

# Analysis of Causes and Countermeasures of Foreign “Double Reverse” Investigation on China’s Photovoltaic Products

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**Abstract**—Under the impact of financial crisis and European sovereign debt crisis, foreign countries’ anti-dumping and anti-subsidy investigation on China’s photovoltaic industry as well as chain reactions triggered by the event further deteriorated the development of photovoltaic industry in China. The problems of photovoltaic industry in China lie in not only external factors such as depression in international economies and serious trade protectionism, but also unreasonable industrial structure, high dependence on foreign countries, passive responding of enterprises etc.. The essay puts forward some countermeasures to realize sustainable development of photovoltaic industry in China, including accelerating negotiations on free trade agreements, strengthening the core technology innovation, implementing market diversification, and strengthening the mechanism of warning and responding of photovoltaic industry.

**Keywords**—*photovoltaic industry; “double reverse” investigation; trade protection; anti-dumping; anti-subsidy*

## I. INTRODUCTION

In the context of International financial crisis and European sovereign debt crisis, the demand of global photovoltaic (hereinafter PV in short) market declined sharply, and the paces of PV industry have to be slowed down seriously. However, Europe and America have set up trade barriers in China through the anti-dumping investigation and anti-subsidy investigation (hereinafter “double reverse” investigation in short). At the same time, as an emerging market country, India also takes the same way to binge in a lawsuit against Chinese PV products. All of these will lead to decline in Chinese foreign trade exports, and the productions of domestic companies are reduced even collapsed. The development dilemma of PV industry reflects existing problems in China’s PV industry, including lack of core competitiveness, excess production capacity, imbalance of market layout and so on, which paradox with the macro strategies that country want to cultivate and develop new energy industries. Therefore it’s of greatly significance that we analyze the reason of China’s PV industry suffering from the “double reverse” investigation and put forward effective countermeasures for healthy and sustainable development of new energy industry in China and other countries.

## II. THE DEVELOPMENT STATUS OF CHINESE PV INDUSTRY

China’s PV industry entered into the stage of stable development in the mid 1990s. Since 21<sup>st</sup> century, China’s PV industry has turned on high speed development trend, and has become an important power in global PV industry.

In recent years, the global PV industry has boomed in. As for new installed capacity as shown in Fig. 1, global new PV installed capacity reached to 38.4 GW with an increase of 28% compared with 30.0 GW in 2012. PV industry has become the third sustainable energy sources after hydropower and wind power. From the point of various regions and countries, the proportion of new PV installed capacity in EU continuously increased from 19.8% in 2000 to 79.6% in 2010 and then gradually decreased. In 2013 European new PV installed capacity was 11 GW, which declined in two years compared with 22.3 GW in 2011 and 17.7 GW in 2012. The proportion of the European new PV installed capacity decreased from 73.9% in 2011 to 59.1% in 2012 and then decreased to 28.6% in 2013. From 2000 to 2007, Chinese PV new installed capacity maintained the level of about 20 GW every year. Since 2008, Chinese PV new installed capacity has developed rapidly and has taken a great leap from 40 GW in 2008 up to 2500 GW in 2011 and 3500 GW and 2012. China’s new installed capacity was 11.8 GW in 2013 with the first in the world. Japan was to the second with 6.9 GW, and the United States was to be third with 4.8 GW. Germany became the largest country of new installed capacity in the European market with 3.3 GW [1].

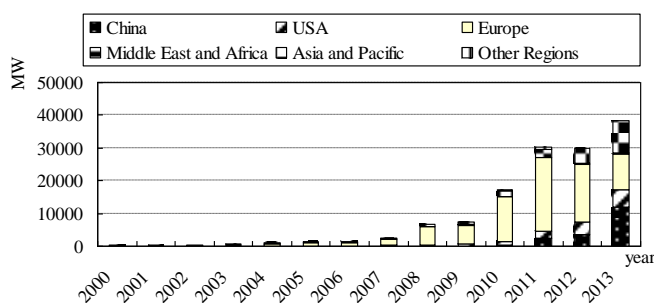


Figure 1. Annual changes of PV installed capacity in countries or regions from 2000 to 2013

As for the international market structure in Tab. 1 and Tab. 2, in 2013, the exports of Chinese solar PV cells and components to Europe was \$3.72 billion which sharply fell by 61.98%, accounting for 30.26%. The market share fell dramatically and only accounted for roughly one-third of China's exports. China's exported \$5.5 billion to Asian markets substantially with an increase of 124.32%, accounting for 44.78%. Asia has become the first largest export market of China's PV cells after European market. China exported \$570 million to Africa with an increase of 387.08%. Africa has become the fastest growing market of China's solar PV cells. The export of China to Latin America was \$190 million with the increase of 131.91%, and became an increasing market of Chinese solar PV cells. Chinese PV exerted an important demonstration effect on

Latin America and Africa. From the analysis of export countries, affected by European and American "double reverse", the export of China to Europe and America fell dramatically. Among it, China exported \$510 million to Germany, with a large decrease of 75.3%. China exported \$1.7 billion to Netherlands, with a large decrease of 60.33%. China exported \$390 million to Belgium, with a large decrease of 64.2%. China exported \$1.68 billion to America, accounting for 13.64% with a large decrease of 0.9%. China exported \$3.03 billion to Japan with the growth of more than two times. Japan became the largest country of Chinese PV product export in Asia in 2013, account for 224.63% of Chinese solar PV cell exports. In addition, China's export had also increased substantially to emerging markets such as India, South Africa, etc [2].

TABLE I. DATA STATISTICS OF IMPORT AND EXPORT MARKET OF CHINESE PV CELLS

unit: \$10 thousand, %

Country	Export Value	Export Ratio	Percentage change of Export Value	Import Value	Import Ratio	Percentage change of Import Value
1 Japan	302667.7524	24.63	212.44	81374.66	22.63	36.02
2 Netherlands	169709.6619	13.81	-60.33	10.8543	0	-29.99
3 America	167627.1097	13.64	-0.9	10702.85	2.98	62.42
4 Hong Kong	66158.8734	5.38	14.08	603.6402	0.17	98.54
5 India	56914.973	4.63	175.16	523.896	0.15	378
6 Germany	50665.2899	4.12	-75.3	1896.942	0.53	-49.77
7 South Africa	48313.0347	3.93	1114.95	0.5722	0	—
8 Australia	44975.6343	3.66	-39.97	9.7981	0	-64.03
9 Belgium	38994.616	3.17	-64.2	1.3129	0	-16.73
10 Britain	35109.457	2.86	52.71	290.2394	0.08	43.17

Data sources: SEMI PV Group

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### III. THE STATUS OF FOREIGN “DOUBLE REVERSE” INVESTIGATION ON CHINESE PV INDUSTRY

With the high-speed development of Chinese PV industry and the export of Chinese PV products, Chinese PV products suffered from the foreign anti-dumping and anti-subsidy investigations which have serious impact on Chinese PV industry.

On May 17<sup>th</sup>, 2012, the Commerce Department published the preliminary result of anti-dumping investigation on Chinese solar cells, which confirmed that Wuxi Suntech Co., Ltd. was levied at the rate of 31.22%, Changzhou Trina Solar Co., Ltd was at the rate of 31.14%, other 59 companies were at the rate of 31.18%, others not responding to the investigation were at the rate of 249.96%. This is the first time the U.S. carried on “double reverse” investigation on Chinese clean energy, which was the concentrated reflection of PV products trade friction between China and the United States. On June 4<sup>th</sup>, 2013, the European Commission announced that the European Union imposed 11.8% provisional anti-dumping duty on Chinese solar panels and the key components since June 6<sup>th</sup>, 2013. The European Commission announced that central Europe has reached a “friendly” settlement on PV trade on July 27<sup>th</sup>, 2013. The main content of the settlement was that about 90 Chinese solar products enterprises (accounts for about 60% of the EU market) promised that the price of the product exporting to the European Union would not be less than €56 cents per watt in order to avoid the temporary duties by EU. This agreement was applicable to up to 7,000 megawatts share market of solar products in EU. In 2013 the EU market total scale was expected to reach 10,000 to 12,000 megawatts. The cap will remain until the end of 2015.

The chain reaction of “double reverse” that EU and the United States on China’s PV products has been gradually revealed. On May 22<sup>nd</sup>, 2014, India made the anti-dumping final determination of solar cells for originating in Malaysia, China, Taiwan and the United State. The determination indicated that India would levy anti-dumping duties of \$0.64 ~ 0.81 per watt on Chinese solar cells. But this decision should be approved by India’s ministry of finance to take effect before August 22<sup>nd</sup>, 2014. Recently, Indian finance ministry decided eventually not to implement the determination that the ministry of commerce would levy anti-dumping tax on PV products of China, Taiwan, the United States, and Malaysia. The case ended without levying tax after 21 months.

### IV. THE CAUSE OF FOREIGN “DOUBLE REVERSE” INVESTIGATION ON CHINESE PV INDUSTRY

#### A. *Slow Down of Global Economy and Increase of Trade Protectionism*

The global financial crisis broke out in 2008, which ended world trade with the growth of 7.5% thoroughly for 8 years. In recent years, less than 4% growth of total world trade on average made economic growth slow down in western developed economies and emerging economies. At present, in conditions of advocating “low carbon economy” and the premise of emissions reduction obligations, many countries regard developing new energy industry represent by PV industry as adjusting industrial

structure, speeding up the economic recovery and realizing the core of the project by strengthening the next round of international competitiveness. Under the impact of the financial crisis and the sovereign debt crisis in Europe and America, some PV enterprises fell into the predicament of the closure or bankruptcy. Thus Britain, Greece, Switzerland, Germany, Italy and Spain, and other European countries have successively cancelled or decreased PV subsidies. Therefore, European and American PV market demand was cut seriously. At the same time, the rapidly rise of the Chinese PV industry took a big pressure of competition to the western countries in recent years. So Europe and the United States and other countries lifted highly up the flag of trade protection, and took the Chinese PV products into discriminatory “double reverse” investigation.

#### B. *Unreasonable Structure and Lack of Core Competitiveness of Chinese PV Industry*

Over the past ten years since entering WTO, the promotion of Chinese foreign trade volume is obvious to all, and the rapid development of PV foreign trade is also included. But Chinese enterprises are just in the middle and lower status in the PV industry chain, which includes manufacturing and production process of the solar panel assembly products with the low technology content, low processing technology and serious pollution. In other words, Chinese enterprises earn meager profits only by simple processing and assembly. Upstream core technology, main raw materials and key PV production equipments mostly rely on foreign imports. In Chinese solar photovoltaic products export trade, the proportion of processing trade accounted for about 53% in 2013, which tagged the Chinese PV industry with the label “foundry workshop”. At the same time, the Chinese PV industry started relatively late, without a strong industrial cluster, overall small size of enterprise, backward technology level, and much higher unit production cost than the developed countries.

#### C. *High External Dependency of Chinese PV Products*

At present, more than 70% solar cells of Chinese solar PV industry products rely on exports. Foreign market dependence is too high and the domestic PV market has not start massively yet. In 2013 the Chinese PV industry gradually went out of the dilemma, and the main PV industry took on a turn from loss to profit. With the support of national ministries and the relevant policies of local government, the enterprises that stopped production have commenced and the full production enterprises continue to increase production capacity through technology upgrading and market supply is accelerating. But the market demand is not optimistic. Major foreign markets such as the European market are shrinking, and put “limited price, limited quantity” constraints on Chinese PV enterprises. Japanese government is suffering heavy burden because of excessive subsidies, and rapid growth may brake at any time. Because of rich energy and shale gas developing hotly, the American PV market potential is limited together with “double reverse” investigation. Emerging markets such as India, South Africa have a big uncertainty, while the domestic market may appeared the local protection due to the power station transferring to a lower level to weaken the bonus of domestic market scale

expansion [3]. Therefore, it is an important issue for Chinese PV industry how to actively develop the domestic market, reasonably adjust the foreign market in order to address the PV overcapacity, and realize the sustainable development of new energy [4].

#### D. *Adverse Responses of China's PV Enterprises to "Double Reverse" Investigation*

Taking anti-dumping for an example, according to Annex 2 in Article 6 of the WTO "the Agreement on the Performance of the General Agreement on Tariffs and Trade in 1994", "once the investigation launched, the competent of the authority investigation should state the information that request any interested party to provide as soon as possible, and the way that the interested party organize such information in its reply. The competent authority should also ensure that the party realized if the information is not provided in a reasonable time, investigation authorities will have the right to decide on the basis of the available facts, including the facts in the application that included in the investigation launched by domestic industries." That is to say, within the prescribed period of time, if enterprises accused of dumping do not provide information to defense, investigation authorities would verdict according the information that the claimant countries provided. When Chinese enterprises have been accused of dumping, most of them would not comply or decline to comply [5][6]. It is because the negative attitude and act of enterprises that the founder members of trade remedy make decisions according to existing data, and the margin of dumping was greatly overestimated. Once the enterprises was ruled dumping, punishment results will mean that the competitiveness would disappear in a long time and product market would also disappear.

### V. COUNTERMEASURES OF CHINESE PV INDUSTRY ON FOREIGN "DOUBLE REVERSE" INVESTIGATION

#### A. *Speeding up Signing Free Trade Agreements*

After the financial crisis, coupled with European debt crisis and global economic downturn, new international trade and new pattern have gradually appeared. Bilateral free trade and inter-regional free agreements have gradually formed a new pattern of international trade following WTO agreements. And at the same time, such as in NAFTA (North American Free Trade Area), the trade volume increase steadily, trade volumes within EU also hardly change affected by the European debt crisis. In ASEAN (Association of Southeast Asian Nations), internal trade keeps a good momentum. Bilateral trade volumes maintain growth under free trade agreements between the United States and South Korea. In Singapore, trade volume have increased quickly under multiple free trade agreements.....Except WTO of a trade platform that the most countries joined in, currently China only signed 11 free trade agreements and is negotiating with 5 bilateral free trade agreements now. In the long term, Chinese foreign trade strategy mainly face the Asia-Pacific region, including Vietnam, Thailand, Malaysia and other countries, which has become destinations and new centers for international low-end manufacturing transferring. From the level of GDP per capita, comprehensive cost of labor force and market space, those countries have become the largest

challenging to Chinese low-end products export. Moreover, with the rapid increase of Chinese domestic comprehensive cost, the industry transferring process not only speeds up at the same time. More importantly, some of the Asia-Pacific countries have already joined the TPP negotiations, some have free trade agreements with developed countries, and some also enjoy trade preference bill offered by developed countries. Therefore, Chinese government is actively seeking to join the TPP (Trans - Pacific Partnership Agreement), also strives to contribute to the bilateral free trade agreement negotiation aiming to complete free trade negotiations between China and South Korea, and among China, Japan and South Korea as soon as possible to enjoy the convenience of bilateral and regional free trade and to realize the sustained and rapid growth of international trade [7].

#### B. *Attaching Technology Research and Development and Enhance Core Competitiveness of PV Industry*

PV industry is the emerging high technology industry, which is the fact that governments and industries recognize. Paying attention to technology research and development, and promoting core competitiveness of PV industry is the way out for development of Chinese PV industry. The governments should further strengthen and standardize the government funding, and perfect the related industrial policies, financial policies and tax policies to strengthen the support of PV industry technology innovation. At present, the technologies of pushing the PV industry technology improvement and reducing cost mainly includes: One is polysilicon preparation technology of Fluidized Bed Reactor. According to the SEMI "global PV manufacturing database statistics" showed that in 2012 among global 290,000 metric tons of polysilicon production, nearly 20,000 tons were made by fluidized bed method, and were concentrated in polysilicon producers in the United States and Germany. The cost of domestic advanced polysilicon manufacturers was \$20 per kilogram, with the lag of \$12 per kilogram of international leading manufacturers. Thus it is urgent to promote technology level and reduce the cost of the domestic polysilicon manufacturing. The second is wire cutting technology of the diamond. The thickness of the silicon wafer is 180-200 microns at present. Reduction of the thickness of the silicon wafer is one of the ways to reduce the cost of PV modules and PV power generation costs. By 2020, the thickness of the silicon wafer will drop to 140 microns. The speed of diamond wire cutting is 2 times that of steel wire cutting speed which silicon wafer processing enterprises widely use. Cutting precision and material loss are also lower than the former, depreciation of the unit silicon wafer production, labor and energy consumption are reduced by half [8].

#### C. *Implementing the Diversification of Target Markets and Exploring Actively Domestic Market*

Exploring actively domestic market, stabilizing the European and American markets, and developing overseas emerging markets are the strategy choice that Chinese PV industry implements the diversification of target markets. Under the pressure of the "Double reverse", after Chinese national development and reform commission issued a feed-in tariff policy in 2011, our country put in place a series of preferential policies to promote vigorously the

project of distributed grid-connected PV. On October 26<sup>th</sup>, 2012, the state power grid at a distributed grid-connected PV news conference officially and released on the well distributed grid-connected PV, which put forward “support, welcome and service” as the basic principle of distributed PV development, made efforts to do a good job of distributed grid-connected PV. These policies would become a great power to promote the development of Chinese domestic PV application market [9]. For the European and American markets, Chinese government should implement the relevant preferential policies to guide Chinese PV enterprises to invest in European and American countries to avoid the “double reverse” investigation. At the same time, we should strengthen cooperation of PV technology with the European and American countries, strengthen the technical cooperation of PV enterprises with Europe and the United States and establish interests unions, strengthen the competitiveness of science and technology of Chinese PV products. For the emerging markets such as India, South Africa, the development of PV industry relatively lags behind, and these countries have low labor costs [10]. China can grab chances to solve the problem that surplus of Chinese PV domestic market and shrinking of European and American market.

#### *D. Establishing and Perfecting the Warning and Responding Mechanism of “Double Reverse” Investigation*

Because trade protection has the characteristics of concealment, pertinence, and abruptness, it has become an important means that developed countries protect domestic industry development. The consequences of a “double inverse” investigation are not confined to a particular enterprise, but are related to the development of the whole industry chain. It is required that the Chinese government departments, industry associations and PV enterprises should fight together, establish and perfect the warning and responding mechanism of “double reverse”. On one hand, the relevant government departments and industry associations strengthen construction of information exchange platform. The specialized agencies are responsible for collecting and sorting international laws and regulations, trade protection policy changes and the latest trends of trade protection in each countries, and timely giving feedback to the relevant enterprises, in order to solve the issues of information asymmetry caused by lagging responses[11][12]. On the other hand, the government, industry associations and enterprises should establish a response league on “double reverse” investigation. We should give full play of “four segments linkage mechanism” formed by the ministry of commerce, local competent commerce departments, business association and enterprises to cope with foreign trade remedy investigation. PV disputes between China and India finally ended the case with “no tax” as an affirmative defense of Chinese PV enterprises represented by Yingli. “Reconciliation” between China and India will play an exemplary role, which will bring the development

confidence to Chinese PV enterprises, also gain valuable experiences in defense.

## VI. CONCLUSIONS

With the financial crisis and European sovereign debt crisis, many countries implemented anti-dumping and anti-subsidy investigation on China’s PV industry, which deteriorated the development of PV industry in China. With the Chinese policies, PV industry has developed quickly but doesn’t take on a healthy path. There are many causes, including slow down of global economy and increase of trade protectionism, unreasonable structure and lack of core competitiveness of Chinese PV industry, high external dependency of the Chinese PV products and adverse responses of China PV enterprises to “double reverse” investigation. The essay puts forward some countermeasures to realize sustainable development of PV industry in China, including speeding up signing free trade agreements, attaching technology research and development and enhance core competitiveness of PV industry, implementing the diversification of target markets and exploring actively domestic market, establishing and perfecting the warning and responding mechanism of “double reverse” investigation, etc.

## REFERENCES

- [1] European Photovoltaic Industry Association (EPIA), “Global Market Outlook for Photovoltaics. 2014-2018.” <http://www.solarpowereurope.org/index.php?id=22>
- [2] China Chamber of Commerce for Import and Export of Machinery and Electronic Product, Solar Energy Branch. <http://www.cccme.org.cn>
- [3] Outlook for Chinese PV Industry Development in 2014. <http://guangfu.bjx.com.cn/news/20131218/480967.shtml>
- [4] Liao Mei and Zhang Qian, “The Multiple Effects of Penalty Tariff – the Study of Sino-US Trade Friction on China’s PV Industry Based on GTAP Model,” Jiangsu Commercial Forum, Dec, 2012, pp.63-68
- [5] Chen Liyao, “The Research of the Anti-dumping Problem Facing by China’s Importing PV Products,” Master Dissertation from Ocean University of China, May, 2013.
- [6] Zhang Yuzhe and Wang Junpei, “The Factors and Strategies of PV Industry Dilemma,” Macroeconomic Management, Apr, 2013, pp.45-47
- [7] Yu Nanping, “Difficulties and Prospects of Chinese Foreign Trade Analysis,” People's BBS, Jul. 2013, pp. 32-34
- [8] SEMI PV Group (PV Branch), SEMI China Solar PV Advisory Committee and the Chinese Photovoltaic Industry Alliance, “2013 China PV Industry Development Report”
- [9] Zhang Tianyu, “The Research on EU for Anti-dumping Issues of Chinese Photovoltaic Products,” Master Dissertation from Liaoning University, Jun, 2013
- [10] Jiao Long, “The Research on International Competitiveness of Solar Energy Photovoltaic Industry in China,” Master Dissertation from Beijing Forestry University, Jun, 2013.
- [11] Yu Nanping, “The Analysis of Dilemma and Prospect of China’s Foreign Trade,” People’s Tribune, Jul, 2013, pp. 32-33
- [12] Ling Jie, “Development Trend and Strategic Choice of Chinese PV Industry in the Post-crisis Era- Based on the Survey of the U.S. on Chinese PV Industry,” Reformation & Strategy, Jun, 2012, pp. 120-123