

Pico Hydro Pwer Generator Utilizing Household Water Supply

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Abstract

The principle objective of this paper is Rural Electrification via hybrid system which includes hydro electric power generation for society. The turbine designed to generate electricity sufficient enough for a domestic. The turbine and generator are installed inside the pipe. Hydro power generation system is the combination of generator and turbine which produces power. It overcomes the limitation of individual system and produces power continuously. Such a system could give reliable, pollution free power supply at low cost. This system does not need special location for its installation, as these energy resources are available abundantly all over the world. The main objective is to produce the energy in an eco-friendly way by using renewable sources of energy and to gain maximum intensity with turbine for maximum power generation.

Keywords: dc generator, Turbine, 12v battery inverter

1. INTRODUCTION

The Pico Hydro comes from word Pico which mean very small and hydro which mean water. It refers to electrical energy that comes from the force of moving water used to power equipment. Specifically, Pico Hydro is hydro power with a maximum electrical output from few hundred watts up to five kilowatts (5kW) [1].

Hydropower plant captures the energy of falling water to generate electricity. A turbine converts the energy of falling water into mechanical energy. Then a generator converts the mechanical energy from turbine to electrical energy. The amount of electricity produce by hydropower depends on two factors which are:

1. High of the head (water pressure).
2. Volume of water falling.

DISCRIPTION

TURBINE:-

There are many different existing designs for hydrokinetic turbines. Hydrokinetic power can be extracted from a variety of locations such as river channels, ocean waves, waterfalls, and canals, and there are turbine models designed to accommodate all of these locations and their unique nuances.

This system work in gravity-fed pipes, where water rushes to generate power by using its gravitational forces when it is flowing or falling at the end, there is turbine and the water spins it, which moves the shaft that moves the generator, making electricity

The equipment use in this types of hydro electricity generation specialized with small and compact design, so it could be installed in small area very easily. Water flow in domestic pipelines has kinetic energy that has a potential to generate electricity for energy storage. Hence energy generated is both reliable and efficient form of clean source of renewable energy.

1.4.2 INTERNAL SYSTEMS:-

Internal systems have the advantage of a more compact size that makes them more suitable, but not restricted, for smaller applications. Power output ranges from 5-10 watts, sufficient to supply self powered water metering or monitoring systems, to 100 kW for more energy intensive applications.

1.4.3 EXTERNAL SYSTEM:-

External systems do not depend so strictly on pipe size since the runner is enclosed in a dedicated conduit, and allow for even greater flexibility. Their main drawback is the need for larger vaults to accommodate the turbine and generator assembly, making them less ideal for retrofit intervention on existing water infrastructures.

INVERTERS :-

A power inverter, or inverter, is an electronic device or circuitry that changes direct current (DC) to alternating current (AC).

The input voltage output voltage and frequency, and overall power handling depend on the design of the specific device or circuitry. The inverter does not produce any power; the power is provided by the DC source.

A power inverter can be entirely electronic or may be a combination of mechanical effects (such as a rotary apparatus) and electronic circuitry. Static inverters do not use moving parts in the conversion process

This 6V to 220V inverter Circuit schematic is one of the voltage inverter circuit, starting from 6-Volt input on the DC current into 220-volt AC output. For maximum output power up to 30W only, and is also very small voltage current. Input voltage plus the entrance on the transistor Q2 to provide the voltage at the collector and then go on Circumference transformer L1 and enter the base. Emitter will be merged with voltage supplied L2 min. And LED1 is useful as an indicator of whether or not an inverter works especially on the transistor.

2. METHOD OF MANUFACTURING

2.1 MANUFACTURING OF FABRIC TRUBINE:-

To start the initial design phase, calculations were conducted to size the turbine and jets for the system. The engineering theory behind these was taken from the 'Micro Hydro Design manual'. Based on the properties of the stream flow and net head, it was possible to calculate the optimal diameter for the runner plate and diameter of the jet nozzles. It was also important to select the correct number of jets and the number of Pelt on cups on the turbine; achieved using the same design calculations.

2.2 MANUFACTURING OF FABRIC BOX:-

It is square box which is design as per the water initial speed the flows of axially aur horizontally which has inlet and outlet space. the box is fully air tight there is no leakage of water. Early on in the design phase it was decided that a set of prototype cups were necessary for testing and in order to guide further design. However the manufacturing of Pelon cups due to their intricacy is extremely difficult and expensive, particularly when multiple cups must be manufactured from stainless steel.

DESIGNING OF TOP MODEL:-

In this top model we have design to present a locality to show the utilization of the project In this top model we have shows the industry which purifies the water and in this industry There is pumping section which pumps or forced the water to flows with its high pressure To its destination and there is many houses and building which utilized the energy by this Generation process.

3. WORKING

WORKING MODULE

In the working model all the component likes turbine, pipeline, dynamo motor are assemble and the inverter is also added for presenting as a big industry which also use or utilized this energy . processor of this working model is hydroelectric power is a power generated by , using its gravitational force

when it is flowing in the turbine and the water spins it, which moves the shaft that moves the generator make electricity.

Nowadays in-pipe water power systems are becoming particularly interesting for the integration of renewable resources at urban and building scale because of the potential to harness clean energy from excess head pressure in urban and domestic water pipelines. Able to operate across range of head and flow conditions, these particular micro hydro power systems can be deployed in municipalities, energy-intensive industries and agricultural irrigation districts providing a consistent amount of clean and continuous energy without the typical intermittency of wind and solar and at the same time helping in pipelines management and maintenance.

4. CONCLUSION

As conclusion for literature review and previous study, research of renewable energy should be continue and expand from rural area to resident area. Several aspects should be count in before installing Pico Hydro Generation system in residential area especially house. Water pressure from selected source should be measured in order to estimate output power. It also helps to choose right turbine, generator, and maximum load can be support by the system.

5. FUTURE SCOPE

In-pipe systems can offer many advantages both in terms of quantity of energy produced and supply continuity without the problems.

In-pipe power systems can provide municipalities with an opportunity to reduce costs and reliance on grid-based power by using their existing water infrastructure to generate cost-effective renewable energy.

These systems can help improving the management of water networks, allowing to monitor and adjust the water flows and to optimize overpressure, thus lengthening service life of all equipment.

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