CHAPTER I

PRELIMINARY

1.1 Background

Today, electrical energy has become something that is very important and cannot be separated from everyday life in society. Electricity is used for various things, such as lighting sources, power sources from electrical equipment, even power sources for electric vehicles. This increases the demand for electrical energy from year to year. Today the energy sources used in the world are still dominated by fossil fuels. Fossil fuels, such as oil, natural gas, and coal, are non-renewable energy sources whose amount will always be depleted along with their use. Therefore, the use of renewable energy sources as a substitute for non-renewable energy sources needs to be increased [1].

Amongst various type of renewable energy sources, the use of solar energy has gained lots of attentions [2]. It is important that we continue to harness and increase our use of solar energy as fossil fuels become depleted, expensive, and fall out of favor with their consumers [3]. Indonesia is a tropical climate country, where the intensity of sunlight is very high in this region, this enormous natural potential can be utilized as an energy source. The average amount of solar power that falls on the earth's surface (in Indonesia) ranges from 1300 - 1720 kWH /m^2 / year or an average of 3.6 - 4.7 kWH /m^2 / day [4]. The solar energy which is coming from the sun in the form of solar radiation can be an alternative source of energy [5]. Of the renewable sources, photovoltaics (PVs) have received

considerable focus because of the development of their fabrication technologies. PV modules consist of electrically interconnected PV cells. The modules are encapsulated to protect the cells from environmental conditions (e.g., water vapor, water, and mechanical damage) [6].

However solar cells as a unit of solar power plant is not without obstacles. The output power of solar cells is very low compared to other types of power plants [7]. In addition, The performance of photovoltaic (PV) modules installed outdoor is greatly influenced by various ambient environmental factors such as incident irradiance, the module temperature and the spectral irradiance distribution [8]. The impact of the low efficiency of solar cells, has an effect on the output of electrical power on solar panels. For that it needs efforts to optimize the electrical power output of solar modules in order for their efficiency to increase as well. One possible solution is with the help of solar reflectors [9]. A booster reflector is an easy and inexpensive modification to add more solar energy to a solar thermal collector [10]. By using a solar reflector, the amount of sunlight that falls on the surface area of the solar module will be more, which causes the output of electricity generated will be greater. So with the increase in the output of electrical power generated, the efficiency value will also increase [9]. The feasibility of solar radiation augmentation by the use of flat booster reflectors was investigated for solar thermal converters a few decades ago with positive results [11].

1.2 Problem Formulas

From the background of the discussion above, the writer can formulate the problem as follows :

1 What is the ratio of voltage, current, and power values on solar panels using reflectors and without the use of reflectors?

2 What is the effect of reflectors on solar panels?

1.3 Research objectives

1 Know the comparison of the output power value of solar panels by using reflectors and without using reflectors.

2 Know the effect of reflectors on the value of power output in solar panels.

1.4 Benefits of Research

1 Increase knowledge about solar panels.

2 Use solar energy as a source of electrical energy.

3 Increase solar energy output in solar panels with minimal sunlight.

1.5 Problem Limitations

1 This study only analyzed the ratio of output power values using reflectors in solar panels.

2 The type of solar panel used is polycrystalline 50WP.

3 The types of reflectors used are flat mirrors and aluminum.

4 The position of the solar panel is horizontal.

5 Reflector used measuring 0.55 m x 0.70 m.

6 Angle used 60°, 75°, 90°

1.6 Writing Systematics

The systematics of writing this final project are as follows:

1. CHAPTER I PRELIMINARY

   Explaining the background of the problem, problem formulation, research objectives, problem limitation, research benefits, writing systematics.

2. CHAPTER II LITERATURE REVIEW

   Contains a literature review related to the research to be carried out. Explain the basic theory of solar energy and solar cells.

3. CHAPTER III RESEARCH METHODOLOGY

   The research methodology explains the place of research, tools and materials, and a research flow chart.

4. CHAPTER IV RESULTS AND DISCUSSION

   Contains research data and discussion.

5. CHAPTER V CONCLUSION

   Contains conclusions and suggestions in research.