
Abstract

An Analysis on Competitive Structure and Cooperation between Korea and China in Solar Photovoltaic Industry

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Since 1990, renewable energy sources have grown at an average annual rate of 2.0%, and growth has been especially high for solar photovoltaic as a clean energy, which grew at average annual rates of 46.2%. Currently, China gets about 8% of its primary energy from renewable sources. China's 12th Five Year Plan sets out a specific goal of 11.4% of total primary energy from non-fossil sources by 2015, and 15% by 2020. China has been following up on its goals with significant investments in renewable energy, including over \$65 billion invested in 2012. It is now also the world's largest producer and

installer of some renewable energy technologies, and invests more in renewables than any other nation.

However, global economic crisis and exploitation of shale gas which is one of the most rapidly growing forms of natural gas, blocked its fast growth. Chinese companies as well as Korean are carrying out a large-scale restructuring and suffering from the depression and price reduction. In this situation, Korea and China need to pursue new development paths with meaningful and complementary cooperation.

The contents of this study can be divided by two parts : 1) Analysis on the competitiveness between two countries by value-chain, and 2) Suggestion of cooperative strategies regarding cooperative and beneficial sustainable growth.

In the study on competitiveness by value-chain, China has an edge in the field of cell and module except polysilicon, showing the global dominant position in the downstream sector. Also, Its industrial base is concentrated in the crystalline silicon PV. In contrary, Korea succeeded in the industrialization rapidly through the vertical in-house strategy from polysilicon(raw material) to electricity service(system). Furthermore, Korea is moving ahead in thin-film PV technologies on the basis of LCD production experience and a lot of intellectual property.

Considering future prospects for renewable energy, this study aims to reveal new cooperation strategies which can improve the competi-

tiveness with harmonization of energy policy and industrial policy.

Also, in this study we suggest some strategies in order to overcome current industrial crisis. ① It needs to intensify the improvement of technological cooperation between two countries. Joint projects by operating the fund of industrial development will contribute to the deepening of industrial partnership. ② It is desirable for two countries to lead de facto standard of the PV technologies jointly, as the high global position is favorable to the them. ③ Exchange of technical professionals should be expanded and activated by the way of internship or joint start-ups by the bilateral specialists, between firms or research institutes. ④ Two countries can jointly exploit the global markets through establishment of supply chain. That means the vertical partnership that Korea has charge of material and components, while China can supply the parts and system. ⑤ Korea should improve the thin-film PV technologies which consider as a post PV. R&D investments aimed at 'large-scale and high efficiency' should be strengthened by government utilizing the superior infrastructure established by technologies bases of LCD and secondary battery. ⑥ New financial support should be introduced for promotion of overall value chain, considered that profits for PV business needs more 20 years. ⑦ New business models should be diffused. It should expand the panel installation for house and business opportunity for coupling system of PV and ESS.

Finally, we hope this study can be helpful for both policy makers

and those who design and build the next strategies for improving competitiveness in renewable energy.