

## **1.6 Present Indian and international energy scenario of conventional and RE Sources:**

### **1.6.1 Overview of Renewable energy in India:**

India's population of more than 1028 million is growing at an annual rate of 1.58%. As fossil fuel energy becomes scarcer, India will face energy shortages significantly due to increase in energy prices and energy insecurity within the next few decades. Increased use of fossil fuels also causes environmental problems both locally and globally.

The 2022 electrical power targets include achieving 227GW (earlier 175 GW) of energy from renewable sources, nearly 113 GW through solar power, 66 GW from wind power, 10 GW from biomass power, 5GW from small hydro and 31GW from floating solar and offshore wind power. The bidding process for the further additional 115 GW or thereabouts to meet these targets of installed capacity from January 2018 levels will be completed by the end of 2019-2020. The government has announced that no new coal-based capacity addition is required beyond the 50 GW under different stages of construction likely to come online between 2017 and 2022.

Ministry of Non-conventional Energy Sources is focused on nation-wide resource assessment, setting up of commercial projects, renovation and modernization, development and up-gradation of water mills and industry based research and development.

#### **Biomass:**

In recent years, the interest in using biomass as an energy source has increased and it represents approximately 14% of world final energy consumption. Estimates have indicated that 15–50% of the world's primary energy use could come from biomass by the year 2050.

Biomass power generation in India is an industry that attracts investments of over Rs. 600 crores every year, generating more than 5000 million units of electricity and yearly employment of more than 10 million man-days in the rural areas

#### **Hydropower:**

Hydro-power is another source of renewable energy that converts the potential energy or kinetic energy of water into mechanical energy in the form of watermills, textile machines, etc., or as electrical energy (i.e., hydroelectricity generation). It refers to the energy produced from water (rainfall flowing into rivers, etc.). Hydro-power is the largest renewable energy

resource being used for the generation of electricity. Only about 17% of the vast hydel potential of 150,000 MW has been tapped so far.

**In India**, hydropower projects with a station capacity of up to 25 megawatt (MW) fall under the category of Small Hydropower (SHP). India has an estimated SHP potential of about 15,000 MW, of which about 11% has been tapped so far. The Ministry of New and Renewable Energy (MNRE) supports Small Hydropower project development throughout the country.

### Wind Energy:

Wind energy is being developed in the industrialized world for environmental reasons and it has attractions in the developing world as it can be installed quickly in areas where electricity is urgently needed. In many instances it may be a cost-effective solution if fossil fuel sources are not readily available. In addition there are many applications for wind energy in remote regions, worldwide, either for supplementing diesel power (which tends to be expensive) or for supplying farms, homes and other installations on an individual basis.

Wind power accounts for nearly 10% of India's total installed power generation capacity and generated 2.67 TWh in the fiscal year 2017-18, which is nearly 3% of total electricity generation. The capacity utilization factor is nearly 16% in the fiscal year 2017-18 (19.62% in 2016-17 and 14% in 2015-16). 70% of wind generation is during the five months duration from May to September coinciding with Southwest monsoon duration. In India, solar power is complementary to wind power as it is generated mostly during the non-monsoon period in daytime.

### Solar Energy:

Solar energy is the most abundant permanent energy resource on earth and it is available for use in its direct (solar radiation) and indirect (wind, biomass, hydro, ocean, etc.) forms. Solar energy, experienced by us as heat and light, can be used through two routes: the thermal route uses the heat for water heating, cooking, drying, water purification, power generation, and other applications the photo voltaic route converts the light in solar

energy into electricity, which can then be used for a number of purposes such as lighting, pumping, communications, and power supply in unelectrified areas.

The Ministry of New and Renewable Energy (MNRE) has planned a detailed trajectory so as to meet the target of 100 GW by 2022. A capacity of 23.12 GW was installed up to July 2018. Projects of around 10 GW are under implementation and tenders for additional 24.4 GW are issued. India has a good level of solar radiation, receiving the solar energy equivalent of more than 5000 trillion kWh/yr.

### Geothermal Energy:

Geothermal is energy generated from heat stored in the earth, or the collection of absorbed heat derived from underground. Immense amounts of thermal energy are generated and stored in the Earth's core, mantle and crust. Geothermal energy is at present contributing about 10,000 MW over the world and India's small resources can augment the above percentage.

The resource is little used at the moment but the Government has an ambitious plan to more than double the current total installed generating capacity.

### 1.6.2. Future of renewable energy in India:

India, faced with twin challenges on energy and environmental front, has no option but to work towards increasing the role of renewable in the future energy systems. Renewable energy technologies vary widely in their technological maturity and commercial status. In India, renewable energy is at the take-off stage and businesses, industry, government and customers have a large number of issues to address before these technologies could make a real penetration. India with large renewable energy resources (solar PV, wind, solar heating, small hydro and biomass) is to set to have large-scale development and deployment of renewable energy projects.