CHAPTER 1

INTRODUCTION

1.1 PROJECT BACKGROUND

The solar energy is the most capable of the alternative energy sources. Despite this hopeful evaluation of the potential of solar energy, considerable technical and economic problems must be solved before utilization of solar energy can occur. The solar power development will depend on how we deal with a number of serious constraint, including scientific and technological problem, marketing and financial limitations, and political. In addition, the education of engineers will have to changes its focus from non-renewable fossil-fuel technology to renewable power source. There has been a general agreement that the most significant of the renewable energy sources is solar radiation.

Thermal conversion is a technological scheme that utilizes a solar radiation. When a dark surface is placed in sunshine, it absorbs solar energy and heats up. Solar energy collector working with sun facing surfaces will transfer energy to the water that flow through it. To reduce heat loses to atmosphere and to improve it efficiency, one or two sheet of glass are usually placed over the absorbed surface. This type of thermal collector suffers from heat losses due to radiation and convection. Such losses increase rapidly as the temperature of the working fluid increases. Improvement such as the use of selective surfaces, evacuation of the collector to reduce heat losses, and the special glass is use to increase the efficiency of the absorber.

Solar water heating (SWH) is a proven and famous renewable energy technology and has been used in many countries of the world. The SWH system
investigated consists of mainly three parts, namely a flat plate solar collector, a heat exchanger (storage tank) and a circulating pump. Solar water heating system have been the famous application that using solar radiation as an energy sources that using thermal conversions.

This project will analyze the Solar Water Heating System based on the theoretical analysis from the mathematical model. The mathematical model will be consider all the part of the solar water heating system to find the solar water heating system temperature when the size and the behavior of solar water heating is changing.

1.2 PROBLEM STATEMENT

In today’s modern world, where new technologies are introduced every day, electrical energy use is increasing quickly Fossil fuel particularly petroleum fuel is the major contributor to electrical production. Quickly depleting reserve of petroleum and decreasing air quality raise question about the future. Solar can be use as a clean alternative energy to reduce electrical production and is promising in the effect to establish environmentally friendly for electrical system. So far, many extensive studies investigated solar water heating system and become the famous application for home and building.

The using of solar water heating system not familiar in Malaysia and the people in Malaysia still not realize about the practical of using solar water heating systems. It’s important to study about the power produce to heat the water using solar water heating system and proving about energy saving of solar water heating system.

1.3 PROJECT OBJECTIVE

The objectives of this analysis are to:

i. Find the mathematical model of solar water heating system.

ii. Find the change in water temperature from variable behavior of all part in solar water heating system.

iii. Find the efficiency and fraction of design using mathematical model.