DEVELOPMENT OF GRAPHICAL USER INTERFACE (GUI) FOR THE CALCULATION OF WIND TURBINE OUTPUT POWER USING DIFFERENT BLADE RADIUS

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ABSTRACT

Wind energy system is one of the sources that is cheap, clean and will never run out to produce energy. The usage of wind energy system can reduce the usage of fuel source that decreases from time to time. This project presents the development of graphical user interface (GUI) which is discussed about calculation of the output power of wind turbine using different blade radius. The wind turbine output power is evaluated by looking at the blade radius and wind speed to supply electricity. GUI is a graphical user interface that interfaced with a program that can make program easier to use with intuitive control such as pushbutton, sliders, menus, axes and so forth. It is used as a platform to simulate the output power of wind turbine system. This project investigates the effect of wind turbine output power using different blade radius. Two types of wind turbine involved in developing the output power are Horizontal Axis Wind Turbine (HAWT) and Vertical Axis Wind Turbine (VAWT). Depending on the wind turbine's characterizations, the most reliable wind turbine used will be determined. As a result, by developing the GUI, the blade radius is proportional to the output power produced for different usage such as outdoor light, individual houses, island and others.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

Wind power is the conversion of wind energy into more useful forms such as electricity using wind turbines. Most modern wind power is generated in the form of electricity by converting the rotation of turbine blades into electrical current by means of electrical generator. The wind is a clean and sustainable fuel source, it does not create pollution and it will never run out. Wind energy technology is developing fast and turbines are becoming cheaper and more powerful, bringing the cost of renewably-generated electricity down.

Wind energy has its own advantages and disadvantages on the surrounding environment, and the general reliability of wind turbine. One of the advantages of wind energy system is clean and independent energy. It is 100% clean, renewable, and independent source of energy [1]. It is also cheaper compared to other sources. As the wind is free, more and more power of this free wind energy can be produced.

The main disadvantage of wind energy system is locations, where not every location is suitable for a wind turbine. Only selected locations have sufficient wind blowing regularly enough to make the turbines useful. In Malaysia, the average wind speeds that are required to move the blades lie between 2 m/s to 13 m/s. In Malaysia, locations that have sufficient wind speed are Kuala Terengganu, Kota Bharu, Mersing and Kota Kinabalu [2].