

Grid Interactive Renewable Power in India

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ABSTRACT

Energy is critical, directly or indirectly, in the entire process of evolution, growth and survival of all living beings and it plays a vital role in the socio-economic development and human welfare of a country. Energy has come to be known as a 'strategic commodity' and any uncertainty about its supply can threaten the functioning of the economy, particularly in developing economies. Achieving energy security in this strategic sense is of fundamental importance not only to India's economic growth but also for the human development objectives that aim at alleviation of poverty, unemployment and meeting the Millennium Development Goals (MDGs). Holistic planning for achieving these objectives requires quality energy statistics that is able to address the issues related to energy demand, energy poverty and environmental effects of energy growth. Renewable energy represents an area of tremendous opportunity for India. Energy is considered a prime agent in the generation of wealth and a significant factor in economic development. Energy is also essential for improving the quality of life. Development of conventional forms of energy for meeting the growing energy needs of society at a reasonable cost is the responsibility of the Government. Limited fossil resources and associated environmental problems have emphasized the need for new sustainable energy supply options. India depends heavily on coal and oil for meeting its energy demand which contributes to smog, acid rain and greenhouse gases' emission. Last 25 years has been a period of intense activities related to research, development, production and distribution of energy in India.

Keywords: compound annual growth rate (CAGR), Renewable energy, Energy conservation.

I INTRODUCTION

The Indian economy has experienced unprecedented economic growth over the last decade. Today, India is the ninth largest economy in the world, driven by a real GDP growth of 8.7% in the last 5 years (7.5% over the last 10 years) [1]. In 2010 itself, the real GDP growth of India was the 5th highest in the world. This high order of sustained economic growth is placing enormous demand on its energy resources. The demand and supply imbalance in energy is pervasive across all sources requiring serious efforts by Government of India to augment energy supplies as India faces possible severe energy supply constraints. Combustible renewable and waste constitute about one fourth of Indian energy use. This share includes traditional biomass sources such as firewood and dung, which are used by more than 800 million Indian households for cooking. Energy exploration and exploitation, capacity additions, clean energy alternatives, conservation, and energy sector reforms will, therefore, be critical for energy security. Energy conservation has also emerged as one of the major issues in recent years. Conservation and efficient utilization of energy resources play a vital role in narrowing the gap between demand and supply of energy.

II INSTALLED GENERATING CAPACITY OF ELECTRICITY

The total installed capacity for electricity generation in the country has increased from 16,271 MW to 23,6387 MW registering a compound annual growth rate (CAGR) of 6.58% [2]. There has been an increase in generating capacity of 29,861 MW over the last one year, which is 14.46% more than the capacity of last year. The highest rate of annual growth (18.91%) from 2010-11 to 2011-12 in installed capacity was for Thermal power followed by Hydro Power (3.79%)[3]. The total Installed capacity of power utilities in the country increased from 14,709 MW in 1970-71 to 1,99,877MW as on 31.3.2012, with a CAGR of 6.41 % over the period. At the end of March 2012, thermal power plants accounted for an overwhelming 66% of the total installed capacity in the country, with an installed capacity of 1,56,107 MW. The share of Nuclear energy was only 2.02% (4.78 MW [2]). Hydro power plants come next with an installed capacity of 38,990 MW, accounting for 16.49% of the total installed Capacity. On-utilities accounted for 15.45% (36510 MW) of the total installed generation capacity.

Improving energy efficiency is one of the most desirable options for bridging the gap in the short term .

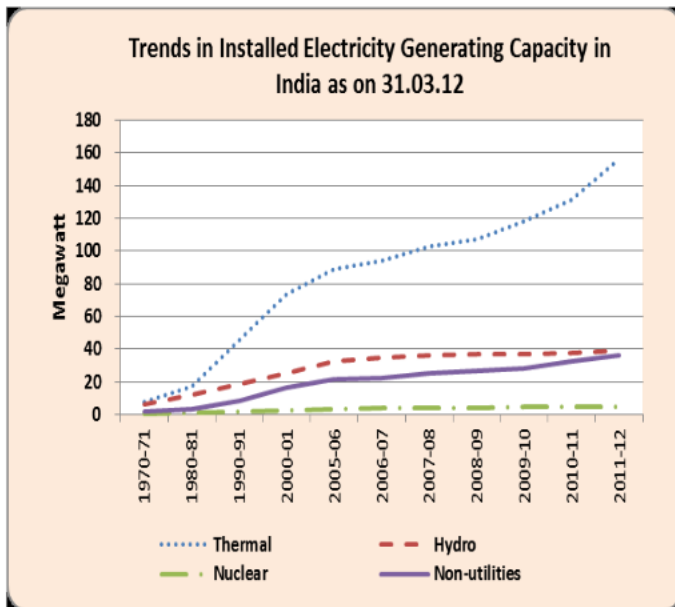


Fig. 1 Trends in installed electricity generating capacity

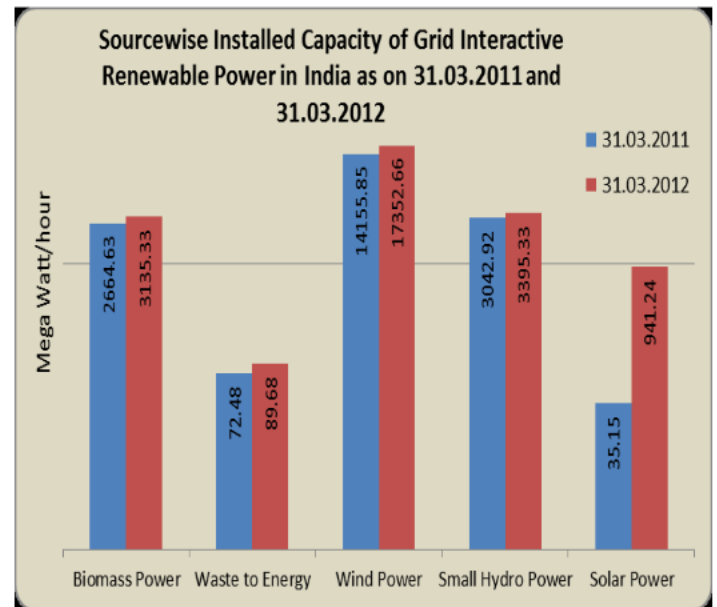


Fig.2 Installed capacity of grid interactive renewable power [9]

III GRID INTERACTIVE RENEWABLE POWER

The total installed capacity of grid interactive renewable power, which was 19,971.03 MW as on 31.03.2011 had gone up to 24,914.24 MW as on 31.03.2012 indicating growth of 24.75% during the period [3]. Out of the total installed generation capacity of renewable power as on 31-03-2012, wind power accounted for about 69.65%, followed by small hydro power (13.63%) and Biomass power (12.58%). Tamil Nadu had the highest installed capacity of grid connected renewable power (7,664.03 MW) followed by Maharashtra (3,644.05 MW) and Gujarat (3,607.27 MW), mainly on account of wind power. As on 31.03.2012 out of total Biogas plants installed (45.45 lakh), Maximum number of such plants installed were in Maharashtra (8.24lakh) followed by Andhra Pradesh, Uttar Pradesh, Karnataka and Gujarat each with more than 4 lakh biogas plants. Out of 1,221.26 MW Solar Cookers installed as on 31.03.2012, 824.09 MW were installed in Gujarat and 222.9 MW in Rajasthan. As on 31.03.2012 there were 1,352 water pumping Wind mills systems installed and 7,286 remote villages and 1,874 hamlets were electrified [9].

IV RENEWABLE ENERGY GROWTH

Global demand for renewable energy continued to rise during 2011 and 2012. Total renewable power capacity worldwide exceeded 1,470 GW in 2012, up about 8.5% from 2011. Hydropower rose 3% to an estimated 990 GW [11], while other renewable grew 21.5% to exceed 480 GW. Globally, wind power accounted for about 39% of renewable power capacity added in 2012 [8], followed by hydropower and solar PV, each accounting for approximately 26% **Cumulative deployment of various Renewable Energy Systems/ Devices [6]**

V CONCLUSION

Electricity consumption in India has been increasing at one of the fastest rates in the world due to population growth and economic development. India's economy faces increasing challenges because energy supply is struggling to keep pace with demand, and there are energy shortages (as much as 15 percent daily)

Table: 1
Cumulative deployment of various renewable energy systems

Renewable energy system	Target for 2013-14	Deployment during October, 2013	Total Deployment in 2013-14	Cumulative achievement up to 31.10.2013
Wind Power	2500	52.25	880.73	19933.68
Biomass Power	105	-	20.0	1284.80
Small Hydro Power	300	20.0	114.50	3746.75
Solar Power	1100	-	395.13	2079.97

[10] <http://www.mnre.gov.in/achievements.htm>.
 [11] <http://www.mnre.gov.in/achievements.htm>.
 [12] <http://www.mnre.gov.in/achievements.htm>.

almost everywhere in the country. The highest rate of annual growth (18.91%) from 2010-11 to 2011-12 in installed capacity was for Thermal power followed by Hydro Power (3.79%) [5]. The share of Nuclear energy was only 2.02% (4.78 MW). Hydro power plants come next with an installed capacity of 38,990 MW, accounting for 16.49% of the total installed Capacity [6]. For economic as well as environmental reasons India needs to shift to non-polluting renewable sources of energy to meet future demand for electricity. Renewable energy is the most attractive investment because it will provide long-term economic growth for India. Renewable energy also has the advantage of allowing decentralized distribution of energy — particularly for meeting rural energy needs, and thereby empowering people at the grass roots level.

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