposed assets contributed Rm3.02bn in profit to Kunlun in FY19, a significant 54.4% of the company's profit for the year. In 9M20, the profit contribution is Rmb1.98bn (Figure 2), roughly similar to FY19 level if we annualise such figure. That said, the disposal will leave a huge hole in its recurrent earnings stream in the future.

Figure 2: Profit contribution of the disposed assets

	For the year ended 31 December 2018	For the year ended 31 December 2019	For the nine months ended 30 September 2020
Revenue	10,839	11,519	7,499
Profit before tax	5,751	6,471	4,244
Net profit after tax	4,307	4,860	3,192
Net profit attributable to the Company	2,684	3,023	1,979

Source: Company data

Kunlun cites that the deal will allow it to further focus on its natural gas end-user business, seize the opportunity for end-user market development and concentrate on the development of city gas and LNG utilization in transportation sectors and minimise the earnings uncertainties due to the intensifying competition of the pipeline business. We think attention should be drawn to its intention to accelerate the integration and development of new energy, cultivate its new profit drivers and facilitate its transformation and upgrading from a natural gas distributor to an integrated green energy supplier with part of the proceeds. Given that 40% of the net proceeds are for developing the natural gas end-user sales business, which is a significant Rmb14.8bn, we expect Kunlun will go on a big spending spree for city gas projects over the next 12 months.

After the transaction, we value Kunlun at HK\$10.58 per share (Figure 3), based on SOTP valuation. When compared with the current share price, we see the stock trades on undemanding 39% discount to such value. We believe with the further expansion of downstream gas sales business and improvement in profitability, the valuation of Kunlun's gas sales business segment should narrow against its peers, which are trading on an average of 15.2x PER for FY21F currently.

Figure 3: Sum-of-the-parts valuation

Business segment	Valuation basis	Value (Rmb m)
Natural gas sales	12.1x FY21F PER (20% discount to sector average)	35,326
Remaining pipeline and LNG terminal assets	Estimated book value	10,828
Beijing pipeline and Dalian LNG	Disposal value	37,000
Exploration & production	55m bbl of crude oil reserve less FY20 production	1,953
Less: Net debt (excluding disposal cash)		-5,891
Total value (Rmb m)		79,215
No. of shares (m)		8,659
Per share value (Rmb)		9.15
Per share value (HK\$)		10.58
Share price (HK\$)		6.43
Discount (%)		-39.2%

Source: Company data, Osbert Tang estimate

Excluding the cash on hand, we estimate Kunlun's current stock price represents a 1.5x P/B multiple. That said, it is very cheap when compared with the gas utilities peers' average of 3.1x, as most of the remaining assets in Kunlun are end-user gas sales business, similar to that of the gas utilities companies like [China Resources Gas \(1193 HK\)](#), [ENN Energy \(2688 HK\)](#) and [China Gas Holdings \(384 HK\)](#).

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— Osbert Tang, CFA (22 Dec 2020)



Phil Rush

Chief Economist | Heteronomics

Phil Rush is the Founder and Chief Economist of Heteronomics. Until launching in November 2016, he was Nomura's Senior European Economist and was the Chief UK Economist there since 2010. Prior to that, he was at Barclays Wealth and Lehman Brothers.

Areas of Expertise

- Primary Asset Class: Multi-Asset
- Geography: Developed World
- Countries: United Kingdom
- Sectors: Generalist

Content Verticals

- Macroeconomics, Cross Asset Strategy

Macroeconomics

Brexit: Yippee Ki Yay, Negotiators

By Phil Rush | 24 Dec 2020

EXECUTIVE SUMMARY

- *The UK and EU negotiators have agreed a deal on their future trading relationship, broadly along the lines of the compromise we've expected for over a year. It should be approved by both parliaments, albeit with the European leg as a belated rubber stamp.*
- *This deal remains a skinny one, focussed on goods, despite the fat legal text. Additional trade frictions are still likely to weigh on growth in 2021 and beyond, although such economic damage is small beer compared to the Covid-related catastrophe.*

DETAIL

A new UK-EU trade deal has emerged from negotiations. While a relief, anything less would have been a total failure of statecraft. The landing zone seemed clear to us over a year ago, and the outcome has not changed significantly since. Unfortunately, brinkmanship was a tiresome political necessity to endure (see [Brexit: brinkmanship beckons](#)). Like John McClane during his escape through broken glass in that Christmas Classic, Die Hard, we're glad there wasn't more space to extend the pain. And we cheer the negotiators' progress with his "festive" Yippee Ki Yay.

There is naturally compromise in the deal itself, which is the only way something sustainable would emerge. The EU dropped its nonsensical initial insistence on effectively preserving the common fisheries policy to tolerate a phased return of UK rights, albeit over a more extended period and with a smaller share of the quota than the UK preferred. Meanwhile, the UK committed to maintaining equivalent standards with the EU, similar to the joint political declaration that accompanied the withdrawal agreement. However, the UK will be free to make the sovereign decision to diverge while bearing the costs of retaliation. Such flexibility, the targeting of the response, and an independent arbiter's role are all things the EU has found difficult to digest. Overall, there is a balance of rights and responsibilities consistent with the norms of international agreements between sovereign nations.

The deal is currently just agreed between the UK and the European Commission's negotiators, with some further formal hurdles left to clear. After Christmas, the UK parliament will be recalled to approve the deal, which they will do on an accelerated basis where scrutiny is likely to be limited. For the EU, the heads of state and government sitting on the European Council will initially need to approve of the deal its negotiator reached. It set the terms of reference, and member states appeared to be consulted enough to ensure that the outcome was satisfactory. Although the European Parliament has a formal treaty-defined role in the process, the deal can be provisionally applied after Council approval while awaiting its rubber stamp in the new year. Dissatisfaction among MEPs at the process should not change the outcome of ratification.

This deal's realisation mostly affects the economic outlook by removing the downside risk of a disorderly break from both sides stubbornly walking over the cliff-edge. It is a skinny deal, despite the forthcoming text being another lengthy tomb (roughly 500 pages according to Boris Johnson). That means zero-for-zero on tariffs with some added bureaucracy on goods trade and no special relationship covering services, despite that being where the UK has a comparative advantage and substantial surplus. A loss of competitiveness here is a structural shock that necessitates sterling staying well-below pre-referendum levels. Moreover, the arrival of new trade frictions will frustrate supply chains and weigh on economic growth in 2021 and beyond. It's another reason to be gloomy on 2021 UK GDP, albeit one that is tiny relative to the ongoing destruction caused by Covid policy.

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— Phil Rush (24 Dec 2020)

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#03-08 The Signature, Changi Business Park Central 2, Singapore 486066

+65 6715 1480 sales@smartkarma.com www.smartkarma.com

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