

Research and Development is a critical component of the National Solar Mission. Mission has endeavoured to accelerate ongoing R&D efforts on different aspects of Solar Photovoltaic and Solar thermal technologies, including multi-disciplinary research, with the objective of improving the efficiency, systems performance and reducing the cost. A comprehensive policy for research & development has been put in place to achieve the objectives of cost reduction and efficiency enhancement. In line of above, **Ministry has sanctioned 4 Center of Excellence in Solar Energy which are as follow:-**

1. [NCPRE, IIT Bombay](#)

National Centre for Photovoltaic Research and Education (NCPRE) at IIT Bombay in “**Crystalline Si solar cells, education and training**”: NCPRE was approved in September, 2010. Setting up of this centre was included in the Mission Policy document. This Centre is actively engaged in research and education in SPV. Various achievements are done in this project in terms of Facilities and Manpower, Education and Training and Majority of Research Deliverables are achieved. NCPRE faculty and students have resulted 110 Journal papers, 214 conference papers, 22 patents and 4 reports. 18 industry / NGO are members of NCPRE Industry Affiliate programme. Many industries are ready to take the patented technology of NCPRE. **Ministry have given 1<sup>st</sup> awards to best R&D project on the occasion of the first Foundation Day of the Association of Renewable Energy Agencies of States (AREAS) on 27th August 2015 at Bengaluru, Karnataka.** Now NCPRE-II has also been sanction for Phase II.

2. [IEST, Kolkata](#)

Indian Institute of Engineering Science and Technology (IEST), Kolkata in “**Thin silicon solar cells and photovoltaic systems**”: In this Center of Excellence, till date Single junction a-Si solar cells of area 1cm<sup>2</sup> with initial efficiency of 8.4% developed with a degradation of 17% would reach a stabilized efficiency >7.5% which is the project target. For HIT cells on n-type wafers, efficiency of 14% has been reached. Attempts are being made to improve passivation process, improve ITO/p interface. In case of photovoltaic systems, Super capacitor based Turbo Charger for Mobile Phones for Rural applications had been designed and developed and various battery research are going on. 7 journal papers and 15 conference papers have been published.

3. [CEPT University – Ahmedabad](#)

Center for Environmental Planning and Technology (CEPT), Ahmedabad in “**Area of solar passive architecture and green building technologies**”: A initiative to Set up Center for Excellence in area of Solar Passive Architecture and Green Building Technologies” at CEPT University – Ahmedabad. CEPT has developed the Generation of database for Building Materials and Laboratory for testing building materials. **This is a first kind of Laboratory in Asia for Green building.** The project progress is good and achieving the defined deliverables.

4. [IIT Jodhpur, Rajasthan](#)

IIT Jodhpur, Rajasthan in “**Solar Thermal Research and Education**”: A project has been sanctioned to develop IIT-Jodhpur as a Center of Excellence in Solar Thermal Research and Education. Designed and installation of Solar Air Tower Simulator (SATS) facility is completed. It is being extended for inclusion of solar convective furnace. Developed high temperature solar thermal research laboratory and so far they achieved 360 °C at a concentration of 420 suns and put target 600C in the next phase.

## **National Institute of Solar Energy, Gurgaon**

Apart from this, National Institute of Solar Energy, an autonomous institution of Ministry of New and Renewable (MNRE), is the apex National R&D institution in the field Solar Energy and to assist the Ministry in implementing the National Solar Mission and to coordinate research, technology and other related works.