Chapter 13
State-Level Status of Renewable Energy Development in India

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ABSTRACT

Renewable energy is energy that is collected from renewable resources that are essentially inexhaustible like sunlight, wind, hydropower, and various forms of biomass. India has a huge renewable energy potential, and the availability of renewable energy sources is widely dispersed. The key objectives of the chapter are to assess the state development of renewable energy in India. It is seen that the average percentage users of solar power in India has increased from 0.27% in 2001 to 0.44% in 2011. ANOVA results indicate there is significant difference among the states of India in renewable energy development in comparison to their potential capacities, and there is enough scope for the development of renewable energy like solar energy in India.

INTRODUCTION

Renewable energy is energy that is collected from renewable resources that are essentially inexhaustible. This includes sources like sunlight, wind, hydropower and various forms of biomass. The Indian power sector is one of the most diversified in the world. Sources for power generation range from commercial sources like coal, natural gas, diesel and nuclear power to other non conventional renewable sources like wind, solar, bio-mass, small-hydro. The demand for electricity in the country has been growing at a rapid rate because of huge population in the country and is expected to grow further in the years to come (Bhaskar 2013, Roy and Jana 1998).

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The major arguments of renewable energy development in India are as follows (Kumar et al 2010, Rathore et al 2019). First, a majority of the population in India still live in rural areas. The sluggish development of the power sector in India has left many rural households with poor quality and unreliable power supply. Secondly, in India the electricity sector occupies the second position in emitting greenhouse gasses. Renewable energy sources (RES) have the potential to provide energy with negligible emissions of air pollutants and green house gases. For generation of 1 KWH for a coal fired power plant, 950 -1000 grams of carbon dioxide is emitted in India. In case of generation solar power, it is only about around 54–60 grams per KWH. During recent years, due to increase in cost of conventional energy and the environmental problems caused by the use of conventional fuels, India is putting emphasis to use renewable energy sources. To meet the increasing demand of power in the country, India has to search for more economical, sustainable, and clean power generation sources. Thirdly, India is a large country with geographical area of 3.287 million square kms including varied regions hills, coastal area, deserts and forests. It is not feasible to connect all the locations through the grid. Decentralized electrification through the development of renewable energy like the rooftop solar power is the best-suited option for providing uninterrupted power supply for the people living in far-flung areas.

India's Intended Nationally Determined Contribution (INDC) to the UNFCCC, outlining the country's post-2020 climate actions builds on its goal of installing 175 gigawatts (GW) of renewable power capacity by 2022 by setting a new target to increase the country's share of non-fossil-based installed electric capacity to 40 percent by 2030. A capacity of 62.84 GW has been set up by December 2017 and this constitutes 18 per cent of the total installed capacity. Now India has 4th and 6th global position in wind and solar power deployment respectively (IBEF 2018).

India has a huge renewable energy potential and availability of renewable energy sources is widely dispersed. In some states, the potential for renewable energy is insignificant (example Delhi) whereas some states have abundant renewable energy sources. Solar energy is concentrated in the northwest region in the country – Gujarat, Rajasthan, Ladakh, Maharashtra and Madhya Pradesh. Wind energy is abundant in some states like Gujarat, Karnataka, Maharashtra, Tamil Nadu and Jammu and Kashmir. and the small hydro potential in the country is concentrated in hilly states of Himachal Pradesh, Uttaranchal, Jammu and Kashmir, Arunachal Pradesh and Chhattisgarh.

As on 31st March, 1990 renewable energy sources capacity was 18 MW. Over the last three decades, the renewable energy has shown an increasing trend. At the initial stage, the capacity addition from renewable energy sources was very slow, but from 2008 onwards the capacity addition was considerable. India accounts for about 4% of the total global electricity generation and its contribution to the global renewable generation capacity is 4.43%. As of July 2018, total installed capacity (grid interactive) of renewable power generation in India stood at 116.82 GW, which is 33.81 per cent of the total installed capacity of 345.49 GW (IBEF, 2018). India's installed capacity during 2010 to 2016 is shown in Table 1. The installed capacity as on 31st March 2016 from renewable energy sources was 42,849 MW. Total installed renewable capacity (MW) during 2006-07 to 2017-18 has been presented in Figure 1. The growth of renewable energy sources like solar power, wind power, small hydro power, biomass and urban & industrial wastages during 2008 to 2016 in India is shown in Figure 1.

In Table 2, we have presented *achievement in grid connected renewable power (as on 31.12.2017).*