Savonius Hydrokinetic Turbine

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Abstract— The contribution of renewable energy in the global electricity production is 26.2% of which 15.8% is the share of hydropower (REN21, 2019). Hydropower is the largest contributor in renewable energy but has various negative impacts on biodiversity and now-a-days, society aims to produce energy in an efficient and sustainable manner. This is the reason that growth rate of large hydropower is reduced. But unlike solar and wind, hydro is 24X7 available, reliable and predictable source of energy and therefore instead of out-looking this source, it is better to utilize the water energy more effectively. Small hydropower has been evolved as a solution to the adverse impact of large hydropower on the environment. In small hydropower, energy can be harnessed by static and kinetic method. Energy is harnessed by creating water head in static method and using flow velocity in kinetic method.

Keywords: Hydropower, Energy, Reliable, Electricity

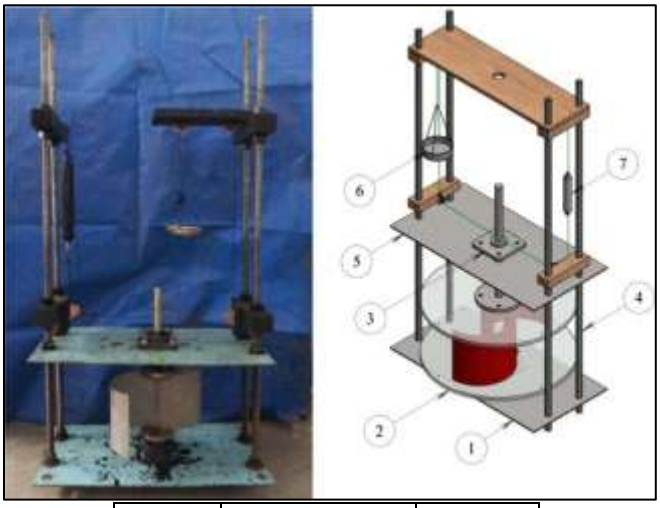
I. INTRODUCTION

Almost throughout the year, consistent water currents are observed in rivers or canals in most of the parts of India. However, development towards the use of kinetic energy from river currents is not explored substantially in India. Development of electricity from the water current of river may become one of the best renewable sources as it is predictable compared to wind or solar energy. Hence, there is a need for a simple hydro turbine which can take advantage of these naturally available sources. This type of run of the river hydroelectricity systems utilizes kinetic energy from rivers or canal water-flow, which does not require huge dams. Strong candidate for the utilization of these hydropower sources is Savonius turbine because of its simplicity in construction and better starting torque. It is made of two or more semicircular vanes (or blades) attached to a vertical shaft.

II. OBJECTIVE

1) To use the low head of minor tributaries and canals to generate electricity for supporting the rural population.
2) Design and development of compact hydrokinetic turbine.
3) Study the properties of this design and compare it on the bases of cost, efficiency and environmental impact.
4) To record and analysis the characteristics of this turbine with respect to power and efficiency.
5) To analyze the cost pro-efficiency and the payback period for the demonstrated piece and use that analysis to support the commercial viability claim for the technology

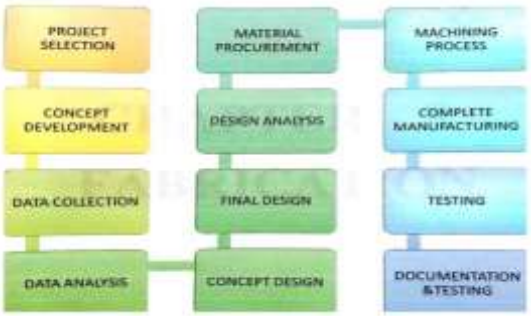
III. MODELING AND ANALYSIS



SR.NO	Component	Quantity
01.	Storage Battery	1
02.	DC Motar	1
03.	PVC Blade	2
04.	Ball Bearing	2
05.	Shaft	1
06.	Spur Gear	2
07.	Fastners	20

IV. METHODOLOGY

1) Literature survey on Savonius hydrokinetic turbine and river system in India.
2) Identify the different ways to harness the flow potential of small water bodies in India.
3) Design development and fabrication of Savonius hydrokinetic turbine.
4) Testing of hydrokinetic turbine in flowing water conditions.
5) Analysis of performance of the turbine with regards to power, efficiency and cost. Discussion and conclusion about results obtained.



V. RESULTS

The design criterions imposed challenging problems which, however were overcome by us due to availability of good reference books. The selection of choice raw materials helped us in machining of the various components to very close tolerance and thereby minimizing the level of balancing problem. Needless to emphasis here that we had lift no stone unturned in our potential efforts during machining, fabrication and assembly work of the project model to our entire satisfaction. Here the project model will capable to produce power 3-6watt per sec. The model develops by us fulfill the required objectives & hence we are satisfied with our project work.

VI. CONCLUSION

While concluding this report, we feel quite fulfill in having completed the project assignment well on time, we had enormous practical experience on fulfillment of the manufacturing schedules of the working project model. We are therefore, happy to state that the in calculation of mechanical aptitude proved to be a very useful purpose.

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