CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

In order to achieve the aim and objectives of this project, there are several method used. The sequence of the methods has been planned as shown in Figure 3.1.

3.2 MONITORING AND COLLECTING DATA

First step is monitoring and collecting data. Data from solar and weather meters for wind speed and temperature are collected within two month to power input from the two sources of energy. By collecting the data, the power obtain within two months can be known as well as the power that will get from the solar and wind energy can be predicted.

As for the first step, the monitoring and data collecting will be done at FKP Laboratory. The apparatus are setup and connected to computer to collect the data needed. As been mentioned before, the data will be collected within two month which is on February until March to obtain the solar radiation and wind speed average at UMP, Pekan, Pahang. For wind speed and temperature, each data are collected every 5 minutes and then average it for 1 day in the two months. Then, for the power output from the solar panel, the

voltage and current drawn will be recorded from 9 am to 3 pm everyday in a week to observe the changes of power which relates to the solar intensity.

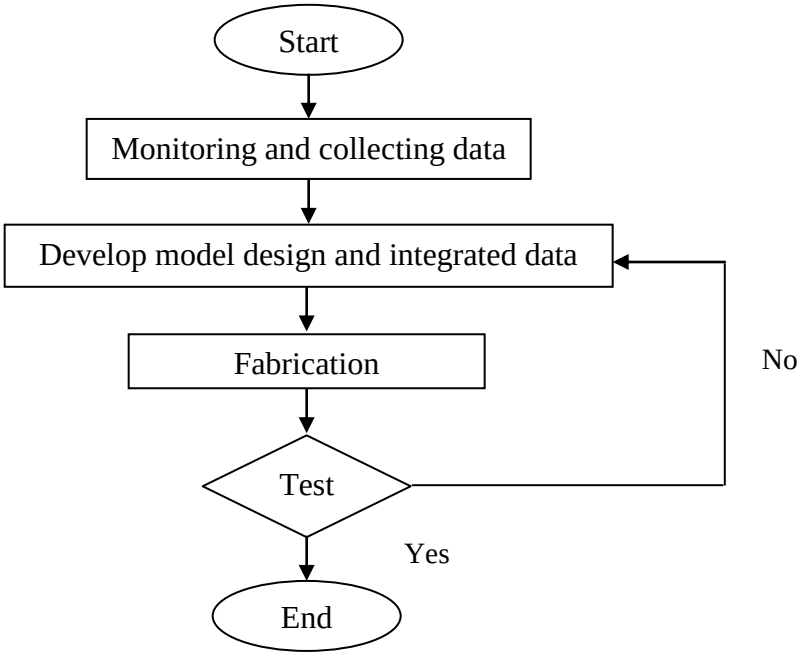

Figure 3.1: Sequence of method

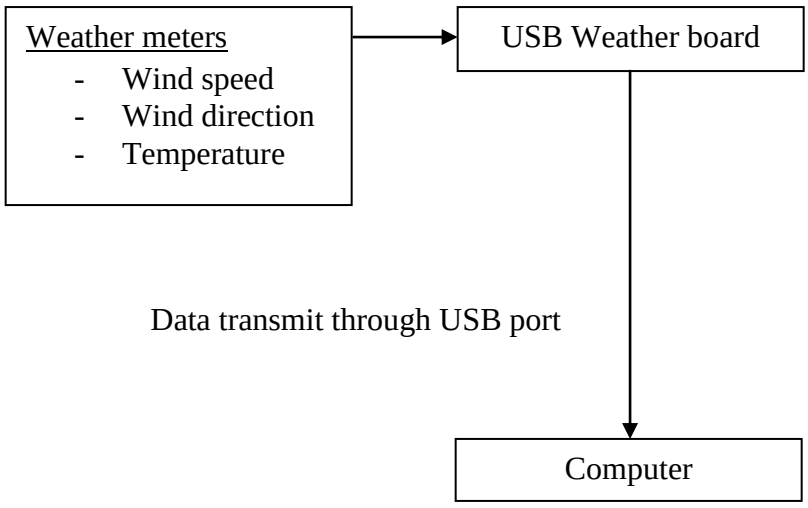

Figure 3.2: Schematic diagram for measuring solar and wind energy

In order to collect the data for wind speed and temperature, weather meters is been used in this project. This kit represents the three core components of weather measurement: wind speed, wind direction and temperature sensor. None of the sensors in this kit contain active electronics, instead they use sealed magnetic reed switches and magnets. Thus, source of voltage is needed to take any measurements. The rain gauge is a self-emptying bucket-type rain gauge which activates a momentary button closure for each 0.01 inch of rain that is collected. The anemometer (wind speed meter) encodes the wind speed by simply closing a switch which each rotation. A wind speed of 1.492 MPH produces a switch closure once per second. Finally, the wind vane reports wind direction as a voltage which is produced by the combination of resistors inside the sensor. The data will be recorded by using CoolTerm terminal program and transmitted through USB port to the computer as it able to store the data depends on the sample rate. With this, the wind speed and temperature can be stored and observed clearly.

While, power generates by the solar panel are collected by using multimeter. Data will be collected every hour starting from 9 am to 3 pm where that are the time where the sun are present clearly.

3.3 DEVELOP MODEL DESIGN AND INTEGRATED DATA

3.3.1 Develop Model Design

In the same time, the model design of this project can be design. This model design is designed so that the process flow of the experiment can be seen clearly. Figure 3.3 shows the block diagram of the model design.

Form Figure 3.3, the function of the controller had been explained before. The battery bank used in this project is Lithium-ion based battery. The inverter used in this project function as to convert the DC voltage to AC voltage as the load will be in AC. AC load in this project is LED 6W spot light with voltage 100 - 240VAC.