Factors Driving Photovoltaic Sector's Ups and Downs

【Solar Photovoltaic】Factors Driving Photovoltaic Sector's Ups and Downs

In 2021, the performance of the A-share photovoltaic sector has fluctuated sharply. What are the factors driving its ups and downs? We take the CSI Photovoltaic Industry Index as the example and briefly discuss the contribution factors of A-share photovoltaic.

The Volatility of CSI Photovoltaic Industry Index

Source: Bloomberg, 2020/12/31-2021/6/24
Note: Black line is the 10-trading-day annualized volatility rate, and blue line is the 30-trading-day annualized volatility rate

What are the main driven factors of photovoltaic performance?

The demand for photovoltaic installations determines the performance of the A-share photovoltaic sector, and there are three main factors affecting the demand for photovoltaic installations:

1. Technology cycle
In the short term, technological development can cause changes in the industry structure and volatilities. However, in the long term, it can fundamentally create photovoltaic demand via improving economic efficiency of photovoltaic, and bring long-term benefits.

2. Government policy
The government can make choices for electricity consumers and promote the demand for photovoltaic installations through policies. Policy had been the dominant factor in the performance of A-share photovoltaic sector before.

3. Industrial chain competition
The production cycle of each link within the industrial chain is not completely matched, and the profit distribution of the industrial chain will also affect the downstream terminal demand.

How do the above three factors affect the performance of the CSI Photovoltaic Industry Index?

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2801-2803, Two Exchange Square, 8 Connaught Place, Central, Hong Kong

The analysis of the three driven factors need to base on different time stages.

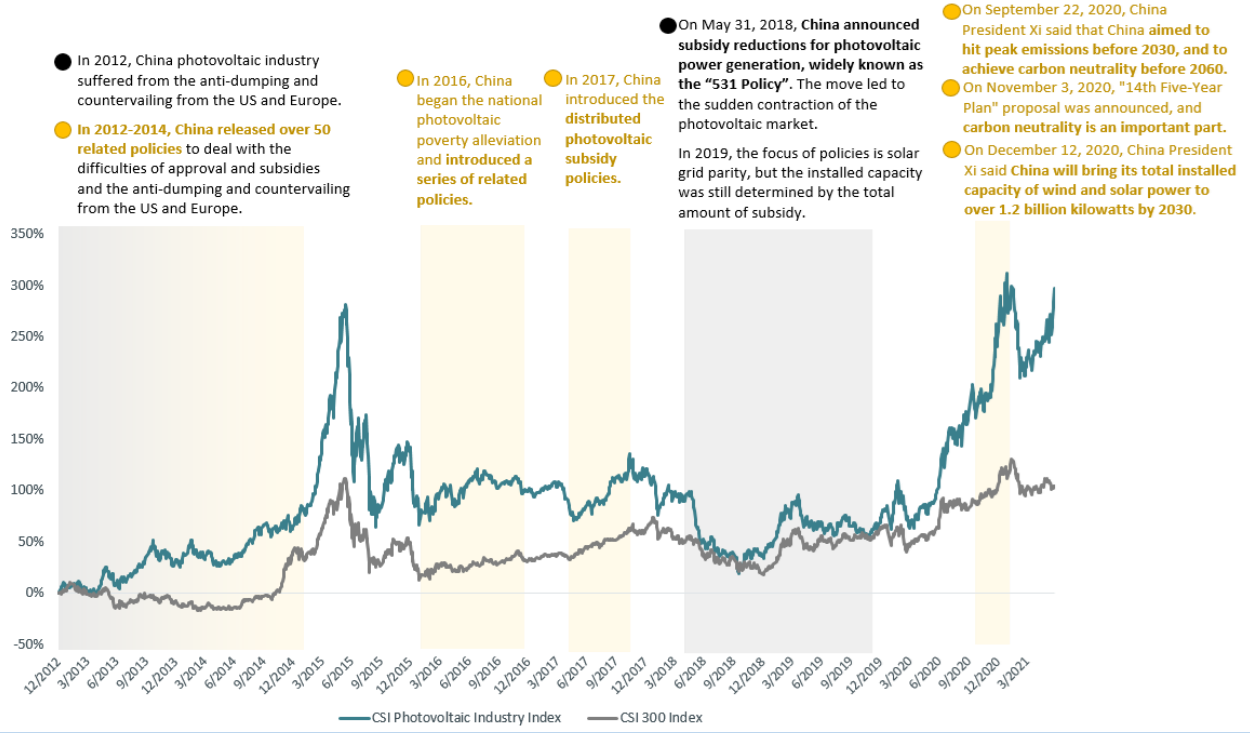
According to the research from SOLARZOOM, the development of photovoltaic can be divided into the following three phases:

Phase	Years	Characteristics	Driven Factors
Solar power as a new energy and alternative energy	2000-2020	The government willingness of energy transition decides the demand (Inelastic Demand)	The dominant factor: Policy Long-term factor: Technology cycle
Solar power to replace fossil energy	**2020-2050**	**The cost competition between photovoltaic and fossil energy (Elastic Demand)**	**Three factors are parallel: policy, technology cycle, Industrial chaincompetition**
Solar power as the main electricity source	2050-?	PV demand ≈ electricity demand (Inelastic Demand)	-

(1) Before: Solar power as a new energy and alternative energy (2000-2020)

Before 2021, the cost of solar power generation is relatively high and not economical, and the grid has not yet achieved parity. **The photovoltaic industry has only relied on government subsidies, and photovoltaic demand is mainly driven by government policies**. Before 2021, the ups and downs of the CSI Photovoltaic Industry Index were also mainly due to policy fluctuations:

The major policies and performance of CSI Photovoltaic Industry Index from 2012 to 2020



Source: Bloomberg, CSOP, 2012/12/31-2021/6/24
Note: Grey dot – negative policy, Golden dot – positive policy

During the same period, we also saw lots of technological development in the photovoltaic industry, such as monocrystalline silicon wafers replacing polycrystalline silicon wafers, the rise of PERC cells, etc. **These changes contributed to the "cost reduction and efficiency enhancement" for solar photovoltaic, improving the economics of photovoltaic and bringing us to today's grid parity era. The CSI Photovoltaic Industry Index has also risen by 255.27% in the past eight years (2012/12/31-2020/12/31).**

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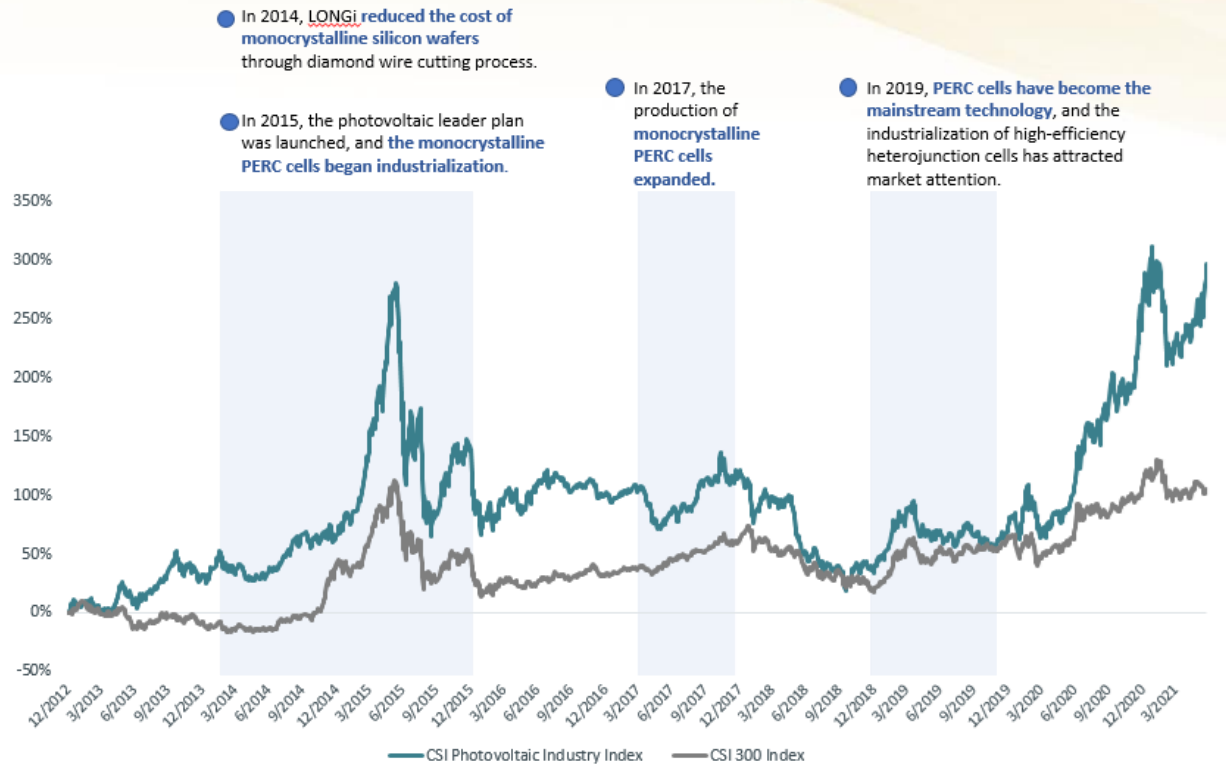
The technological changes in the Chinese photovoltaic industry from 2012 to 2020



Source: Bloomberg, CSOP, 2012/12/31-2021/6/24

(2) Today: Solar power to replace fossil energy (2020-2050)

Now that we have entered the grid parity era of photovoltaics, the influence of government policies relatively reduced, and the market supply and demand is expected to be the dominant factor.

- **Technology cycle**: The last round of technology cycle has ended, which is represented by monocrystalline silicon wafers to replace polycrystalline silicon wafers and PERC technology to replace aluminum backfields. Now we are at the beginning of a new technology cycle.

  In this round of technology cycle, the upgrade of cell technology has become the key part. TOPCon and HJT technologies are expected to replace PERC technology to improve conversion efficiency and further reduce power generation costs. In the medium and long term, the new cycle also means another round of investment opportunities.

- **Industrial chain competition**: **When photovoltaic demand is more sensitive to price changes (more elastic), industrial chain competition becomes an important driven factor, which has been proved in the YTD performance of CSI Photovoltaic Industry Index.** In the first half of 2021, the price of silicon materials in the upstream hit new highs consistently, leading to the falling profit margins of downstream module manufacturers in the industry chain. Some downstream module manufacturers were forced to reduce their operating rates, and it might hit photovoltaic terminal demand and depressed the photovoltaic sector.

The Estimated Weights of the Gross Profit for Each Link in the Photovoltaic Industrial Chain

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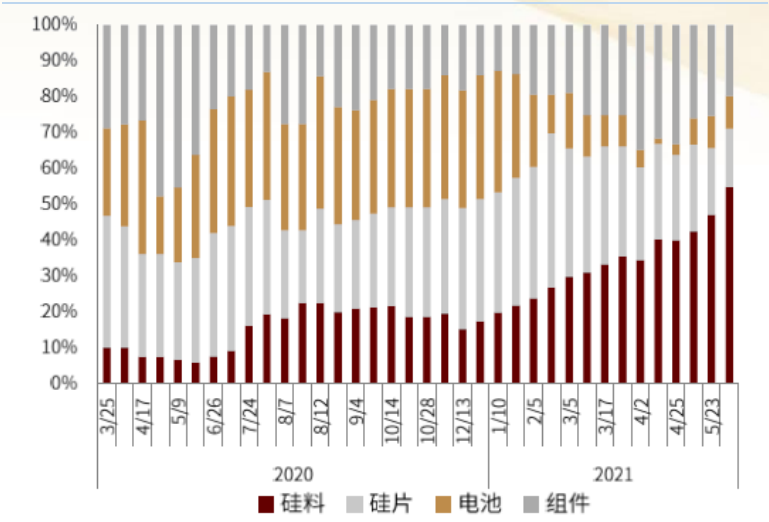
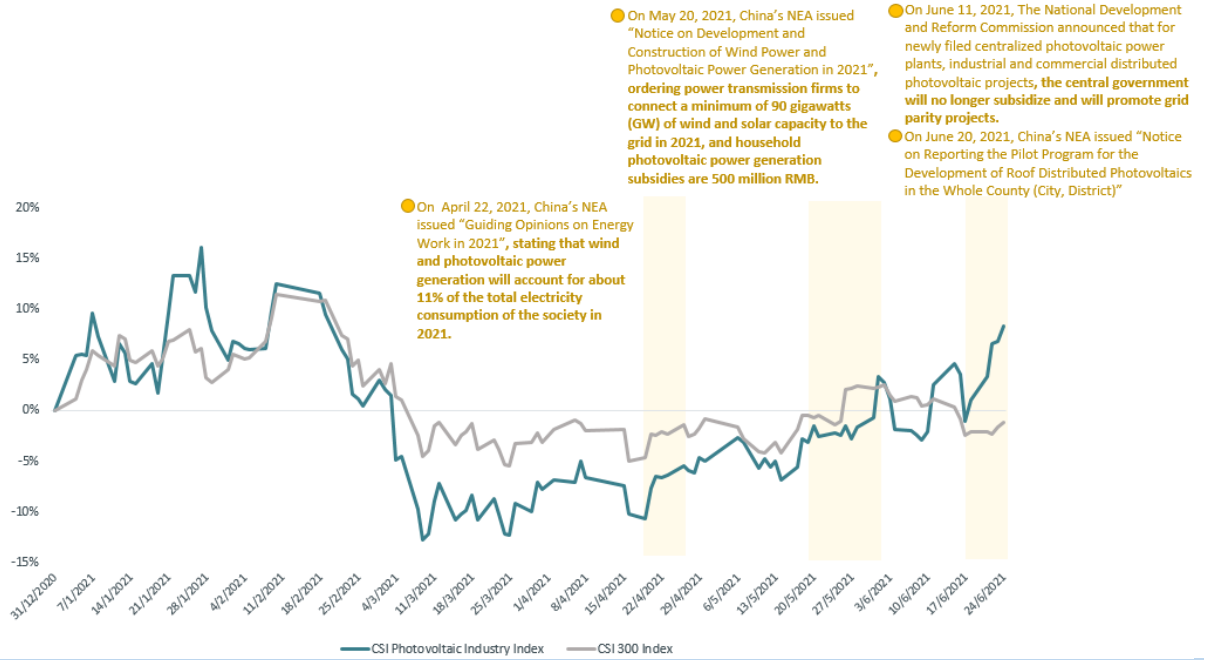


Source: Solarzoom, Company Announcement, CCIC
Note: the red bar is silicon material, the light grey bar is the silicon wafer, the golden bar is the cell, the dark grey bar is the module

- **Government Policies**: 2021 is the first year of the "14th Five-Year Plan" and "Carbon Neutrality", and a number of industrial policies have been introduced, supporting the index performance. However, in the context of "grid parity", the cancellation of subsidies is no longer regarded as a negative signal as in 2018. The index is less sensitive to subsidy policies, but remain sensitive to policies related to the demand for photovoltaic installations.

The major policies and performance of CSI Photovoltaic Industry Index in 2021



Source: Bloomberg, CSOP, 2020/12/31-2021/6/24

What the outlooks for the A-share photovoltaic sector?

In the short term, Industrial chain competition is the most important driven factor. On June 23, the Silicon Industry Branch announced the latest domestic silicon material price data. The price of silicon material remained stable, but the operating rate of downstream module companies continued to be sluggish. With the completion of the production capacity expansion of the silicon material industry, it is

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expected that supply and demand will reach a balance by the end of 2022. In addition, the industrial policies remain stable in 2021, and supportive policies can ease market concerns to some degree and boost market sentiment. Besides, at the beginning of a new round of technology cycle, new technologies will bring about changes in the industry structure and cause volatility to the CSI Photovoltaic Industry Index.

In the medium and long term, we remain optimistic about A-share photovoltaic sector. From a policy perspective, the continuous growth of the photovoltaic industry under the background of carbon neutrality is an inevitable trend. Industrial chain competition will only bring about short-term fluctuations; from the perspective of the technology cycle, at the starting point of a new round of technology cycle, we have seen frequent good news in the development of energy accumulation technology and solar cell technology. Therefore, the cost of photovoltaics has more downside in the future, bringing a new great cycle of demand.

Currently, the photovoltaic industry is a growth sector, and the technology cycle and Industrial chain competition have brought large volatilities. The industry structure may change frequently, and there is still the possibility of leader replacement. Therefore, **ETFs are still the best investment tool** when the medium and long-term investment value is significant, and the correction in 2021 has brought a good time to enter the market.

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