CHAPTER 1

INTRODUCTION

1.0 Introduction

Wind energy consumption had become a very critically and practically used in 21st century (Peter, 2007). The usage of wind energy had now increased due to the awareness of the people around the world, how much advantages the wind energy can bring to the world. To collect the energy from the wind, what we need is a wind turbine.

Wind power as a renewable energy has started to develop rapidly since the late of the 1970s. The market for renewable energy has started to develop since the awareness of the energy used on that time has already facing some crisis on to finish and cannot be reused as the wind can provide (Wizelius, 2007).

As the wind energy does not create pollution and also does not need any fuel transport which can be harmful to the environment and also does not leave any damage waste behind it, it was become popular in some country (Wizelius, 2007).

Modern wind turbines are more efficient, more reliable and can generate power at a very cheap cost. As one of the renewable energy source, wind power can be seen as the most successful development compare to other renewable energy such as solar energy and running water energy (Wizelius, 2007).

This project is focused on designing and analyzing the best shape of small blade wind turbine. Wind turbine is a device which we used to convert the wind energy to become electricity power. The wind turbine can vary in its size. Turbine can vary from a
very small wind turbine that can be built with a rotor only 0.5 meter to the giant machine with its rotor diameter can reach up until 100 diameters (Gipe, 2004). Larger the rotor diameter, we will gain the higher power output and vice versa.

Main focus of this project is to find the best shape of blade wind turbine. For the wind turbine to produce more power from the wind energy, it was decided by the performance of the blade wind turbine itself. The rotation speed of the blade also affects the energy being captured by the blade. The faster the rotation of the blade is the more energy can be captured by the wind turbine. All of the statement support the idea on how much the shape design for the blade wind turbine important to the wind turbine to ensure it perform on its optimum.

1.1 Problem statement

Now, more people aware about the effect of the used of emission gasoline combustion vehicle, which can cause air pollution, when the exhaust stream from the engine was released in to the air. Solution for this problem is by using an electric vehicle. As a general the project was focus on to find another alternative of battery-charging for electric vehicle.

Electric vehicle is different to the combustion vehicle due to its ‘fuel’. For the combustion vehicle, fuels such as petrol or diesel are needed to make the combustion happen, in other word to let the vehicle moved. While for the electric vehicle, what was needed is a pack of battery which can be re-charged over and over to make this type of vehicle moved. To recharge the battery what we need is an energy that can be gain without any loss to our environment.

Wind energy consumption as an alternative energy to be used in so many things. This type of energy cannot be finished and always can be used for our advantage in daily life. By using wind power, we can give solution to the battery-charging for electric vehicle also for home usage. With wind turbine we could never to worry about source of electric anymore.
Wind energy also can reduce pollutions in our country. The source of energy is taken from the nature, thus there is no pollutant can be created. As for these past few years our environment has become worse, these renewable energy can give solution to the matter.

By using wind energy, we can save a lot of money. The cost for wind energy can be said as free. The only cost we need to worry is cost for developing the wind turbine. The price to built wind turbine is not too expensive as all the tools and material needed, can be use from a junk thing.

The blade is important in wind turbine. It shape plays an important role to make sure the blade can give its optimum performance. To make sure the blade reaches its optimum performance the aerodynamic concept was applied to the design which the aerofoil design was chosen.

In aerodynamics, there are few forces acting on the airfoil shape such as thrust, drag and lift force. Thrust force is the an acting force that act on the blade. Lift force was defined to be perpendicular to direction of the oncoming airflow. The lift force is a consequence of the unequal pressure on the upper and lower airfoil surfaces.

Drag force was defined to be parallel to the direction of oncoming airflow. The drag force is due both to viscous friction forces at the surface of the airflow and to unequal pressure on the airfoil surfaces facing towards and away from the oncoming flow.

In order to make the blade move during an attack of air the lift forces plays an important role. This project was to make sure the lift force is higher than the drag force. The higher the lift force the blade can move even faster as long as the drag force was lower.