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Free Energy Micro Hydro Power Plant (Whirlpool Turbine)

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Abstract: *Hydro energy is a very reliable and expensive renewable energy source. Amidst all renewable energy, hydropower remains the first place on earth and will keep this place for many years to come. Among renewable energy sources, small hydro is one of the most attractive renewable energy technologies. A small hydroelectric system uses energy from flowing water to generate electricity. Although there are several ways to use energy from running water, the performance of river systems, which do not require large storage dams, is often used for Micro hydro and sometimes for hydro scale projects. The position of power stations is increasingly critical to modern renewable energy technologies around the world. It is a cost-effective way to bring electricity to remote villages. It is expected to grow much faster than required by other forms of energy.*

Keywords: *Small Water Projects, Electricity Needs, Cost works well.*

I. INTRODUCTION

Hydroelectric production (potential energy in stored water) is one of the cleanest ways to generate electricity. In 2012, renewable energy sources donated about 16 percent of the world's electricity generation. Hydroelectricity is the most widely used form of renewable energy. It is a flexible source of electricity and the cost of electricity production is very low.

Micro hydro or Micro hydel is a type of electric power that usually generates up to 100 kW of electricity using natural water flow. This installation can provide power to an isolated home or small community, or is sometimes connected to electrical networks. There are many of these inserts globally, especially in developing countries as it can provide a source of energy savings without the purchase of fuel.

II. CLASSIFICATION OF HYDROPOWER PLANTS

Classification of power plants according to Micro Pico Substantial Capacity High Medium Low Depending on purpose One purpose Multiple objectives Depending on geographical areas Run-of-River In-stream Reservoir Storage Distributed System Connected Grid.

A. Micro-hydro Power

Power Micro-hydro Power is a type of Hydro power that produces up to 100 kW of electricity using natural water flow.

☐ These types of generators can provide energy to an isolated home or small

community.

System The Micro-hydro system is compliant with solar energy because in many areas in winter the water flow is high and the solar energy is low. In such areas micro-hydro power and photo voltaic solar energy are used.

B. Various Elements

Construction of Micro-hydro power station specified location. It is made of many materials. Some of them are Intake, Canal, Penstock, Turbine, Generator, Controlling unit

1) Turbines

- a) Turbines convert flow energy and pressure into mechanical energy.
- b) Turbines are basically two types namely Reaction & Impulse and depending on the head of available water they continue to be divided into three categories namely high, medium and low head.
- c) Based on site specifications (eg head and flow) we choose a turbine to use on the micro-hydro power plant.

2) *Penstock*: Penstock is a large metal pipe that carries water from a pond to a turbine. The potential force of water is converted into kinetic energy as it flows down with a penstock due to gravity.

3) *Generator*: Standard generators used in micro hydro power projects are a compatible generator and an import vehicle used as a generator. Induction generator: - An incoming generator is usually an import vehicle. Rotating 1-5% speed and sync speed to achieve a negative slip, to work in production mode.

4) *Synchronous Generator*: A synchronized generator or alternator is used for micro-hydro projects. These generators provide their attractiveness through a rectifier or an external battery system can be used to attract. Occasionally industrial pumps (eg centrifugal) are used as generators.

5) *Controller*: Water turbines vary in speed as load is applied. This speed difference will greatly affect the output and power output from the generator. To add to this problem the electronic load controller is used in a small power plant.

III. CONSTRUCTION

1) Details of the micro hydro plant construction specific to the site. Sometimes there is an existing mill or other artificial dam available and which can be converted to power generation. Generally, microhydro systems are made of many materials.

2) Most importantly include access where the water is diverted from a natural river, stream, or waterfall perhaps. A food structure such as a holding box is needed to inspect floating debris and fish, using a screen or multiple bars to store large items.

3) In warmer climates the building must also withstand frost. Installation may have a gateway to allow the system to be watered for inspection and maintenance.

4) Micro hydro installation usually lacks a dam and a water storage facility, such as large hydroelectric power plants, depending on the small flow of water that will be available throughout the year

A. Uses

1) Micro hydro systems are flexible and can be distributed in many different locations.

2) Depending on how fast the water source flows (river, river, stream) and the speed of water flow.

3) Energy can be stored in battery banks in remote areas or used over a directly connected system so that in times of high demand there is more storage capacity.

4) These systems can be designed to minimize the potential damage caused by large dams or other power generation sites.



B. Cost

The cost of a micro hydro plant can be between \$ 1 billion and US \$ 20,000.

1) Advantage

- a) Economic energy source
- b) No reservoir required.
- c) Utilize natural flow of water.
- d) No harmful effect on surrounding.

2) Disadvantage

- a) Low power generation during summer months
- b) Suitable site characteristics required.
- c) Efficiency is low.

IV. CONCLUSION

Micro-hydro power plant is an important part of world's electricity supply. Specially in remote areas it is providing reliable and economic source of electricity. As no fossil fuel required in hydro power plant, it can help to save other source

REFERENCES

- [1] <http://www.microhydropower.net>
- [2] <http://www.ieee.org>
- [3] Power Plant Engg. By. P. K. NAG
- [4] Electrical Machinery by, Dr. P. S. Bimbhra



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