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IISc researchers map hot spots to set up solar power plants

Rajasthan, Gujarat and Karnataka receive enough sunlight to merit large plants, according to IISc

Bhargavi Kerur & Surabhi Agarwal

Bangalore/New Delhi: Researchers at the Indian Institute of Science (IISc), Bangalore, are mapping India's solar hot spots—where round-the-year sunlight makes it viable for companies to set up solar power plants.

The study can play a crucial role in enhancing India's energy supply.

Under the Jawaharlal Nehru National Solar Mission, India aims to have 1,000 megawatts (MW) of solar power produced by 2013 and 20 gigawatts (GW) by the end of 2022.

Also See | State of sunshine ([PDF](#))

One gigawatt is enough to power close to one million homes.

The country currently generates 18,155MW, or 10.9%, of its electricity from renewable resources. Of this, solar energy makes up just 18MW, or 0.01%.

In the first phase of the study, supported by the environment ministry and being conducted at IISc's Centre for Ecological Sciences (CES), researchers have mapped states and regions with an abundance of sunlight.

"We have mapped the states that will have sunlight throughout the year, which will guide a business firm to set up a plant," said T.V. Ramachandra, a faculty member at CES and the project's guide.

CES will carry out district-level mapping in the next phase.

Rajasthan, Gujarat and Karnataka have been identified as the states that receive enough sunlight throughout the year to merit large commercial solar plants.

"Coastal parts of Kerala, Jharkhand and Uttar Pradesh and Andhra Pradesh are ideal states to set up small plants for domestic use, like solar cooker and solar water heater," Ramachandra said.

Rishabh Jain, a member of the research group, said most other states and metro cities receive sunlight only during the summer.

"Hence, those places are not favourable. For instance, Delhi is the hottest in summer, but the winters do not receive (enough) sunlight," he said.

The researchers used radiation data from US-based National Aeronautics and Space Administration's records.

Surface meteorology and solar energy data sets provided monthly average radiation data for 22 years—July 1983 to June 2005.

Solar potential maps, depicting monthly variations over the topography of India, were obtained using the geographical information system for mapping.

“While solar technology is improving, it is imperative to estimate the solar energy available over the land surface. We have only 45 solar radiation stations spread across the vastness of the country to give authentic ground measurement of the radiation. This sparse network cannot provide the data for the whole country,” Ramachandra said.

India’s location in the global solar belt—which lies between the 40 degrees north and 40 degrees south latitudes— makes it ideal for harnessing solar energy, said Jain.

The country, he said, receives sunlight in abundance for more than 300 days of the year.

India potentially has a \$1 billion (Rs4,481 crore) solar energy market, according to an estimate by the United Nations Energy Programme in its report for 2010.

A report on solar photovoltaic cells by the India Semiconductor Association (ISA), also released in 2010, said India has a cumulative power generation capacity of 152GW and faces a deficit of 11% in overall demand and 12% when demand peaks.

“With an expanding economy, the demand for power is growing at around 6% every year, and the peak load is expected to reach 176GW by 2012 and cross 778GW by 2031-32,” the report added.

Mapping solar hotspots will benefit companies that want to harness solar power commercially, said Rajiv Jain, associate director, government affairs, ISA.

“As solar power is presently quite expensive, every percentage increase in the solar power output matters, which leads to reduction in per unit cost of power. The studies being carried out to map the solar hotspots would help in identification of areas with larger amount of solar insolation and output,” he said.

Lalit Jain, chief operating officer, Moser Baer Clean Energy Ltd, said that in the absence of reliable data, energy generation estimates cannot be provided to banks, making it difficult to launch solar power projects.

“It also increases risks for the investors, and high interest rates increase the cost of generation...This kind of mapping will help the industry,” he said. “However, we require last 20 years’ radiation data along with data for weather conditions, which is required to assess energy generation at various sites.”

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bhargavi.k@livemint.com