

MA SEMESTER II (2019-2021)

Paper – CC8 (Geography of India)

Niharika Narayan

Assistant Professor Guest Faculty

Email id – narayanniharika@gmail.com

## **Hydroelectricity in India and the related Facts**

- How much is the world's electricity supplied by Hydroelectric Power Plants?

2700 TWH is generated every year. Hydropower supplies at least 50% of electricity production in 66 countries and at least 90% in 24 countries.

- What are the different types of Hydroelectric Power Plants?

These are: -

1. Pelton turbines - It is impulse turbine which is normally used for more than 250 m of water head.
2. Francis - This is a reaction turbine which is used for head varying between 2.5m to 450m.
3. Kaplan - It is propeller type of plant with adjustable blades which are used for heads varying between 1.5 m to 70 m.
4. Propeller - It is used for head between 1.5 to 30 m
5. Tubular - This is used for low and medium height projects. Normally for head less than 15 m.

- What are the major components of a Hydroelectric Power Plant?

The major components of a Hydroelectric Power Plant are:-

1. Dam/Barrage Head works i.e. power intake, head regulator and desilting chambers etc
2. Head race tunnels/channels
3. Surge shaft/surge chambers
4. Pressure shaft
5. Underground and surface power house
6. Tailrace channel or tailrace tunnel.

- What is the classification of Hydro Projects based on Installed Capacity?
  - Micro: upto 100 KW
  - Mini: 101KW to 2 MW
  - Small: 2 MW to 25 MW
  - Mega: Hydro projects with installed capacity  $\geq 500$  MW
  - Thermal Projects with installed capacity  $\geq 1500$  MW
  
- How energy is generated in Hydroelectric Power Plant

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.

- How does cost of generation from Hydropower Plant compare with other sources of electricity?

The hydropower generation is highly capital-intensive mode of electricity generation but being renewable source of energy with no consumables involved; there is very little recurring cost and hence no high long term expenditure. It is cheaper as compared to electricity generated from coal and gas fired plants. It also reduces the financial losses due to frequency fluctuations and it is more reliable as it is inflation free due to not usage of fossil fuel.

- Why hydropower is called renewable source of energy?

Hydropower is called renewable source of energy because it uses and not consumes the water for generation of electricity, and the hydropower leaves this vital resource available for other uses.

- Which is the oldest Hydropower Plant in India?

The oldest Hydropower power plant is in Darjeeling District in West Bengal. It's installed capacity is 130KW and was commissioned in the year 1897.

- What is the estimated total Hydropower potential of India?

The hydropower potential of India is around 1,45,000 MW and at 60% load factor, it can meet the demand of around 85, 000 MW.

- How much of the total Hydropower potential has been exploited so far in India?

Around 26% of Hydropower potential has been exploited in India.

- What are the different types of dams?

Different types of dams are

- Conventional concrete dam,
  - Roller compacted concrete dam,
  - Rock fill dam,
  - Concrete Faced Rock fill Dam (CFRD),
  - Earth fill dam,
  - Arch dam, barrages etc.
- Why the unit sizes of hydro generating machines are not standardized as in case of thermal power plants?

Since the size of hydro generating machines are based on availability of water in river and the water head available at a particular project site, the size of the machines keeps varying from location to location and river to river. The sizes are also based on logistics and variation of water in river during the year

- What are approaches to tackle sedimentation problem of reservoir?

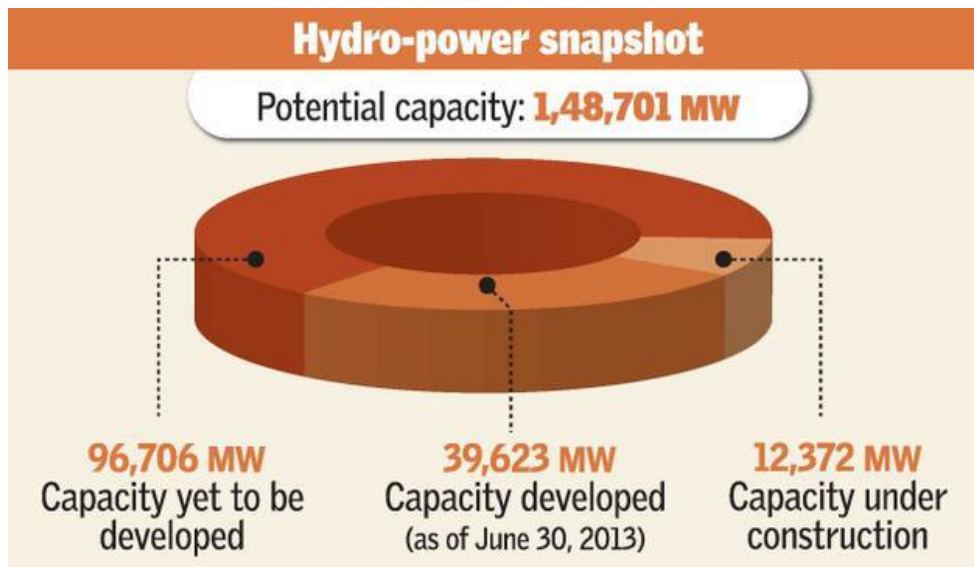
The following are some approaches to tackle sedimentation problem of reservoir:-

- Catchment Area Treatment (CAT) for reduction of silt load includes forestations of the catchment area and constructions of check dams on the tributaries and upstream of the river.
- Effective desilting arrangements for prevention of silt.
- Silt resistant equipments of withstanding the silt.
- Effective operation of the reservoir to minimize silt deposition.

## ***BASIN - WISE HYDRO POWER POTENTIAL IN INDIA***

<b>BASIN / RIVER</b>	<b>Probable Installed Capacity (MW)</b>
Indus	33,028
Ganga	20,252
Central Indian Rivers	3,868
West Flowing Rivers	8,997
East Flowing Rivers	13,775
Brahmaputra	65,400
<b>TOTAL</b>	<b>145,320</b>

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## Negative Impacts of Dams Construction

