



## **How could the family-scale photovoltaic module help the poor farmer out of poverty and reduce CO<sub>2</sub> emission?**

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China, the world's most populous country, is facing great opportunities and challenges. On the one hand, China's increasing economy is raising hundreds of millions of people out of poverty. On the other hand, there are still 100 million of whose daily income is less than 1 US dollar. In addition, China is the world's largest solar panel producer and also the largest emitter of greenhouse gases. Could we find a feasible way to use solar panels to help the poor and meanwhile reduce CO<sub>2</sub> emissions? To do this, we reviewed the literature and investigated the related field sites and institutions in China. Results show that the extension of family-scale photovoltaic modules to countryside could help. The 3 kW-module is recommended for widely distribution because its technology is mature and the cost is relatively low (3500 US dollars). Besides their own use to improve their living standard, farmers can sell the excess electricity to the grid at the price of 0.17 UD\$/kWh. The farmer's annual income could be increased by 460-615 US dollars by selling electricity, and this is equivalent to half of their annual income in many rural regions. The photovoltaic module can be used for 25 years and the payback period is 7 years. In addition to its economic benefit, the photovoltaic module can reduce CO<sub>2</sub> emissions by 0.93 kg/kWh. This is equivalent to annual reduction of 3000-4000 kg CO<sub>2</sub> per family. Therefore, it is concluded that the family-scale photovoltaic module not only can help the farmers out of poverty but also can reduce CO<sub>2</sub> emissions significantly. To promote its sustainable development, it is worthwhile to further investigations its business models as well as the effects of long-term support policies under different social and nature conditions.