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Indian Renewable Energy Development Agency Limited.

A Government of India Enterprise

ISO 9001:2015, 27001:2013 Certified

Hydro Energy

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Financing Schemes

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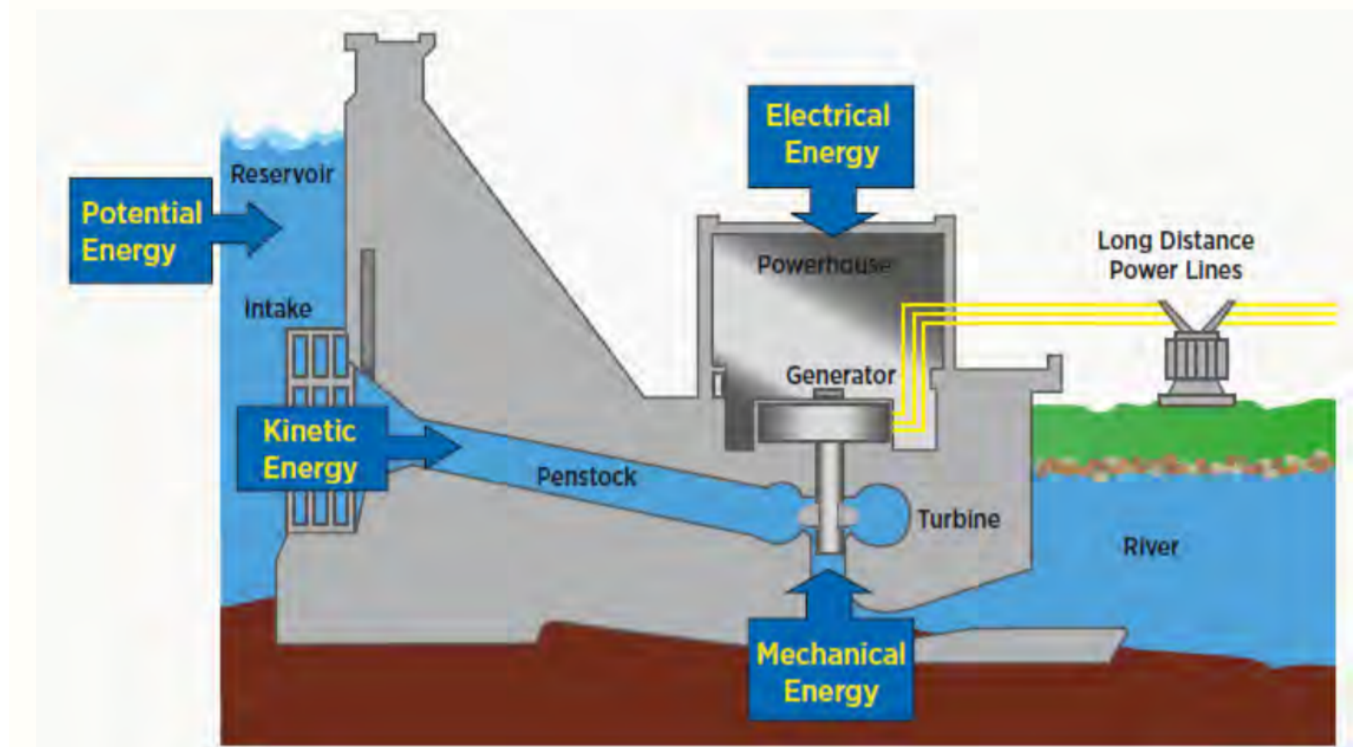
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Hydro Energy:

Hydroelectric power is electricity produced from generators driven by turbines that convert the potential energy of falling water into mechanical energy. Hydro power projects are classified as large and small hydro projects based on their sizes. In India, hydro power plants of 25MW or below capacity are classified as small hydro and comes under purview of Ministry of New and renewable energy(MNRE).

ENERGY CONVERSIONS



Basic Principle of Hydro power:

$$P = g \times Q \times H \times \eta$$

Where, P=Power in kW

Q=Turbine Discharge in Cu. M. per second or cumecs

H=Net head in meters

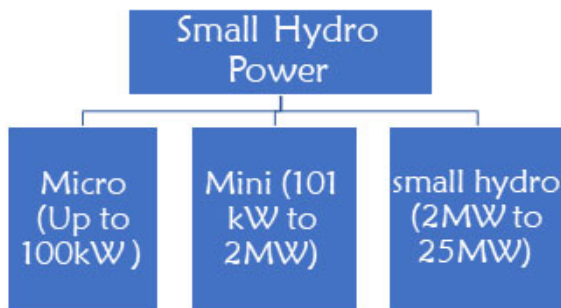
η =Overall unit efficiency (Turbine and generator efficiency)

g=Gravitational constant generally taken as 9.81

Small Hydro Power:

India has a history of about 120 years of hydropower. The first small hydro project of 130 kW commissioned in the hills of Darjeeling in 1897 mark the development of hydropower in India. The Sivasamudram project of 4500 kW was the next to come up in Mysore district of Karnataka in 1902, for supply of power to the Kolar gold mines. Following this, there were number of small hydro projects set up in various hilly areas of the country. Till the Independence (1947), the country had an installed capacity of 1362 MW, which included 508 MW hydropower projects, mainly small and medium. As per MNRE, the estimated potential of small hydro power plant is 20 GW across the country.

Depending upon the capacity of the project, a Small hydro Project can be classified as below:



Small hydro projects can be broadly classified in the following two types:

Small Hydro Projects on Hill Streams:

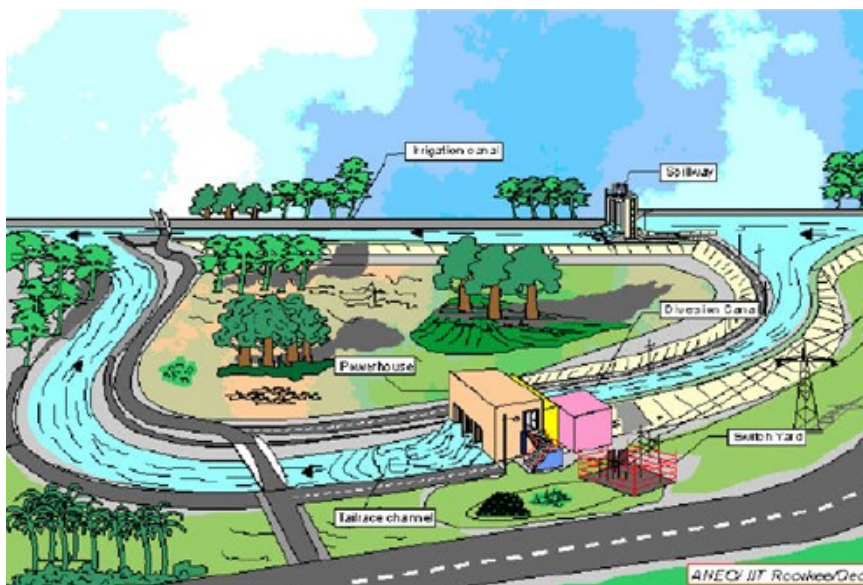
Small streams with steep bed slopes are available in the hills, giving rise to medium as well as high head projects utilising small discharges. These schemes are normally run of the river type with a small diversion structure to divert the flows through the head regulator located in the intake portion of the diversion structure. The water conductor system would usually comprise of a diversion and head regulator, a power channel, a desilting basin, forebay, penstock, power house and a tail race leading from the power house to the stream.



Small Hydro Projects on Canal Falls / Dam Toe

Irrigation canals carrying relatively high but assured discharges have several falls along their route. Small hydel projects utilising low heads can be constructed at such falls. Small hydel projects can also be located just downstream of a dam, barrage or similar structure to utilise the difference in the water level in the reservoir and in the canal downstream. A bypass channel to bypass the flows adjacent to the fall structure is constructed and the power house is constructed in the bypass channel. The bypass channel is suitably connected to the main channel.

Canal based hydro projects:



Dam Toe Hydro Project:



Type of Turbine for Small Hydro Projects:

Type Of Turbine	Class Of Head	Head Range For Large/ Medium Sets (M)	Head Range For Small Sets (M)
Pelton (Impulse)	High Head	Above 300 m	Above 150 m
Francis (Reaction)	Medium Head	30 to 300 m	20 to 200 m
Kaplan (Axial Flow)	Low Head	3 to 50 m	3 to 40 m

Large Hydropower:

India has an estimated hydropower potential of 1,45,320 MW, excluding small hydro projects (SHPs). Several hydroelectric projects (HEPs) in India are languishing due to contractual conflicts, environmental litigations, local disturbances, financial stress and unwilling purchasers. Only about 10,000 MW of hydropower could be added over the last 10 years.

Cabinet approves Measures to promote Hydro Power Sector:

The Union Cabinet, chaired by the Prime Minister Narendra Modi, has approved following Measures to promote Hydro Power Sector:

- Large Hydropower Projects to be declared as Renewable Energy source (as per existing practice, only hydropower projects less than 25MW are categorized as Renewable Energy).

- HPO as a separate entity within non-solar Renewable Purchase Obligation to cover LHPs commissioned after notification of these measures (SHPs are already covered under Non-Solar Renewable Purchase Obligation). The trajectory of annual HPO targets will be notified by Ministry of Power based on the projected capacity addition plans in hydropower sector. Necessary amendments will be introduced in the Tariff Policy and Tariff Regulations to operationalize HPO.
- Tariff rationalization measures including providing flexibility to the developers to determine tariff by back loading of tariff after increasing project life to 40 years, increasing debt repayment period to 18 years and introducing escalating tariff of 2%;
- Budgetary support for funding flood moderation component of hydropower projects on case to case basis; and
- Budgetary support for funding cost of enabling infrastructure i.e. roads and bridges on case to case basis as per actual, limited to Rs. 1.5 crore per MW for upto 200 MW projects and Rs. 1.0 crore per MW for above 200 MW projects.

For Details of Incentives Available In the Sector, kindly refer the Ministry of New and Renewable Energy (MNRE) Website at <https://www.mnre.gov.in>

List of officers Name in Sector - Hydro Energy

Sl. No.	Name	Designation	Email Id	Mobile No.
1	Sushant Kumar Dey	Addl General Manager	skdey@ireda.in	9871692920
2	Puran Mal Meena	Senior Manager	pmmeena@ireda.in	9650796774
3	Ajit Singh	Manager	ajitsingh@ireda.in	9911578474
4	Sanchit Singhal	Manager	sanchitsinghal@ireda.in	8806012674
5	Halavath Bhuralal	Deputy Manager	bhuralal@ireda.in	8319443179

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(<https://www.digitalindia.gov.in/>)



(<https://swachh.bharat.nudge.gov.in/>)



(<http://nic.nic.in/>)
solar-pv)



(green-energy-certificate)



(<http://www.india.gov.in/>)

Important Links

[Ministry of New And Renewable Energy \(http://www.mnre.gov.in/\)](http://www.mnre.gov.in/)

[Ministry of Power \(http://www.powermin.nic.in/\)](http://www.powermin.nic.in/)

[Central Electricity Authority\(CEA\) \(http://www.cea.nic.in/\)](http://www.cea.nic.in/)

[Public Grievances \(http://pgportal.gov.in/\)](http://pgportal.gov.in/)

[MoE IT \(http://meity.gov.in/\)](http://meity.gov.in/)

[Solar Energy Corporation of India](https://www.seci.co.in/) (https://www.seci.co.in/)

[Intranet](https://myireda.ireda.in) (https://myireda.ireda.in)

[Webmail](https://Outlook.office365.com/owa) (https://Outlook.office365.com/owa)

[Ombudsman scheme](images/whatsnewpage/OmbudsmanScheme.pdf) (images/whatsnewpage/OmbudsmanScheme.pdf)

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