Power Generation Through Multiple Sources

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Abstract- *Renewable energy is the energy that we can made again and again from the sources such as wind power, solar power, hydropower, Hand power and from various forms of biomass. The popularity of the renewable energy has increased significantly due to the fact that conventional energy is limited will finish one day. So, in the future we have to use the renewable energy more significantly. Therefore the power generation through the wind, solar, hydropower and pedal was examined and design of required components is done.*

Keywords- Renewable energy, Conventional energy, Hydropower.

I. INTRODUCTION

Power generation through multiple sources is a project in which the combination of solar power, wind power and manual pedal power. All this together gives the best of both worlds for greater independence from costly grid electricity bills.it is providing the power to the world.

Wind turbine power generation is and for renewable energy, because it has less moving parts so, it requires less maintenance and less cost. Using magnet in the turbine a small breeze can rotate the turbine.

The turbine produces power only when there is wind and solar panels absorb sun energy only at day time so many batteries are required to store the energy at night time. But because of the decrease in the temperature in night time the wind intensity increases and this hybrid system produces the power whole day.

When due to some reasons, if hybrid system of wind and solar could not produce power then pedal system could be used. The pedal power system with lighting system can produce 40 min of lighting with just 10 min of pedaling.

II. WORKING PRINCIPLE

The working principle of the project is to generate power using multiple sources. A vertical axis turbine has its axis perpendicular to wind streamlines and vertical to bottom. Wind generation is that the use of air flow through turbines to automatically power generators for electricity. Solar energy is that the conversion daylight into electricity, either directly using photovoltaic (PV), or indirectly using concentrated solar power. In pedal power generation manual power to pedal is transmitted to power generating unit through chain-sprocket and gear. In hydropower, the falling kinetic energy of the water is converted into the rotary motion of turbine and then into electrical energy.

III. LITERATURE REVIEW

The different researches were carried out on the solar and wind power generation. The utilization of renewable energy required system. The literature carried out with categorization of the different system stand alone as follows:
Standalone solar system

Abhaya Swarup et.al [1] developed a model for energy management of PV based energy system. This model has been mainly proposed to raise the public awareness and education levels of solar systems in an interesting and entertaining way. The results indicate that the problems with PV systems were not due to PV array and instead it was due to the performance of the battery units.

Martina et.al [2] have discussed about multilevel converters that are effectively used to connect single-phase grid with solar photovoltaic systems. An overview of different multilevel topologies and the suitability for single-phase grid connected photovoltaic systems has also been presented.
Standalone Wind Systems

Aydogan Ozdamar et.al [5] have analyzed and presented a case study on wind energy utilization in a house in Izmir, Turkey. The developed model determines the number of batteries needed for continuous energy supply, for each wind turbine taking into account of the economical aspects. It was found that the wind battery hybrid system was not economical in the areas of low wind potential.

Solar Photovoltaic Wind Hybrid System

Bhave A.G [9] studied the techno-economic feasibility of installing solar photovoltaic-wind hybrid system. This system uses electrical storage by lead acid battery and

auxiliary power from AC mains. The result from the above study showed that 80% of the energy demand was satisfied by the solar photovoltaic wind hybrid system. But it was cost effective, only when the system cost was considerably reduced or the current electricity cost raised to a much higher level.

IV. DESIGN

Turbine design

In this project modified version of Darrieus type of wind turbine is designed and the final fabricated rotor blades design parameters like Tip speed ratio, material selection, and solidity and power coefficient are considered while fabricating rotor blades.

Number of blades used in this prototype is 6 to avoid turbulence. Each separated from one another by 45°, once the wind blows one blade should come after each rotation. Each blade having a curvature of 180° to harness wind from all direction.

Fig. no. 1 turbine

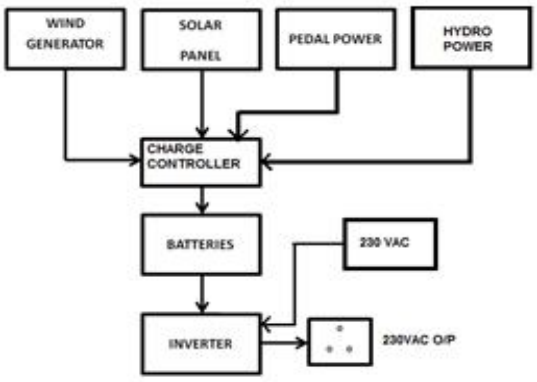

Fig. no. 2 Construction diagram

V. COMPONENTS

A. Solar panel

Photovoltaic solar panels absorb sunlight as a source of energy to generate electricity.

Fig. no. 3 Solar Panel

B. Battery

Battery is device to storing the mechanical energy to electrical energy. It is use to storing the device from resources wind turbine, hydro turbine, pedal and solar.

Fig. no. 4 Battery

C. Bearing

A ball bearing is a type of rolling-element bearing that uses balls to maintain the separation between the bearing races.
The purpose of a ball bearing is to reduce rotational friction and support radial and axial loads.

It is used in two end of the power generation source wind and hydro turbine.

E. Hydroturbine Spoons is required to making a hydro turbine.M6 STUD is required to support a turbine for a

turning. Plastic water container is required to support the turbine.

F. Pedal system

To making a pedal the following components are required - Cycle Axle, Cycle chain, Cycle pedal and Frame MS (Mild steel).

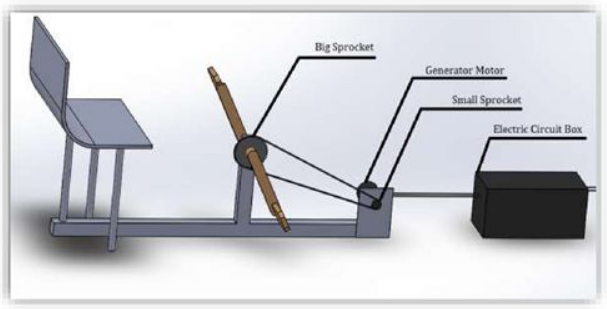

Fig. no. 5 Pedal System

V. RESULT

After doing experiments the output is recorded and is shown in following table.

Sr.no.	Description	Individual Output(in volts)	Combined Output(in Volts)
1	Solar panels	12.00	22.5volt
2	Hydropower turbine	4.07	
3	Wind power turbine	4.20	
4	Pedal power	4.83	
	Total power	25.1 volt	22.5 volt

Table no. 1 Result

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