

## A STUDY ON SOLAR ENERGY SOURCES IN INDIA

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**Abstract:** *The Indian renewable energy sector is the fourth most attractive renewable energy market in the world. As of October 2018, India ranked 5th in installed renewable energy capacity with a total of around 73.35 GW of renewable energy capacity installed in the country. India's population of more than 1028 million is growing at an annual rate of 1.58%. India is one of the countries with the largest production of energy from renewable sources. Renewable energy accounted for 20% of the total installed power capacity (69.02 GW) as of 31 March 2018. Recently renewable energy sector in India has emerged as a significant player in the grid connected as power generation capacity. It supports the government agenda of sustainable growth, while, also an integral part of the solution to meet the nation's energy needs. By expanding renewable energy, India can improve air quality, reduce global warming emissions, create new industries and jobs, and move world towards a cleaner, safer, and affordable energy.*

**Key Words:** *Caste, Dalit literature, Modernity, Public Sphere, Secular modernity, Subalterns.*

### 1. INTRODUCTION:

As the Indian economy grows the electricity consumption is projected to reach 15, 280 TWh in 2040. With the government's ambitious green energy targets, the sector has become quite attractive to both foreign and domestic investors. It is expected to attract investments of up to 80 billion USD in the next 4 years. The Government of India has ramped up its previous target to achieve 225 GW of renewable energy capacity by 2022. India was ranked 4<sup>th</sup> in EY Renewable Energy Country Attractive Index 2018.<sup>1</sup>

Taking lessons from the 1979 energy crisis, several countries began exploring the possibilities of Renewable Energy with an increased zeal. India formally began its journey into the world of Renewable Energy in 1981 when The Commission on Additional Sources of Energy was established additionally the Department of Non-conventional Energy Sources set up in 1982, which later became the Ministry of Non-Conventional Energy. India stands 3rd in the list of countries that produce the most electricity as of 2016; it's the 5th largest wind energy producer having wind energy potential of 102.8 GW. It has Hydro energy potential of 19.7 GW, Bio power potential of 22.5 GW, Solar power potential of 6 GW and it is expected that 22,000 MW of solar power would be generated by 2022.<sup>2</sup>

#### 1.1 Solar energy:

Solar power in India is the fastest developing industry. There are 300 clear and sunny days in a year and calculated solar energy incidence on India's land area is about 5000 trillion KWh per year. The solar energy in India available for a single year would exceed the possible energy output of all of the fossil fuel energy reserves. Being a densely populated region in tropical belt, the subcontinent has the ideal combination of both high solar insulation and a big potential consumer base density. The Rural Electrification Program of 2006 was the first step by the Indian Government in recognizing the importance of solar power, giving guidelines for the implementation of off-grid solar applications. The Generation Based Incentive (GBI) scheme, announced in January 2008 was the first step by the government to promote grid connected solar power plants. Despite the GBI scheme, installed capacity in India grew only marginally to 6MW by 2009. In June 2008, the Indian government announced the National Action Plan for Climate Change. A part of that plan was the National Solar Mission (NSM).<sup>3</sup>

Solar Energy Corporation of India Ltd is a Central Public Sector Undertaking under the administrative control of the Ministry of New and Renewable Energy, set up on 20th Sept, 2011. It is responsible for the implementation of schemes like the Jawaharlal Nehru National Solar Mission including, solar park scheme and grid-connected solar rooftop scheme, defence scheme, canal-top scheme, etc. In addition, SECI has ventured into solar project development on turnkey basis for several PSUs.

<sup>1</sup> India Brand Equity Foundation Report, <https://www.ibef.org/download/renewable-energy-mar-2019.pdf>

<sup>2</sup> Aadithya Ranjan Srivastava, Role of Renewable Energy in Indian Economy, IOP Conference Series: Materials Science and Engineering (2018), 404012046

<sup>3</sup> Swami Prakash Srivastava & Surat Prakash Srivastava, Solar Energy and its Future role in Indian economy, International Journal of Environmental Science: Development and Monitoring, Issn No. 2231-1289, Vol 4 No.3 (2013)

India has the lowest capital cost per MW globally to install solar power plants. Rooftop solar power accounts for 3.4 GW, of which 70% is commercial. In addition to its large-scale grid-connected solar photo voltaic initiative, India is developing off-grid solar power to meet local energy needs. While the world has progressed substantially in production of basic silicon mono crystalline photo voltaic cells, India has fallen short to achieve the worldwide momentum. It is now in 7<sup>th</sup> place worldwide in Solar Photovoltaic (PV) Cell production and 9<sup>th</sup> in Solar Thermal Systems with nations like Japan, China, and the US currently ranked far ahead.

## 2. STATEMENT OF THE PROBLEM:

It is well-known that India has the 2<sup>nd</sup> largest population in the world. It has been doing well to provide adequate energy for such a rapidly growing population being the 4<sup>th</sup> largest electricity consumer in the world. It is also one of the largest consumers of fossil fuels and has been experiencing negative energy balance for decades. Rapid urbanization and improving standards of living for millions of Indian households, the demand is likely to grow further in the years to come.

## 3. OBJECTIVES:

- To study the growth of production and installed capacity of solar energy sources in India
- To make a comparative study of the total production of renewable energy sources in India

## 4. METHODOLOGY:

The following methodology has been used to collect, analyse and interpret the data.

### Nature of research design

The present study describes the performance of production and capacity of solar energy source in India. Hence, the study is both descriptive and analytical in nature.

### Source of data

The study was based on data collected from the publication of International Renewable Energy Agency (IRENA), Central Electricity Authority (CEA), Energy Statistics (from Central Statistics Office) and Ministry of New and Renewable Energy.

### Period of study

The production and installed capacity figures of solar energy in India were analysed for a period of 10 years from 2007-08 to 2016-17.

### Method of data analysis

The collected data were analysed with the help of Annual Growth Rate, Compound Annual Growth Rate, Percentage and Trend analysis to calculate the figures annually and present them graphically.

## 5. SCOPE OF THE STUDY:

The present study will help find out the performance and growth of renewable energy in relation to non-renewable sources and also to suggest policy measures to increase the production of renewable energy in India.

## 6. LIMITATIONS :

The data and information collected are from secondary sources and hence the study has its own limitations.

### Installed Capacity of Solar Energy in India

In this chapter the data collected were analysed and the results presented therein. For the purpose of meaningful analysis appropriate graphical presentation has also been given under this section

**Table 1**  
**Installed Capacity of Solar Energy in India (Capacity = MW)**

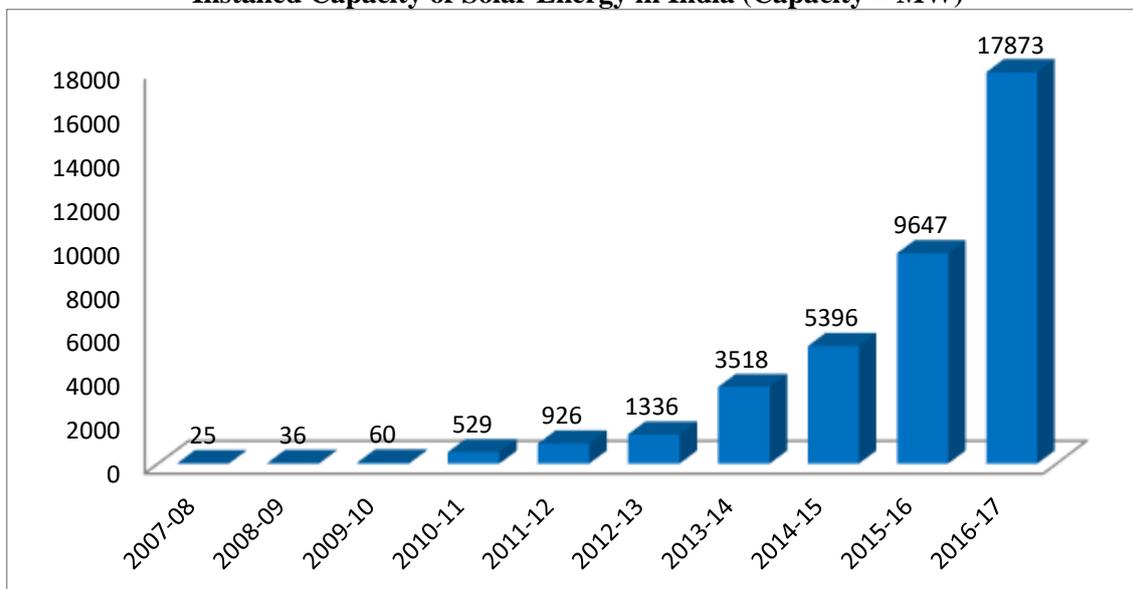
Year	Capacity	AGR	Percentage
2007-08	25		0.06
2008-09	36	44	0.09
2009-10	60	66.67	0.15
2010-11	529	781.67	1.34

2011-12	926	75.05	2.35
2012-13	1336	44.28	3.40
2013-14	3518	163.32	8.94
2014-15	5396	53.38	13.71
2015-16	9647	78.78	24.52
2016-17	17873	85.27	45.43
<b>Total</b>	<b>39346</b>		
<b>CAGR</b>	<b>92.94</b>		

Source: IRENA (2018), Renewable Energy Statistics 2018

It has been observed from the analysis that the Installed capacity of Solar Energy has been growing throughout the study period, though with a few slacks in between. The least installed capacity of solar energy was 25MW (0.06%) in 2007-08 and maximum was 17873 MW (45.43%) during the period of 2016-17. The highest growth rate of 781.67 percentage was achieved between 2009-10 and 2010-11. This was due to the various initiatives of the state such as launch of the National Solar Mission (2008) and establishment of the Solar Energy Corporation of India (2011). The compound annual growth rate was 92.94 percentage (2007-08 to 2016-17).

**Chart 1**  
**Installed Capacity of Solar Energy in India (Capacity = MW)**



## 7. CONCLUSION:

It was found that the Installed capacity of solar energy has grown manifold during the study period, from 25MW in 2007-08 to 17873MW in 2016-17. This was due to the various initiatives by the centre and state governments such as launch of the National Solar Mission (2008) and establishment of the Solar Energy Corporation of India (2011).

## REFERENCES:

1. India Brand Equity Foundation Report, <https://www.ibef.org/download/renewable-energy-mar-2019.pdf>
2. Aadithya Ranjan Srivastava, Role of Renewable Energy in Indian Economy, IOP Conference Series: Materials Science and Engineering (2018), 404012046
3. Swami Prakash Srivastava & Surat Prakash Srivastava, Solar Energy and its Future role in Indian economy, International Journal of Environmental Science: Development and Monitoring, Issn No. 2231-1289, Vol 4 No.3 (2013)