

Hydroelectric power plants, also known as hydroelectric power stations or hydroelectric dams, are facilities that use the energy of flowing or falling water to generate electricity. These plants are a form of renewable energy generation and are considered one of the cleanest and most reliable sources of electricity. India has 197 Hydro Power plants. The end of the 19th century saw the development of power in India.

How Hydroelectric Power Plants Work

- **Water Source:** Hydroelectric power plants are typically located near a water source such as a river, dam, or reservoir. The availability of a steady flow of water is essential for their operation.
- **Dam or Diversion Structure:** In many cases, a dam is built across a river to create a reservoir, which stores a large volume of water. This reservoir allows for the control and regulation of water flow.
- **Penstock:** The dam or diversion structure directs water into a penstock, which is a large, high-pressure pipe. The force of falling or flowing water generates high kinetic energy.
- **Turbine:** The high-pressure water in the penstock is directed onto the blades of a turbine. The kinetic energy of the water causes the turbine to spin.
- **Generator:** Connected to the turbine is a generator. As the turbine spins, it turns the generator's rotor, which is equipped with magnets. This rotation induces a flow of electrons, creating an electric current.
- **Transmission:** The generated electricity is then transmitted through power lines to homes, businesses, and industries for various uses.

Key Points about Hydroelectric Power Plants

- **Renewable Energy:** Hydroelectric power is considered a renewable energy source because it relies on the Earth's water cycle, which continuously replenishes the water used for power generation.
- **Clean Energy:** Hydroelectric power plants produce clean electricity with minimal greenhouse gas emissions. They have a smaller environmental footprint compared to fossil fuel-based power plants.
- **Base Load Power:** Hydroelectric plants are known for their reliability and ability to provide continuous "base load" power, meaning they can generate electricity consistently.
- **Types of Hydroelectric Plants:** There are different types of hydroelectric plants, including:
 - **Run-of-River:** These plants do not require a large reservoir. They generate electricity using the natural flow of a river.
 - **Reservoir:** Reservoir plants use a dam to create a storage reservoir, which allows for controlled electricity generation and water management.
 - **Pumped Storage:** These plants can act as both consumers and producers of electricity. They store excess electricity by using it to pump water uphill and release it when needed.

- **Environmental Considerations:** While hydroelectric power is generally considered clean and sustainable, the construction of large dams and reservoirs can have significant environmental impacts, including habitat disruption and altered river ecosystems.
- **Global Usage:** Hydroelectric power is a widely used energy source in many countries. It provides a substantial portion of the world's electricity, particularly in regions with abundant water resources.

List of Hydroelectric Power Plants in India

State	River	Hydroelectric Power Plant
Andhra Pradesh	Krishna	Nagarjunasagar Hydro Electric Power plant
Andhra Pradesh	Krishna	Srisaillam Hydro Electric Power plant
Andhra Pradesh, Orissa	Machkund	Machkund Hydro Electric Power plant
Gujarat	Narmada	Sardar Sarovar Hydro Electric Power plant
Himachal Pradesh	Baira	Baira-Siul Hydroelectric Power plant
Himachal Pradesh	Sutlej	Bhakra Nangal Hydroelectric Power plant
Himachal Pradesh	Beas	Dehar Hydroelectric Power plant
Himachal Pradesh	Sutlej	Nathpa Jhakri Hydroelectric Power plant
Jammu and Kashmir	Chenab	Salal Hydro Electric Power plant

Jammu and Kashmir	Jhelum	Uri Hydro Electric Power plant
Jharkhand	Subarnarekha	Subarnarekha Hydroelectric Power plant
Karnataka	Kalinadi	Kalinadi Hydro Electric Power plant
Karnataka	Sharavathi	Sharavathi Hydroelectric Power plant
Karnataka	Kaveri	Shivanasamudra Hydroelectric Power plant
Kerala	Periyar	Idukki Hydro Electric Power plant
Madhya Pradesh	Sone	Bansagar Hydroelectric Power plant
Madhya Pradesh	Narmada	Indira Sagar Hydro Electric Power plant
Madhya Pradesh, Uttar Pradesh	Rihand	Rihand Hydroelectric Power plant
Maharashtra	Koyna	Koyna Hydroelectric Power plant
Manipur	Leimtak	Loktak Hydro Electric Power plant
Odisha	Sileru	Balimela Hydro Electric Power plant

Odisha	Mahanadi	Hirakud Hydro Electric Power plant
Sikkim	Rangit	Rangit Hydroelectric Power plant
Sikkim	Teesta	Teesta Hydro Electric Power plant
Uttarakhand	Bhagirathi	Tehri Hydro Electric Power plant
Himachal Pradesh	Baspa	Baspa-II Hydro Electric Power plant
Himachal Pradesh	Satluj	Nathpa Jhakri Hydro Electric Power Plant
Himachal Pradesh	Beas	Pandoh Dam
Himachal Pradesh	Ravi	Chamera-I
Himachal Pradesh	Ravi	Chamera-II
Himachal Pradesh	Beas	Pong
Jammu and Kashmir	Chenab	Dulhasti