

GREENING SOLAR PV VALUE CHAIN

Renewable energy plays a very important role towards greenhouse gas (GHG) mitigation and helping address the disastrous consequences of climate change. Given that renewable energy, and in particular solar energy, has significant sustainable development implications and the country has tremendous scope of generating solar energy due to its geographical location, Government of India, in 2010, launched an ambitious renewable energy program - 'Jawaharlal Nehru National Solar Mission (JNNSM)', with an objective of deploying 20,000 MW of grid connected solar power by 2022. Large scale deployment will not only help in reducing the cost of power generation in the country and helping promote energy access, but the promotion of research and development in the context and the related technology transfer can enhance domestic manufacturing capability of components and products and help achieve grid tariff parity. In 2015, the Government of India further revised the target of Grid Connected Solar Power Projects from its earlier target of 20,000 MW to 100,000 MW by 2022 of which 60000 MW is grid connected and 40000 MW is rooftop solar.

Silicon is the leading technology in making solar cell. However, due to high cost, considerable amount of research has been undertaken on newer generation thin film low cost technology. Three materials that have been given much attention under thin film technology are amorphous silicon, CdS/CdTe and CIS. Other materials that find application include copper, silver, iron, plastics, etc. There are further research towards development of third generation technologies using polymer or organic as solar cell materials. Polymer materials have many advantages like they are low cost, light weight and environmental friendly.

Given the scale of deployment of solar power that is being discussed in India, dedicated availability and affordability of materials among others are some of the critical factors for the success of the ambitious program in India. The PV industry is not immune from such issues. For example, India depends heavily on imports of the materials particularly silver and copper and any change in prices will have impacts on these products. There are also significant rooms for improvement of material usage during manufacturing and assembly of solar panels.

Further, many of panels that have been installed will be reaching their end of life in a decade and will pose new environmental challenges. However the PV waste also has the potential to create unprecedented opportunities for value generation for recycling businesses.

To discuss these issues, TERI is organizing a workshop as a part of a larger study on 'Resource Efficiency Initiative in India' commissioned by the European Union in

association with the Ministry of Environment Forest and Climate Change. The aim of the project is introduce a resource (material) efficiency framework for a number of priority sectors in order to alleviate existing pressures on natural resources and take advantage of the economic benefits of resource efficient production. One of the sectors that is currently being studied in the project is Renewable Energy with a focus on understanding resource efficiency issues in the solar PV sector.

Issues to be discussed

- What are the major resources that find use in solar PV technologies and how will the demand for these resources evolve over the next 10-15 years?
- To what extent can secondary material management be achieved under the current scenario?
- What are the different best practices (including those related to technological interventions and use of standards) along the value chain in the solar PV sector existing across the globe and if and how they can be replicated in India?
- What are the current policies (if any) and legislative framework (in India and abroad) that can promote material use efficiency in the sector and the kind of learning that can be drawn for the Indian context?
- How to enhance consumer awareness on the need and role of resource efficiency in solar sector?