

MA SEMESTER II (2019-2021)

CC-8 Geography of India (Unit II)

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Sources of Power: Hydroelectricity

Hydropower is a renewable energy resource because it uses the Earth's water cycle to generate electricity. Water evaporates from the Earth's surface, forms clouds, precipitates back to earth, and flows toward the ocean. The movement of water as it flows downstream creates kinetic energy that can be converted into electricity. 2700 TWH is generated every year. Hydropower supplies at least 50% of electricity production in 66 countries and at least 90% in 24 countries.

Out of the total power generation installed capacity in India of 1,76,990 MW (June, 2011), hydro power contributes about 21.5% i.e. 38,106 MW. A capacity addition of 78,700 MW is envisaged from different conventional sources during 2007-2012 (the 11th Plan), which includes 15,627 MW from large hydro projects. In addition to this, a capacity addition of 1400 MW was envisaged from small hydro up to 25 MW station capacity. The total hydroelectric power potential in the country is assessed at about 150,000 MW, equivalent to 84,000 MW at 60% load factor. The potential of small hydro power projects is estimated at about 15,000 MW.

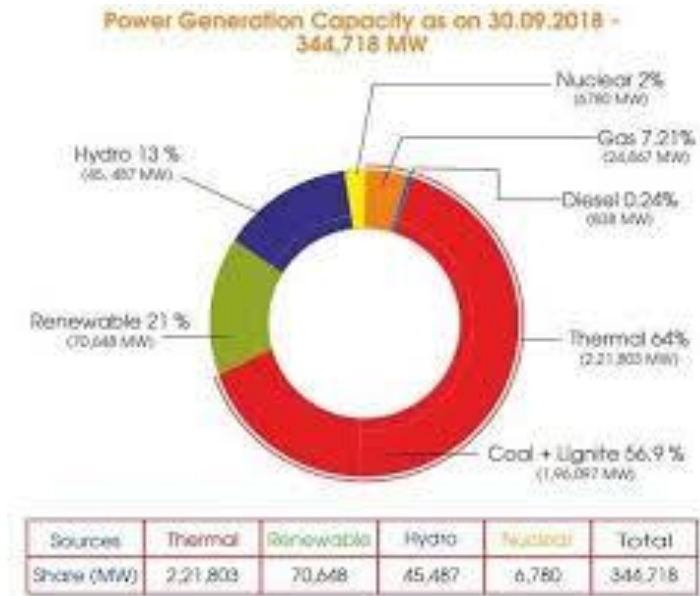
Technology

A hydroelectric power plant consists of a high dam that is built across a large river to create a reservoir, and a station where the process of energy conversion to electricity takes place. The first step in the generation of energy in a hydropower plant is the collection of run-off of seasonal rain and snow in lakes, streams and rivers, during the hydrological cycle. The run-off flows to dams downstream. The water falls through a dam, into the hydropower plant and turns a large wheel called a turbine. The turbine converts the energy of falling water into mechanical energy to drive the generator. After this process has taken place electricity is transferred to the communities through transmission lines and the water is released back into the lakes, streams or rivers. This is entirely not harmful, because no pollutants are added to the water while it flows through the hydropower plant.

Hydroelectric Power in India

India is the 7th largest producer of hydro electric power in the world. India's installed hydro electric capacity was 44,594MW, or 13.5% as of 2017 (India slips to rank 8th according to the International Hydropower Association in 2019). India has 3 major sources of power generations are:

- i. Thermal Energy
- ii. Hydro Power Energy
- iii. Nuclear Energy



India has vast hydro power potential of 44,594 MW, out of which Brahmaputra, Indus and Ganga contribute about 80%. Out of these only 15-20% of the has been utilized and rest remain unharnessed.

Factors that are important for the development of hydroelectricity:

- Flow of the water
- Relief of the particular regions
- Lithological characteristics of the place (appropriate for the dam construction)
- Nature of the river i.e. perennial or non perennial river
- Local residents
- Market and technologies

India has a history of over 110 years of hydroelectricity production. The hydroelectric power plants at Darjeeling and Shivanasamudram (on Kaveri River) were established in 1898 and 1902, respectively. The real development started after 1947, when some mega projects like Bhakra Dam, Hirakund Dam, Tungabhadra Dam, Damodar, Koyna Dam and many more due to which total install capacity increased.

Hydroelectric Projects Under Construction

The National Hydroelectricpower Corporation Ltd (NHPC) is constructing five projects with a total capacity of 4,924 MW

