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## Studies on Status of Solar Energy in India

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### Abstract

In the present study, efforts have been made to summarize the current status, availability and future potentials of solar energy in India.

**Keywords:** Studies, Solar Energy

### Introduction

Energy is an important input in all sectors. It is a basic necessity for the life of human being. Its consumption rate is increasing day by day while its generation is not enough to its demand; therefore a huge gap has emerged between the generation of energy and its consumption. The population has increased two times in the last two centuries and the energy requirement has increased 35 times in the same period, so obviously there is a crisis of energy and this has become a most talked subject of the day. Then the demand for energy sources has grown and the need for new sources of energy becomes essential. Obtaining energy from all the sources is expensive, but as time progresses, renewable energy generally gets cheaper in comparison to non-renewable energy, which is an inexhaustible source of energy. For example- sun, water, biomass and wind. India will become 100 per cent powered by renewable energy in near future, so our future generations will no longer be dependent on polluting fossil fuel supplies. Here we discuss the growth and status of solar energy in India.

### Methodology

In the present study the work is based on literature survey, Data published by various agencies working in the field of energy in India was used in this work. The data were tabulated, summaries and cross tabulations were also done manually for inclusion in the work.

### Theory and discussion

Nature has used the solar energy in creating the life through photosynthesis and created the plant kingdom to make the earth a living planet comprising of both biotic and abiotic component of the world. It is a universal source of energy and is considered as ultimate source of energy. All types of energy sources have a direct or indirect links with this form of energy <sup>[1]</sup>.



**Fig -1:** Solar cells produce electricity directly from sunlight

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India is endowed with rich Solar Energy resource. India receives the highest global solar radiation on a horizontal surface <sup>[2]</sup>. With its growing electricity demand, India has initiated steps to develop its potential for solar energy based power generation. In November 2009, the

Government of India launched Jawaharlal Nehru National Solar Mission under the National Action Plan on Climate Change. The Government of Gujarat taking advantage of the national initiative and high solar irradiation in the state and proposes to establish a number of large-scale solar parks starting with the Charanka solar park in Patna district. [3] In India solar energy is an important, energy resource in India with the potential to offer an improved power supply especially in remote areas. The India Energy Portal estimates that around 12.5% of India’s land mass is bestowed with solar irradiation ranging from 4 to 7 kWh/square meter/day across the country, with western and southern regions having higher isolation [4].

**Growth and Result**

India’s installed solar power capacity was 15.2 MW at the end of June 2010 that was based entirely on PV technology with approximately 20% of the capacity being used for off-grid applications. It has grown rapidly, albeit from a small base, to a total global capacity of 69 GW at the end of 2011 [5]. Solar photovoltaic’s, after hydroelectric power and wind power, is the third most important renewable energy source in terms of globally installed capacity. More than 100 countries use solar PV. Currently, more attention is being paid to large-scale solar PV projects so for this many solar photovoltaic power stations have been built, As of July 2012, Charanka Solar Park (India, 214 MW) [6]. India has witnessed an unprecedented growth in Solar Installations over past 1 year from showcasing approximately 56 MW in 2011 to around 1060 MW of Solar Power in 2012 (till August 2012). In past couple of years Solar Power has contributed significantly into the growth of Total Renewable Energy installations in India till 2012.

**Table 1:** State wise installed solar capacity till August 2012

State	Capacity in MW
Gujarat	709.54
Rajasthan	198.70
Andhra Pradesh	21.80
Chhattisgarh	4.00
Punjab	9.30
Tamil Nadu	15.10
Haryana	7.80
Uttar Pradesh	12.40
Jharkhand	16.00
Uttarakhand	5.10
Karnataka	14.00
West Bengal	2.10
Madhya Pradesh	7.40
Maharashtra	20.00
Delhi	2.50
Orissa	13.00
Lakshadweep	0.80
Andaman & Nicobar	0.10
<b>TOTAL</b>	<b>1059.64</b>

In Phase 1 of JNNSM, which will end in 2013, India aims to install 500 MW of grid-connected solar PV power. By the end of March 2013 the installed grid connected photovoltaic’s had increased to 1686.44 MW [7].

**Table - 2:** State Wise Installed Solar Capacity till March 2013 in India

State	Capacity in MW
Gujarat	654.8
Rajasthan	510.27
Andhra Pradesh	21.80
Chattishgarh	4.00
Punjab	9.00
Tamil Nadu	15.00
Uttar Pradesh	12.00
Jharkhand	4.00
Uttarakhand	5.00
Karnataka	9.00
West Bengal	2.00
Madhya Pradesh	2.00
Maharashtra	20.00
Delhi	2.50
Orissa	13.00
Haryana	7.80
<b>TOTAL</b>	<b>1686.44</b>

Source: JNNSM

New PV projects are also being registered under state programs in Punjab, Gujarat, West Bengal, Rajasthan, and Karnataka, though many of these are being migrated to JNNSM (Jawaharlal Nehru National Solar Mission).

**Future Plan**

With its growing electricity demand, India has initiated steps to develop its large potential for solar energy based power generation. In November 2009, the Government of India launched its Jawaharlal Nehru National Solar Mission under the National Action Plan on Climate Change. Under this central government initiative, India plans to generate 1 GW of power by 2013 and up to 20 GW grid-based solar power, 2 GW of off-grid solar power and cover 20 million square meter with solar energy collectors by 2020 and India expects to install an additional 10,000 MW by 2017, and a total of 20,000 MW by 2022 [8].

**Conclusion**

PV power is used in remote applications such as communications, homes and villages in developing countries, water pumping, camping, and boating. Grid connected applications such as electric utility generating facilities and residential roof top installations make up a smaller but more rapidly expanding segment of PV use. Solar power is pollution-free, production end-wastes and emissions are manageable using existing pollution controls. PV installations can operate for many years with little maintenance, so after the initial capital cost of building any solar power plant, operating costs are extremely low compared to existing power technologies. Grid-connected solar electricity can be used locally thus reducing transmission/distribution losses. Compared to fossil and nuclear energy sources, very little research money has been invested in the development of solar cells, so there is considerable room for improvement. Nevertheless, experimental high efficiency solar cells already have efficiencies of over 40% in case of concentrating

photovoltaic cells and efficiencies are rapidly rising while mass-production costs are rapidly falling.

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