

4TH

GLOBAL
NETWORK
INVESTMENT
COMPETITION
2018.10-2019.4



GLOBAL
NETWORK
FOR
ADVANCED
MANAGEMENT

LONGi Green Energy Technology Co., Ltd. (SSE: 601012)

Golden Unicorn Team Members

YaJie Li CFA FRM (Leader)
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HongTao Zhang
HuaYuan Xu
Jie Li



**FUDAN
UNIVERSITY**

Investment Highlights

Reasons Of Recommending LONGi

BUY

Price: 13.55

Price Target: 23.90

Price Target Potential: 76.36%

Price Target Period: 1 Year

PV Power Industry has bright future, estimate new installation of PV Power facilities will have steady increment.

Compared with traditional energy, PV Power energy have following advantages:

- ✓ Sustainibility
- ✓ Clean
- ✓ Universality

It will become the most clean, safest, reliable, and low cost energy.

PV Power occupies 1.5% among all enery generation in the world, and this percentage is expected to increase to at least 10% in the future. According to PV InfoLink's projection, PV Power facilities new installation will reach **163GW** in the year of 2025 with the growth rate of 63% compared with 2017. And this number will exceed **300GW** when it comes to the year of 2030, which is around 200% growth compared with 2017.

Monocrystalline silicon is the future, LONGi is the Best Player

The power generate efficiency of monocrystalline silicon is higher than polysilicon, previous advantage of low production cost in polysilicon is fadding. With the development of PV Power industry, the market share of monocrystalline silicon energy will increase gradually with the estimation of reaching 48% market share in 2025, while the marekt share of polysilicon will decrease from current 80% to 48% in 2025.

LONGi is now leading the whole PV Power industry with its precedency in technology innovation and cost control. It has several world records in PV Power Industry:

- ✓ PERC cell conversion efficiency is **23.60%**. (WORLD RECORD)
- ✓ Type 60 PERC module cell conversion efficiency is **20.66%**. (WORLD RECORD)
- ✓ Mono PERC module power breaks through **360W**.(WORLD RECORD)
- ✓ Mono Global Market Share is **27%**.(in 2017)

The output of LONGi is expanding steadily, In the past five years, the annual growth rate of revenue has reached 65% and the annual growth rate of profit has reached 181%.

The capacity of monocrystalline silicon will reach 28GW in 2018,45GW in 2020,compared with 15GW in 2017 it will have great increment.



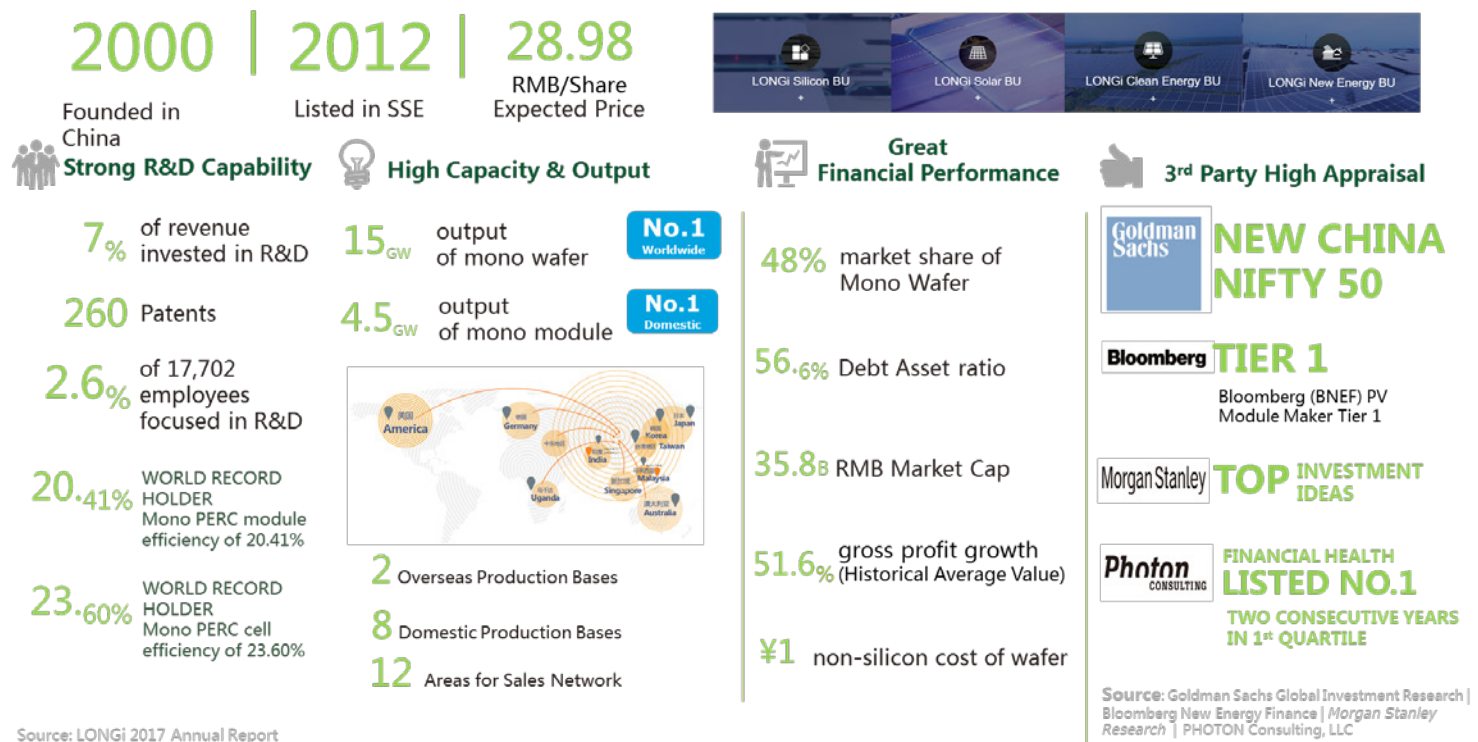
Company overview

A World Leading Monocrystalline Silicon PV Production Manufacturer

LONGi Green Energy Technology Co., Ltd. was founded in 2000. And in April 2012, it was listed in Shanghai Stock Exchange, named "LONGi" with its stock code of 601012.

This company focus on the R&D of monocrystalline silicon ingot, wafer as well as its production and sales.

Over decades of development, it has developed into the World's Largest Monocrystalline Silicon PV Production Manufacturer.



LONGi also received high appraisal from global famous 3rd financial parties.

Website: <https://en.longigroup.com/>

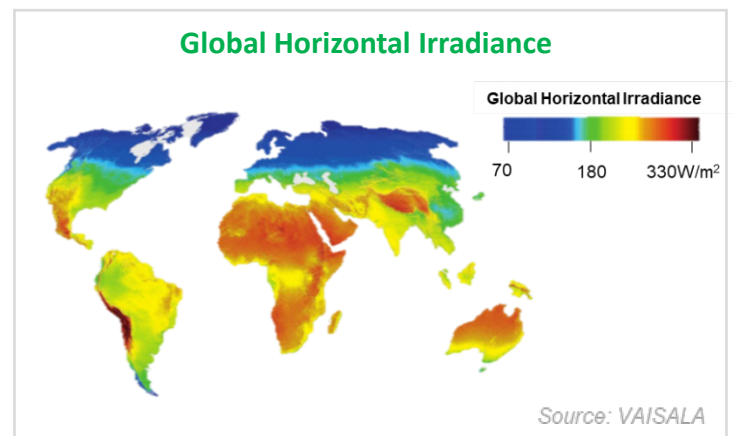
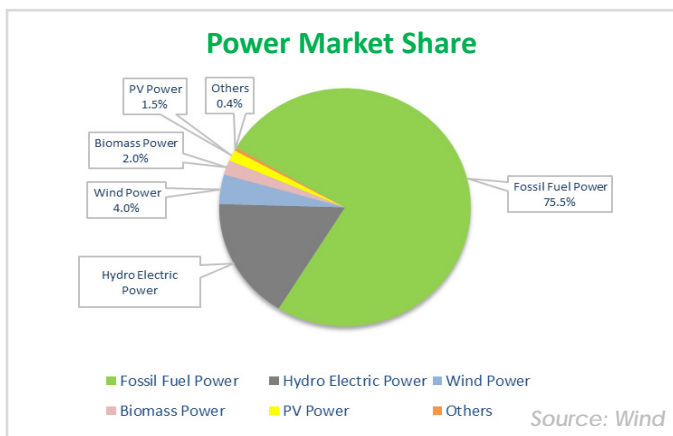
PV Power Industry

The Best Prospects In New Energy Industry

Has Huge Installation Growth in Emerging Oversea Markets

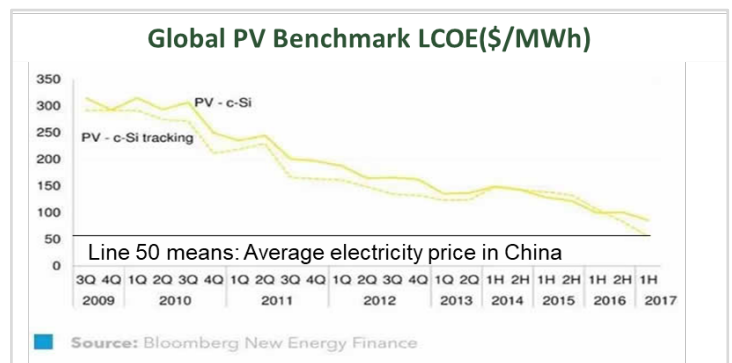
Currently, the main energy power generation around the world include traditional energy and new energy. Traditional energy is consist of fossil fuels, coal, natural gas, and nuclear power, while new energy comes from hydropower, wind and solar. Among those energy, PV power energy has following advantages, which are better than all other energy. The future of PV Power is promising.

1. **Infinity:** Inexhaustible and superior to fossil energy
2. **Clean:** No secondary emission and no environmental pollution compared with fossil energy generation and nuclear power generation
3. **Universality:** Sufficient light in most parts of the world, which is applicable to a wide range of areas, compared with wind power and hydropower.



PV Power will be the mainstream energy because its advantage of decreasing cost

Driven by the development of technique, production automation and intelligent transformation, the production cost of **silicon raw material** in China reduced to 60,000 yuan/ton, and the production cost of PV Power **module** decreased to less than 2 yuan/watt, the investment cost of PV power generation **system** cut down to about 5 yuan/watt, the cost of kilowatt power has been reduced to 0.5-0.7 yuan/kilowatt hour.



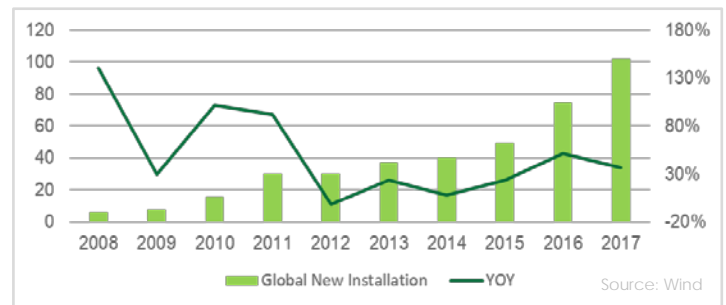
With the continuous cost decline in each section, when the cost reach a breakthrough point, the PV Power industry will face a booming installation trend. In some high irradiance regions like GanSu, Inner Mongolia, NingXia and high developed cities like BeiJing & ShangHai, the price of PV Power has been able to achieve industrial & commercial electricity affordable price, which is almost lower than any other power. Besides, in foreign regions like India, Middle East and parts of South America, the cost of PV power is already lower than coal power.

PV Power Industry

The Best Prospects In New Energy Industry

Global PV Power New Installation Analysis

In 2017, the global installed PV Power capacity was 102GW, increased 33.7% year-on-year, which has exceeded industrial expectation. In the same year, accumulated installed capacity reached 400GW, increased 34% year-on-year. Previously, due to global financial crisis from 2008 to 2009 and the European debt crisis in 2012, there were two stagnations in these time period.



In 2018, due to the impact of US-China trade war and China's "531 policy", the global installed capacity might reduce from original expected 120GW to 90-100GW, and the integration of PV Power industry will be accelerated at the same time. Those enterprises with high-tech & cost advantage like LONGi will face a high speed development period.

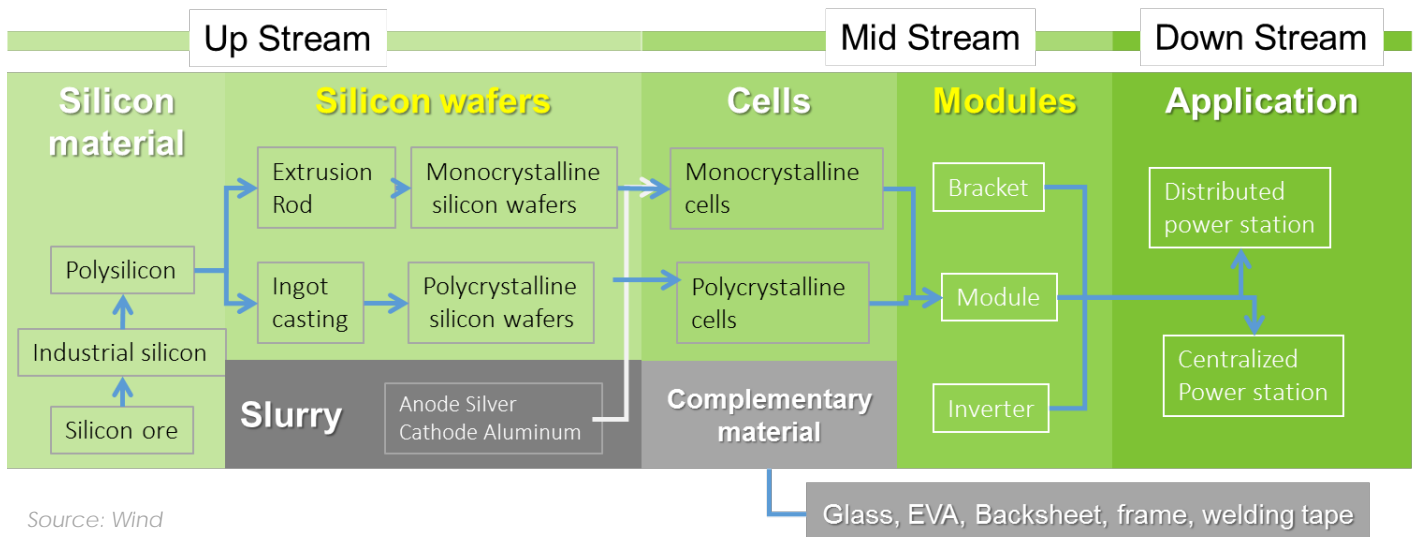
Industry Analysis

Monocrystalline Silicon Is The Future

PV Power Industry Chain Analysis

Recently, PV Power industry is under severe competition. The raw materials in upstream are standardized product, however the technical barriers of this industry will gradually transfer from downstream to upstream.

Illustration: LONGi's main business are Silicon Wafers and Modules.



Industry Analysis

Monocrystalline Silicon Is The Future

Monocrystalline silicon has better quality and higher efficiency than Polysilicon

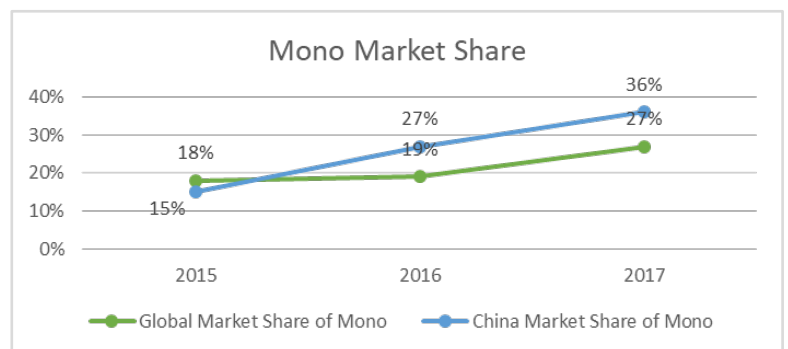
There are two types of silicon wafers: monocrystalline silicon wafer and polysilicon wafer. And monocrystalline silicon is the trend of future. Under the same manufacture process, the efficiency of monocrystalline cell which made from monocrystalline silicon is 1.5% higher than made from polysilicon.

Polysilicon's cost advantage is fading

Generally, to ensure the purity of silicon, silicon furnace is only one time use. Previously, polysilicon had cost advantage over monocrystalline silicon in Crystal Growth Process due to its quantity advantage: more polysilicon could be produced in one furnace per time, which can reduce equipment depreciation cost, labor cost, water and electricity cost, auxiliary material cost, raw material loss and other costs. However, at present, the feeding amount of mainstream polycrystalline ingot furnace G6 is about 800kg, which is gradually close to the critical value of scale effect and low cost effect's cross point, while the feeding amount of monocrystalline furnace has exceeded 500kg. Obviously, polysilicon has less cost advantage than monocrystalline silicon now.

Monocrystalline silicon will dominate the PV Power Industry

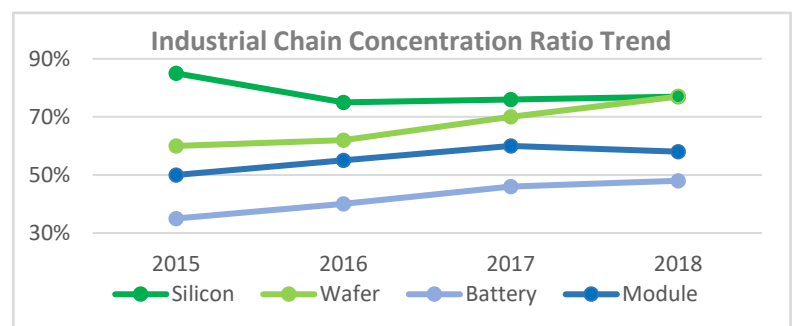
According to the statistics of PV InfoLink, global market share of monocrystalline silicon has a conspicuous increase trend, which has increased to 36% in 2017 since 15% in 2015. Meanwhile, China domestic market share also increased to 27% in 2017 since 18% in 2015.



Source: Wind

Mono Industry Chain Concentration Ratio is rising

The company with higher efficiency & lower cost will drive the company with high cost & low efficiency product out of this market.



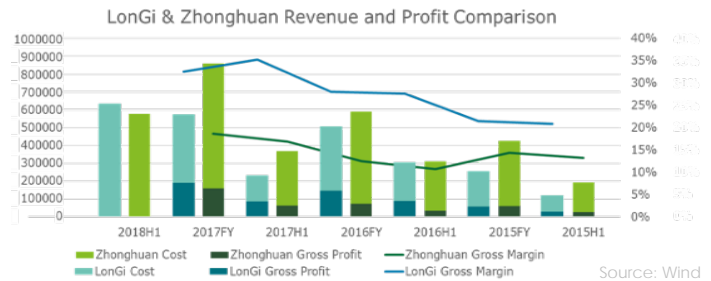
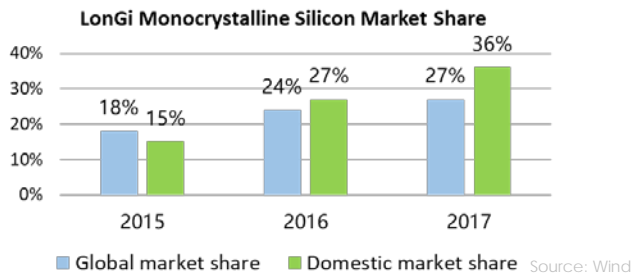
Source: Wind

Industry Analysis

LONG Is The Best Player

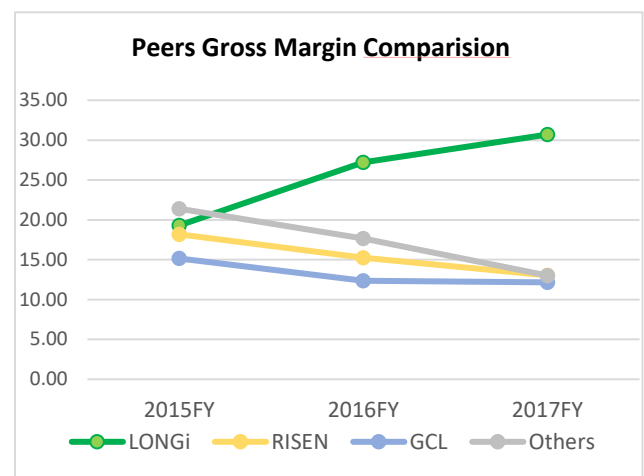
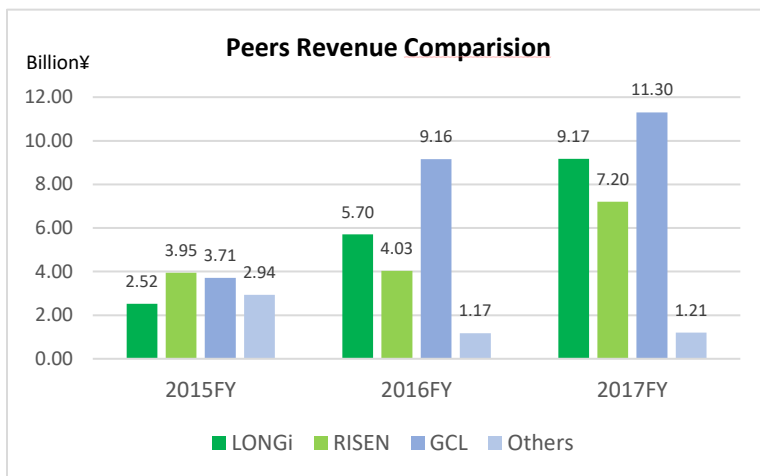
LONGi has high share rate in monocrystalline wafer market

LONGi and ZhongHuan are the 2 leading companies in the field of monocrystalline silicon. But LONGi has better technology advantage and higher profit margin, which result in its great market share.



LONGi demonstrates beautiful trend in monocrystalline module market

Since 2016, LONGi has demonstrated an obvious revenue growth trend year-on-year. In terms of gross margin, LONGi is the best among all competitors. Besides, LONGi has better technical advantages, higher efficiency, and lower cost, and those advantages will become more obvious in the competition of module industry under the background of overall PV power price reduction.

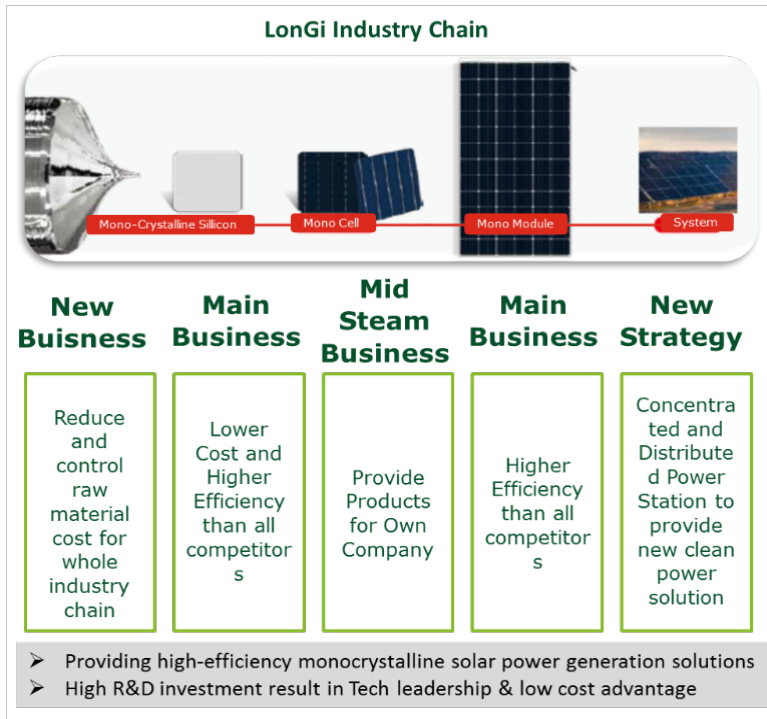


Business Model

1. Product line

LONGi is focus on providing high-efficiency mono solar power solutions for global customers, and it mainly engages in R&D | production | sales of mono ingots, wafers, cells and modules | as well as construction + operation of PV power systems. The layout of LONGi's main business and product in PV industry chain is as follows:

Whole Industry Chain



2. Main business unit & Subsidiaries

➤ Silicon Wafer BU

LONGi silicon wafer BU takes the production and manufacture of monocrystalline silicon materials as its core business.

➤ LEYE Solar Technology Co.,LTD

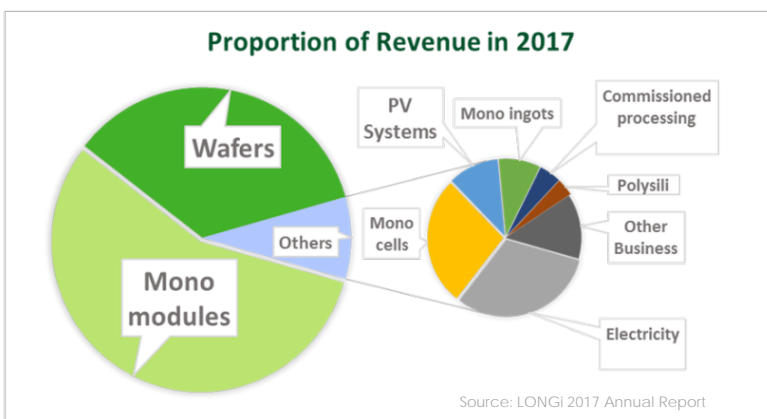
A wholly owned subsidiary of LONGi, it's the leading supplier of high efficient monocrystalline battery component in the world.

➤ LONGi Clean Energy Co.,LTD

This company is committed to providing customers with high efficient, intelligent and green PV Power application system solutions.

3. Each BU Revenue Composition

2017 Revenue Composition



Business Unit	Revenue (Billion Yuan)	Percentage
Mono modules	9.17	56.07%
Wafers	5.75	35.16%
Electricity	0.45	2.73%
Mono cells	0.39	2.38%
PV systems	0.15	0.95%
Mono ingots	0.13	0.78%
Commissioned processing	0.07	0.41%
Polysilicon	0.05	0.32%
Other business	0.2	1.20%

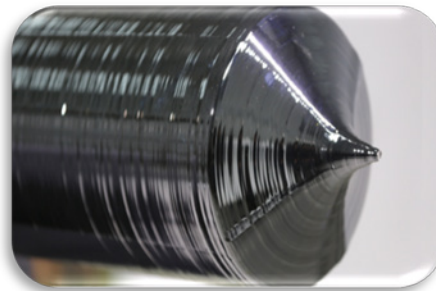
Company Analysis

Core Product: Low Cost & High Capacity

Main Product #1: Monocrystalline Silicon Wafer & Slice

LONGi's production capacity of monocrystalline silicon wafer reached 15GW at the end of 2017, and it is expected that the production capacity will reach 28GW by the end of 2018, 36GW by the end of 2019, and 45GW by the end of 2020.

In 2018, the shipment target of monocrystalline silicon is 4 billion square silicon slices(including self-use)



This company is a monopoly oligopoly in photovoltaic industry with low cost due to its scale effect.

Main Product #2: Monocrystalline Silicon Module

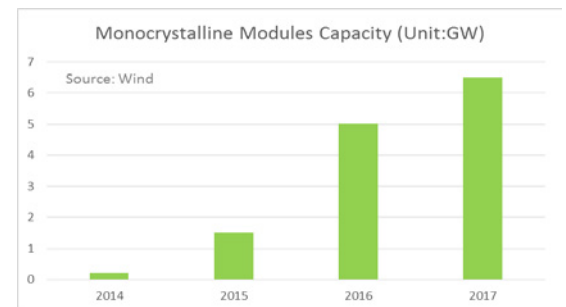
LONGi's Production capacity of monocrystalline modules was 6.5GW, The shipment volume is 4.5GW. In 2018, the expansion and technical reform was carried out simultaneously, which means production capacity is expected to reach 12GW by the end of the year.

Nearly 40% of the 8 front-runner production bases will use Monocrystalline Double-Sided Module technology in 2018. At present, only LONGi has the ability to mass produce monocrystalline high-efficiency double-sided components.

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Target of cells and modules shipments in 2018 is 7.5GW, The self-invested power station volume reaches 600MW.

Lerri Solar is a wholly-owned subsidiary of LONGi Green Energy, which specializes in R&D, production and sales of solar monocrystalline cells and modules. In 2016, its capacity is 5GW, 2017 capacity is 6.5GW, and global monocrystalline module shipments ranked **NO.1** in 2017.



Company Analysis

New Business and Future Strategy

New Business: 4 kinds of PV Power station



Large Scale



Distributed



Off-Grid



Micro-Grid



Main Business's Future Target

Now: The total cost of current mono silicon wafer is about **1.76 yuan/ per** piece of wafer, which is lower than the average cost of industry.

Conversion efficiency of cells is more than **22.5%**, while the average industrial conversion efficiency is 21%.

Future: According to <Monocrystalline silicon business for three years (2018-2020) strategic planning>—10/1/2018

➤ Strategic Positioning

Create value for customer, leading the innovation of global monocrystalline silicon technology. Provide global customers with high efficiency & low cost monocrystalline silicon products, continue to consolidate the high-tech barriers, strengthen the global monocrystalline silicon wafer leading position.

➤ Capacity Targets

Steadily expand the capacity of monocrystalline silicon wafers, continuously reduce production costs and ensure the market supply of high-efficiency monocrystalline silicon products. Based on the capacity of 15GW at the end of 2017, LONGi will strive to reach 28GW at the end of 2018, 36GW at the end of 2019 and 45GW at the end of 2020.

➤ Cost & Quality Target

Newly launched projects with the target of higher tech & lower cost, will support national PV Power price cost down, which will be easier to access to the state grid power. The new standard of mono silicon wafer cost target is no more than 1 yuan per wafer, the quality of silicon wafer can support the mainstream PERC cell production conversion efficiency exceeds 22.5%, and control light fading within 1%.

➤ Overseas development plan

Develop overseas market of mono silicon modules, provide the PV Power solutions for different regions and countries. Enhance the cooperation in different culture and improve PV power intergration.

Company Analysis

Monocrystalline Technology is the core advantage

1.R&D Center

LONGi continues to strengthen investment in technology research and development, and has built up a first-class photovoltaic enterprise technology center in China. The R&D center covers an area of more than 10,000 square meters. The center is equipped with integrated R&D process test line.

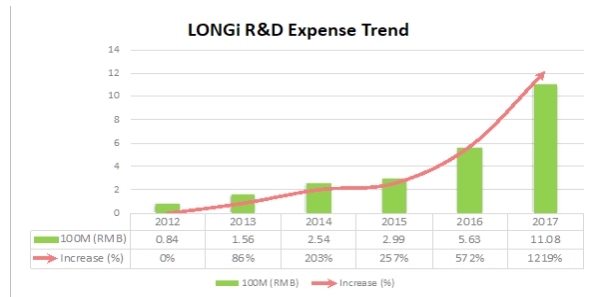
2. Professional Team

LONGi has several professional R&D teams, they possess high innovation insights. With more than 400 key technical specialists, the company has established a relatively perfect platform for R&D, cooperation, exchange of production, learning and research integration.

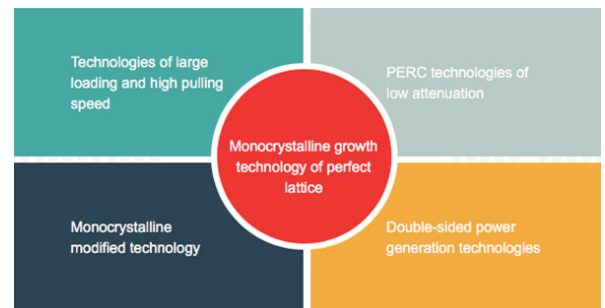
3. Core Technology

Why LONGi Leads PV Power Industry?

- ✓ Perfect Lattice Monocrystalline Silicon Growth Tech
- ✓ Large Loading High Speed Tech
- ✓ Low Decay PERC Cell Tech
- ✓ Monocrystalline Modification Tech
- ✓ Double-Sided Power Generation Tech



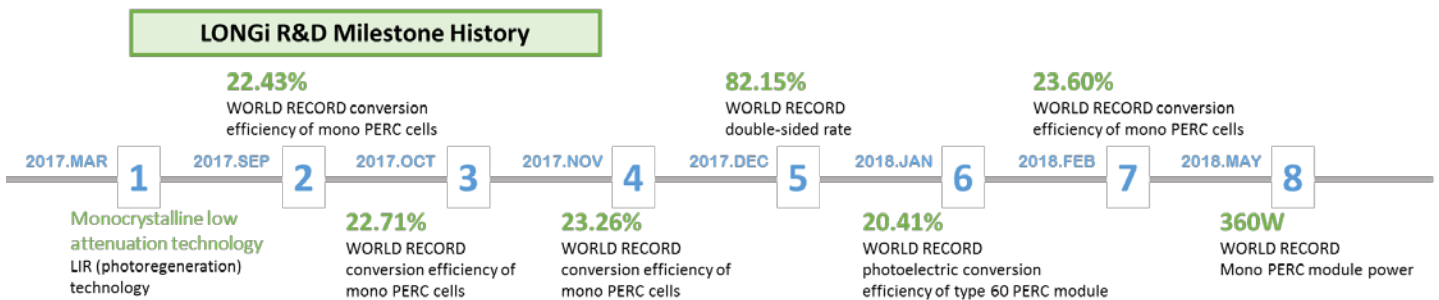
Source: LONGi Annual Report(2012-2017)



Diamond wire slicing know-how helps LONGi leads this industry.

Only LONGi has the ability to mass produce monocrystalline high-efficiency double-sided modules.

4. R&D Milestone(2017-2018)



In 2017, LONGi broke through the photoelectric conversion efficiency of monocrystalline PERC batteries. At present, the photoelectric conversion efficiency of monocrystalline PERC batteries has reached 23.26%, which is the **first-class level** in the whole industry.

Also In 2017, the monocrystalline low attenuation technology & LIR (photoregeneration) technology, were released to help global monocrystalline products solve the problem of initial light decay.

Financial Analysis

High growth and low PE

Year	Jun-18	Dec-17	Dec-16	Dec-15
EPS (¥)	0.47	1.81	0.86	0.31
BVPS (¥)	5.2	6.8	5.05	3.18
Profitability				
Revenue (billion ¥)	10	16.36	11.53	5.95
YOY	59.36%	41.90%	93.89%	61.60%
Gross Profit (billion ¥)	1.46	4	1.77	0.57
Gross Margin	22.62%	32.27%	27.48%	20.37%
Net Income (billion ¥)	1.31	3.56	1.55	0.52
YOY	5.73%	130.38%	197.36%	77.25%
ROE	8.84%	30.14%	21.77%	11.81%
Growth & Solvency				
Asset (billion ¥)	37.89	32.88	19.17	10.21
YOY	15.24%	71.52%	87.80%	58.29%
Liability (billion ¥)	22.58	18.64	9.08	4.55
Owner's Equity (billion ¥)	15.14	14.2	10.09	5.63
YOY	7.00%	34.42%	79.13%	75.07%
Asset liability ratio	59.60%	56.68%	47.35%	44.62%
current ratio	1.34	1.53	1.87	1.7
Cash Flow				
CFO (billion ¥)	1.17	1.24	0.54	0.36
CFI (billion ¥)	-2.46	-3.77	-2.15	-1.22
CFF (billion ¥)	-1.05	4.76	5	1.76

Because of the increasing demand, especially in monocrystalline silicon wafers, the company size has grown rapidly these years both in assets and revenues. To expand the capacity, LONGi also rise its leverage to meet with the investment. Although the asset liability ratio is higher than industry(56%), with the excellent operating cash flow and sufficient cash reserve, the solvency of the company is still strong. On the other hand, net income, with a 181% annual growth in the past five years, was growing faster than assets and equity, giving a robust rising ROE before 2017. The PEG was 0.076 last year, significantly less than 1, indicating a very strong growth.



In 2018, due to the withdrawal of the subsidy in China, gross margin and net income may run into some decrease, which cause the decline of stock price over the past 5 months. However, with the ongoing decline in cost and expansion, the gross margin and net income will recover and enhance consistently. The stock market may focus too much on the short-term effect and ignores the long-term growth of this stock. Now PE(TTM) is in the lowest value in last 5 years.

Valuation

Assumptions:

Although PV industry has faced some difficulty in 2018, we believe LONGi can make full use of its capacity as planned, which is 45GW in monocrystalline silicon wafers and 20GW in modules in 2020. To keep the leadership in PV power industry, we predict the price of the products will decline by 20% over the next three years, making PV power more competitive. The profit margin will be about 20% in 2018 and 2019, and the same as 2016 in 2020. To expand further in the next three years, LONGi needs more CAPEX, working capital and about 15billion ¥ new debt. FCFE can be calculated and predicted as follow:

Year	2015	2016	2017	2018E	2019E	2020E
Revenue (billion ¥)	5.95	11.53	16.36	22.09	28.71	34.54
Gross Margin (billion ¥)	20.40%	27.50%	32.30%	18.30%	21.66%	27.08%
Asset Liability Ratio	44.62%	47.35%	56.68%	60.59%	59.97%	57.77%
Net Income (billion ¥)	0.52	1.55	3.55	2.42	3.73	5.61
YOY	74.40%	197.90%	128.80%	-31.67%	53.88%	50.40%
NCC	-0.03	0.32	0.61	1.05	1.40	1.63
CAPEX	0.98	2.08	3.95	4.58	5.23	5.73
Working Capital	2.66	5.59	6.59	7.65	8.73	9.57
Net Borrowing	-0.07	2.56	6.68	5	5	5
FCFE (billion ¥)	-3.21	-0.58	5.91	2.82	3.83	5.66

After 2020, as estimated by JRC, European Joint Research Centre, PV Power Global share will increase to over 10% in 2030, which is about 4240GW. IEA, International Energy Agency, predicts a 163GW new installation in 2025, accounting for 2265GW accumulative installation in 2030. We take their predictions as positive and negative estimates. In neutral condition, we predict the installation as follows with a 12% growth every year before 2030. Then the new installation will grow relatively slow.

Installation estimate	2019	2020	2021	2022	2023	2024
New installation(GW)	120	135	151	169	190	212
Accumulative installation(GW)	510	630	765	916	1086	1275
Installation estimate	2025	2026	2027	2028	2029	2030
New installation(GW)	238	266	298	334	374	419
Accumulative installation(GW)	1488	1726	1992	2290	2625	2999

After 2020, LONGi may not need to expand too fast, with much less CAPEX and net borrowing. We predict that LONGi's cash flow may grow a little quicker than the industry scale after 2020.

Date: 20th/Oct/2018

Issue Data

Market Cap (billion ¥)	35.8
EV (billion ¥)	55.25
Shares Outstanding(billion)	2.77
EPS	0.47
BVPS	5.2
P/E(TTM)	9.85
P/B	2.47
P/S	1.79
EV/EBIT	37.93
EV/Revenue	5.52

Index (Date:20 th /Oct)	Value (billion ¥)	Industry Ranking
Net Profits	1.69	4
Income	14.7	7
Total Asset	38.84	6
ROE	11.36%	6

Valuation

LONGI

DCF shows attractive upside potential

We use FCFE to determine the fair value. Risk Premium and Beta are calculated with historical data. Risk Free Rate is estimated as a long-term rate in the future. We give three estimates in conditions of positive, neutral and negative.

Positive Estimates	
Risk Free Rate	3.50%
Risk Premium	9%
Beta	1.07
Equity Cost	13.10%
Growth1(10 years)	21%
Growth2(Long term)	2.80%
Value	
Terminal Value	193.87
PV	159.29
NO. shares	2.79
Value Price	57.09
Price now	13.55
Up potential	321.35%

Neutral Estimates	
Risk Free Rate	3.50%
Risk Premium	9%
Beta	1.07
Equity Cost	13.10%
Growth1(10 years)	13%
Growth2(Long term)	2.60%
Value	
Terminal Value	78.54
PV	66.67
NO. shares	2.79
Value Price	23.9
Price now	13.55
Up potential	76.36%

Negative Estimates	
Risk Free Rate	3.50%
Risk Premium	9%
Beta	1.07
Equity Cost	13.10%
Growth1(10 years)	7%
Growth2(Long term)	2.40%
Value	
Terminal Value	51.87
PV	45.83
NO. shares	2.79
Value Price	16.43
Price now	13.55
Up potential	21.23%

Risk Analysis

1. The uncertainty of industrial integration

At present, there are many small and medium-sized private enterprises in the photovoltaic industry chain. The product integration cycle caused by the new round of product structural surplus is expected to be long, and the industrial integration completion is uncertain.

2. The difficulty of photoelectric grid connection

The profit model of photovoltaic power stations is incompatible with grid enterprises and both of the power station and State Grid have interest conflict. The State Grid is not enthusiastic about buying new energy power.

3. The uncertainty of connection to grid at an equal price

The non-technical costs of China's photovoltaic industry (including land use costs, grid access costs, pre-development costs, etc.) are still relatively high. It is necessary for the government to introduce relevant policy support to reduce the non-technical costs.

4. The impact of the international situation

The US-China trade war has great impact on China's economy. The United States, Europe and India has already exist or are more likely to set up trade protective barriers to China's photovoltaic industry, with the aim to restrict the import of China's photovoltaic products.