

Energy Generation in Multi Storey Building Using Micro Hydro Turbine

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ABSTRACT

Increase in human population has increased the demand for energy. Fossil fuels are the major source to meet the world energy requirements, but its rapidly dwindling supply and its adverse effects on our ecological system are of major concern. In India over 70 % of the electricity generated is from coal based power plants. Other renewable such as wind, geothermal, solar, and hydroelectricity represent a 2% share of the Indian fuel mix. Fossil fuels (coal) are a major source of power production in India. Our concept features the run of river active setup of micro hydro power generation using simple gear mechanism. This concept is based on the collection of mechanical energy from two rotors spinning by the effect of higher river velocity and transmission of power from the rotors to a small pinion gear which runs the generator shaft, through two large driver gears attached to the shafts of two rotors. This method of power production is comparatively simpler than others. The objectives of our project include low cost, higher output, environment friendly power production, multiple setups in one row, and decrease the power shortage in India.

Keywords: Micro-hydro Turbine, Transistor, Receiver & Flow Sensor.

1.INTRODUCTION

Hydro-power production can be carried out using Turbines and water wheels. Turbines need extensive potential energy which means an appreciable head is needed to produce power while using turbines. On the other hand waterwheels don't need any head requirement and it's the kinetic energy of flowing water which is used by waterwheels to produce power. Low head and flow requirements ease

in fabrication and relatively low cost excels them from turbines. These are especially advantageous to small residential projects where the long payback period of turbines is prohibitive and hence hydropower production using waterwheel has become an important source of renewable energy these days.

A water wheel is a machine for converting the energy of free flowing or falling water into useful forms of power. A water wheel consists of a large wooden or metal wheel, with a number of blades or buckets arranged on the outer rim forming the driving surface.





Figure 1: position of micro hydro turbine

1. LITERATURE REVIEW AND OBJECTIVE

Bilal Abdullah Nasir (2013) performed a multi-objective optimization of hybrid power generation systems derived from micro-hydro, photovoltaic solar, and pumped hydro storage. The optimization method used is a modified multi-objective particle swarm optimization (MOPSO). Optimization is carried out for hybrid system operation so that there is a similarity between the generation and the electrical load it serves. The operating strategy applied in optimization is based on hour-level data of seven days of pumped hydro storage. This strategy aims to maximize the value of similarity between the power generation curve and economic income from the storage of pumped hydro. The study was carried out in Xiaojin county, Sichuan province, China.

Irene samora, Pendro Masnaso, Mario .J.France, Helena M. Ramos (2016). In their study, they named the power plant a hybrid power plant. The effort made by Kusaka et al. is noble because it is trying to build a self-generating plant in a rural area that does not yet have electricity energy facilities. Research conducted by Kusaka et al. is also worthy of being used as one of the references because it is closely related to research conducted by the author. solar and micro hydro-based hybrid power plants are designed for low-cost electricity generation, so that the selling price of electricity also becomes affordable. This effort is very realistic because the power plant is designed to meet the needs of electrical energy in remote and isolated areas. In this study optimization of the hybrid power plant system has been carried out, which includes technical and economic considerations. Another factor that supports the research is that micro-hydro and solar energy are sustainable sources of energy in the area of research.

Lory Marcus paresa (2018) conducted a study on optimizing the design and size of micro-hydro, the solar, wind, and fuel cell-based hybrid power generation systems. Optimization has been done using the bees'

algorithm (BA) and compared with the particle swarm optimization (PSO) algorithm. The optimal size of the system design is obtained based on its net present value (NPV). The results of their study have concluded that the system is quite feasible in meeting the burden with suitable energy costs. The results of the analysis of the method show that although both algorithms can provide a global solution, the PSO method is faster in achieving the optimal solution and less time consuming than the BA method.

Tunji John Erincle (2020) have conducted studies on the optimization of hybrid renewable energy systems for resort islands. Optimization is carried out on an optimal combination of hybrid systems based on side-generation energy audits, techno-economic analysis, and assessment of the availability of seasonal renewable energy resources versus the electricity load profile. Their research has been carried out on the island of Tioman, the South China Sea, which has been highly dependent on diesel generators. Their study has produced an optimal hybrid system configuration, which includes investment costs, fuel savings, and improvements in CO₂ emissions.

Objectives-

- 1) To introduce a prototype featuring simple mechanism.
- 2) To design the prototype with sufficient cost effectiveness.
- 3) To reduce the chances of pollution, thereby being ecofriendly

3. MATERIALS AND METHODS

3.1 Component Description:

Micro hydro turbine: -Hydropower Diy water charging

Power genrate voltage: 12V;

Dimensions 10*10*10cm

Item weight 90 Gm

Micro hydro genrator the potential energy conversion equipment it can be directly to the small battery charge it can charge mabile phone, 12v radio power, power supply for LED light etc.



Figure 1: Micro hydro turbine

Battery: - The battery must have a good power-to-weight ratio & should be able to discharge a large amount of current fairly quickly. There is 12V rechargeable battery is used in the

store the power. The batteries are used to the power supply for circuit.



Figure 4: Lead Acid Battery

Transmitter & Receiver: - This system is responsible for relaying the commands given by the operator through the transmitter to the receiver via a frequency band. It's the central & most fundamental component of the whole power generation system. There are four channels in this system.

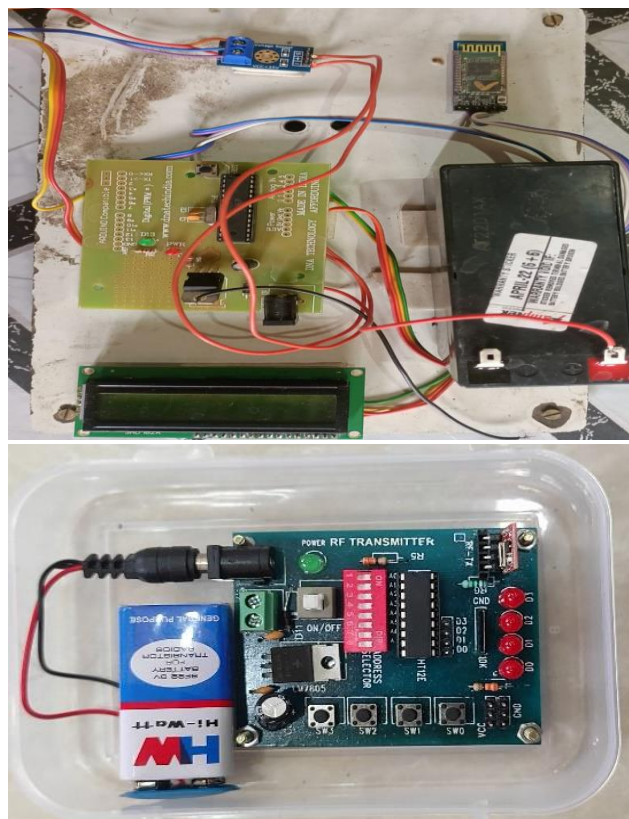


Figure 6: Transmitter & Receiver

3.2 hydropower generation Principle

In the hydro-power turbine need extensive potential energy which means an appreciable head is needed to produce power while using turbine. The water wheel is a machine for converting the energy of free flowing or falling water into useful forms of power.

It's the kinetics energy of flowing water which is used by waterwheels to produce power.

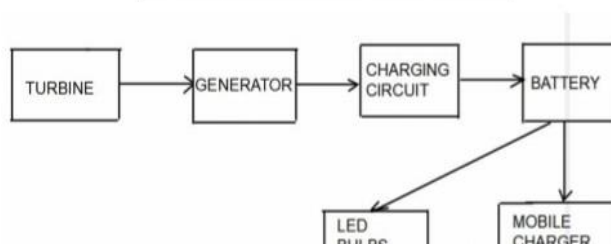
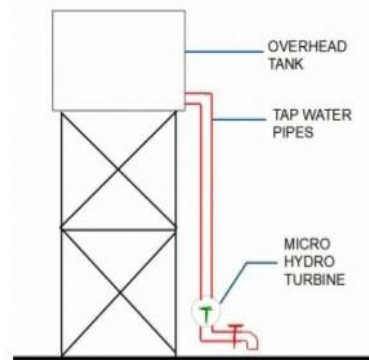


Figure 8: Hydro power Principle

4. RESULTS AND DISCUSSION

a. ADVANTAGES

- 1) This type system is most Eco-friendly system.
- 2) It is cost effective energy generation can be possible.
- 3) In this system not additional water require use of waste water energy of tap water
- 4) It is clean and nonpolluting source of energy and no fuel is require

b. DISADVANTAGES

- 1) The require huge amount of water all time.
- 2) Land space requirement for set up is large.
- 3) A construction cost is high.
- 4) Require flowing water.

5. CONCLUSIONS

From this project we conclude that by using this technology electricity can be produced and is stored in battery which can be used whenever and wherever required. Hydroelectric power has always been an important part of the world's electricity supply, providing reliable, cost effective electricity, and will continue to do so in the future.

This project can be further developed by enhancing the performance and by adding more features. Further developments in this project can be an addition of features like the addition of a IOT system and water flow measuring sensor for measuring flow rate.

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