

Executive Summary

Solar PV Industry: Global and Indian Scenario

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The Renewable Energy (RE) sector around the world, including India, is developing rapidly. Within RE, solar is one of the major growth segments globally with almost 30% of all investments in the sector going into solar. The Indian solar industry, which is in the nascent stage, holds huge potential. But the pace at which it is growing does not compare to global standards. One of the main reasons for this is the lack of adequate investment in solar PV manufacturing and R&D in India. There is an urgent need to facilitate and enhance investment in solar PV manufacturing in India. This would enable the domestic solar PV industry to provide cost-effective and sustainable solutions to the domestic market and compete with the rest of the world. This study has been carried out with the intent to provide the requisite background for investment in this sector.

The study provides a broad overview of the solar PV market globally and in India. It provides the current status and future trends in solar PV manufacturing, technology, R&D, market dynamics, commercial and financial aspects, and government policies and market drivers in leading countries in this space, namely, Germany, Japan and the USA. The study also identifies key market segments where solar PV can be implemented and evaluates the market viability and the size of these market segments. Based on these analyses, a set of recommendations has been made to enhance the growth and competitiveness of the Indian solar PV industry.

Benchmarking and policy

Based on the above analysis of market segments, solar PV appears to be an attractive alternative source of energy which till now has a limited market in India. The global solar PV market has been growing substantially, especially in developed countries. Led by Germany, Japan and more recently the USA, the growth of solar PV has been remarkable. A consistent PV strategy based on ambitious and long-term targets, a clearly defined implementation policy programme and a mix of financial instruments have led to the growth of the solar PV market in these countries. Simultaneously, the authorities related to power at the federal, regional and local levels have been demonstrating a strong commitment in implementing strategies and programme.

Instead of the stop-and-go approach, the basic requirement for each PV policy framework is its longevity and stability. That will lead to creating secure conditions for target groups (customers and industry) who would then be willing to invest in PV.

The main reason for Germany's leading position is its existing regulatory framework and incentive mechanism, which sets out an innovative 'Feed-in Tariff' (FIT) structure to create a ready-made market for PV manufacturing as well. In addition to tariff support, the Federal Government provides manufacturing incentives to promote production capacity in Germany. For example, the roof top programme in Germany was a mega success after the introduction of the EEG (German renewable energy feed-in law), mandating utilities to purchase all available RE-based power. Also, support to PV R&D has created a thrust within manufacturers to systematically reduce production costs and to offer more efficient products. As a result of a favourable policy structure, Germany produces solar PV component across the value chain, i.e. silicon production (10,000 tonnes, equal to a PV production of approximately 1,000 MW), wafer production (around 1,300 MW), solar cell production (around 1,300-1,400 MW) and production of module with capacity of around 1,000 MW.

In the previous decade, Japan emerged as the dominant player on the global solar PV market, especially the manufacturing companies that have dominated global production. Japan's solar PV market development has thrown up a number of important lessons for developing countries on how to develop their indigenous solar PV industry. More precisely, Japan's approach is largely focused on the supply side, especially relying on technology interventions. One area where Japan stands out globally is its expertise in solar PV technology. The development of this expertise has been the result of a strong focus on R&D. Another area of success is the focus among Japanese policy-makers on balancing both demand and supply. On the demand side, Japan targeted the largest possible consumer group, i.e. the residential sector and provided it the incentives (subsidy, net metering, access to easy finance, etc.) to mandate solar PV application. On the supply side, the government has been working with the solar PV industry to reduce the cost of solar PV power.

The USA was one of the early movers in the production and use of solar PV globally. However, in the previous decade the US solar industry was overshadowed first by Japan and now by Europe (particularly Germany). In the USA, the incentive framework for solar PV is fairly complex with incentives being available at the federal as well as the state level. However, till now the growth of the solar PV industry has been largely due to state level incentive programmes - thus development is taking place only in a few states which are proactive in initiating incentives and favourable policies. The overall strategy of these state programmes is to encourage cost reduction through increased manufacturing volume and lowering of transaction costs through the development of local market infrastructure. This, in turn, is resulting in progressively lower levels of public support requirement.