INTRODUCTION

1.1 Introduction to Turbines

Across the globe, around 1.4 to 1.6 billion people have no access to electricity at all while another one billion are dependent on unreliable electrical grids. Many of those lacking access to modern energy live in rural areas, thus decentralized, off-grid energy projects will play a vital role in achieving. In order to solve this problem, water turbine had built. However people in rural area prefer things that low cost, easy to operate and long lasting. The turbines produce electricity from the free-flowing water in a river or stream and do not rely upon a water-head to produce electricity. (Bryan R.Cobb et al, 2011)

There are many type of turbine that can be found. However, this project is to gain improvement of this mechanism to apply in rural area from improving Hydrokinetic Turbine which place at river stream. The main objective of this project is to generate electricity and supply this green energy in rural area for a better living of remote community in Sungai Pahang. The hydrokinetic turbine could be submerge in the river or could be placed on the surface of the water river using the pontoon. Table 1.1 below show that classification of turbines used for pico-hydro based on hydraulic head type. The characteristic that suit to Sungai Pahang river is propeller turbine which reaction type and used depth of river below 10 meter.
The approach here is to apply the hydrokinetic water turbine to the rural area and tested to a house then electricity supply will be connected to a house which is located near to Sungai Pahang. The idea is to provide people on a solution for a rural area which is hard to get electricity supply. The project of hydrokinetic water turbine is proposed because it suit for small communities that required only a small amount of electricity.

Pahang River having the width more than 100 m and the depth could be reached more than 10 meter. The velocity of Pahang River during first sampling ranged from 0.308 to 0.582 m sec$^{-1}$ and second sampling was from 0.217 to 0.484 m sec$^{-1}$ (Muhamad Barzani Gasim, 2013). Usually, turbines able to produce about 1 kW to 2 kW of electrical power from range 0.217 to 0.484 m sec$^{-1}$ velocity of river suitable for remote homes (Martin Anyi et al, 2009).

### Table 1.1: Classification of turbines used for pico-hydro based on hydraulic head and type (Bryan R. Cobb et al, 2011)

<table>
<thead>
<tr>
<th>TURBINE TYPE</th>
<th>LOW (&lt;10m)</th>
<th>MEDIUM (10&lt;50m)</th>
<th>HIGH (&gt;50)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impulse</td>
<td>Crossflow</td>
<td>Crossflow Turgo Pelton francis</td>
<td>Turgo Pelton</td>
</tr>
<tr>
<td>Reaction</td>
<td>Francis Propeller Kaplan</td>
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</tbody>
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1.2 Problem Statement

One of the major problem faced by major rural areas around the world is lack of electrical supply because of hardness for electrical supplier to provide electrical supplies for them. However, vast amounts of untapped clean energy can be found in waterways, and this is where hydrokinetic energy, one of the best potential ways can be used for remote communities.

This problem can be solved by developing a hydrokinetic water turbine that enables generate power supply which is trasmitted from kinetic energy to electrical energy for home power in remote areas. Hydrokinetic energy is a promising new technology that still in the research and development stages. Many companies are approaching commercial distribution of various hydrokinetic energy systems, most of which are capable of providing clean energy off and on grid.

This idea also to promote green energy generation which lack of awareness among our generation nowadays and utilize the natural resources that would give benefits to all human land.

1.3 Design Objectives & Theory

The design and construction of a hydrokinetic water turbines which will generate an electrical supplies for home power in remote areas. The project is called Hydrokinetic Water Turbines for Home Power. The objectives of this project are :

- To design a hydrokinetic water turbines that able to withstand certain degree of water flow’s pressure
- To design a transmission system to supply electrical energy for home
- To measure performance study of the whole system