

UNIVERSITI TEKNOLOGI MARA

**DESIGN AND DEVELOPMENT OF
SMALL HYDRO TURBINE USING
VERTICAL WIND BLADE POWER
GENERATOR**

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ABSTRACT

Renewable energy sources are becoming increasingly important as the world seeks sustainable alternatives to conventional energy generation. One of the source is hydropower, which harness the power from flowing water to generate electricity. In many cases, small scale hydropower projects are more feasible and cost-effective than large-scale installations. This project intends to design and build a micro hydro turbine system that utilize vertical wind turbine blades. The hydro turbines are not commonly used in Malaysia as a source of electrical generation. Therefore, a small-scale hydro turbine can be used to power communication devices or electrical devices. Hence, the aim of this project is to design a small hydro turbine power generator using vertical wind turbine blades that can be used anytime and everywhere even in a remote area. This will be achieved by the manufacturing process such as machining process, sheet metal and joining process and other method that will be explored through this experiment. The expected result to supply electricity and ease the user to do their daily routine using renewable energy was obtained which is max power is 2 kW.

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CHAPTER ONE

INTRODUCTION

1.1 Background of Study

As the globe searches for sustainable alternatives to conventional energy generation, renewable energy sources are becoming more and more significant [1]. Hydropower which uses the energy of moving water to produce electricity, is one such source [2]. Small-scale hydropower is frequently more practical and affordable than large-scale facilities. In order to increase efficiency and maximize power production, this project intends to design and build a micro hydro turbine system that makes use of vertical wind turbine blades.

1.2 Problem Statement

Hydro turbines are not commonly used in Malaysia as a source of electrical generation [3]. But if only a modest amount of electricity is required, a small-scale hydro turbine might be useful tool for producing power [4] . A small-scale hydro turbine, for instance, can be used to power a communication device for emergency during a natural disaster if there may be an interruption in the energy supply. In addition, hydro energy may be harvested both day and night, unlike solar energy, which can only be harvested during the day. Designing a small hydro turbine is one of the project's goals considering that assessment.

In addition, using an electrical device in an area without an electrical source is restricted. For instance, if we travel to a remote location, we can only rely on the power source in the form of extra batteries or a power bank to keep using electronics equipment. Additionally, a person who visits a beach or a mountainous area for vacation will struggle to charge their electronics [5]. Thus, the design of portable mini wind turbine is needed for a better transportation and storage purpose.