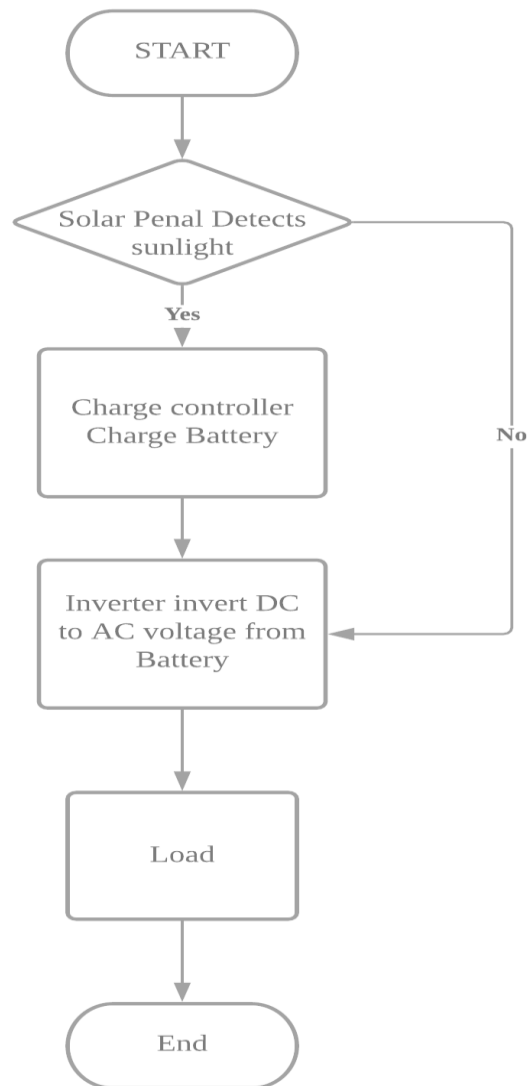# CHAPTER 3

## METHODOLOGY

### 3.1    Introduction

Methodology is method that we use to find information and knowledge about our project. So, we have been searching in the internet, read some books and also ask our supervisor. Then, from knowledge and information that we get, we can save our environment when we use solar system. We also can identify the equipment that we want to use. Lastly, we can develop a successful project.

In this chapter, the methodology of this project will be discussed in detail the approach and method that will be used in this project which include the project flow and grant chart this semester.

### 3.2    Project Planning

Project planning is part of project management, which relates to the use of schedules such as Gant chart to plan and subsequently report progress. A project plan is formal, approved document used to guide both project execution and project control. The primary used of the project plan are to document planning assumptions and decisions, facilities communication among stakeholders, and holders, and documents approved scope, cost, and schedule baselines. A project plan may be summarized or detailed.

## 3.3 Flowchart

```
                    ╭─────────────╮
                    │    START    │
                    ╰─────────────╯
                           │
                           ▼
                    ╱─────────────╲
                   ╱ Solar Penal   ╲──────────────┐
                   ╲ Detects        ╱              │
                    ╲ sunlight     ╱               │
                      ╲──────────╱                 │
                      Yes │                        │
                          ▼                        │
                  ┌──────────────┐                 │ No
                  │ Charge       │                 │
                  │ controller   │                 │
                  │ Charge       │                 │
                  │ Battery      │                 │
                  └──────────────┘                 │
                          │                        │
                          ▼                        │
                  ┌──────────────┐                 │
                  │ Inverter     │◄────────────────┘
                  │ invert DC    │
                  │ to AC voltage│
                  │ from Battery │
                  └──────────────┘
                          │
                          ▼
                  ┌──────────────┐
                  │    Load      │
                  └──────────────┘
                          │
                          ▼
                    ╭─────────────╮
                    │     End     │
                    ╰─────────────╯
```

## 3.4    Flow Chart of The Output System

This is flow char of process for our final year project to achieve the goals. Based on the flow chart, we have an efficiency flow from the beginning to start this project until end.

## 3.5    Flow Chart of The Input System

This is flow char of process for our final year project to achieve the goals. Based on the flow chart, we have an efficiency flow from the beginning to start this project until end.

## 3.6    Prototype Circuit Diagram

Figure 3.1 shows a circuit diagram that has been sketched by Fritzing software in this project, a 50-watt solar cell is used to generate the voltage generated by the waves and the sun connected to a 12V 10A pwm solar controller. The voltage is generated by two natural energies that are allowed to create renewable energy that can run continuously. In this project as well, the pwm solar controller serves as a 12V 35AH battery changer. To convert Direct current voltage to Alternating Current voltage by using a 1000-Watt power inverter.
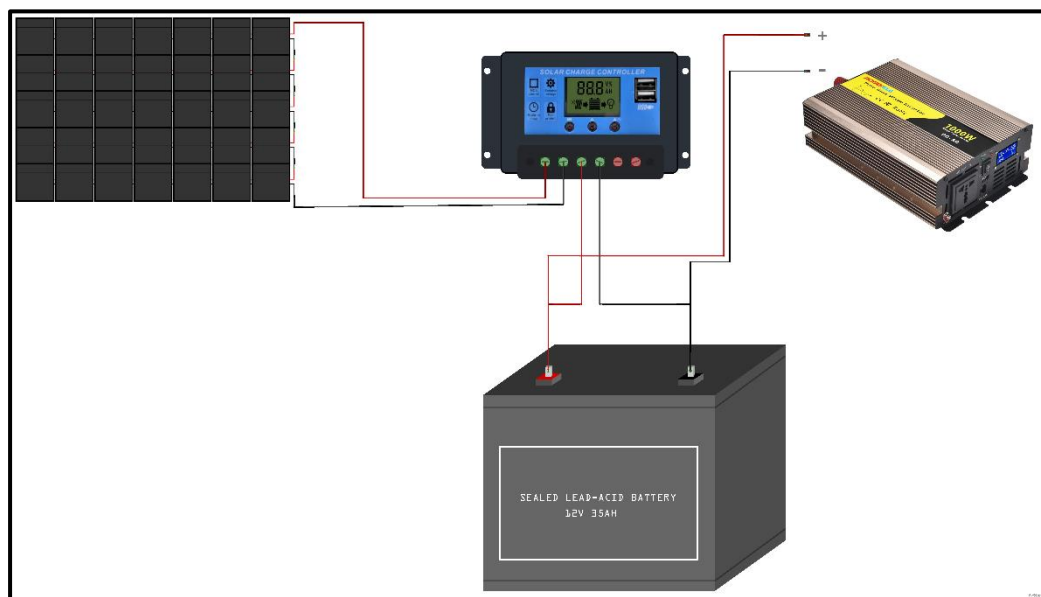


Figure 3.1 Prototype Circuit Diagram Project

## 3.7 Hardware

### 3.7.1 Solar Penal

There are many types of solar cell that have been created and polycrystalline solar cell was chosen to generate electric from sunlight for this project. It is because this solar cell was cheaper compared to 32 monocrystalline and ultra-thin solar panel. This solar cell produced 12V output voltage with dimension seven inches wide and seven inches long. It was placed at the top of container.



Figure 3.2 Monocrystalline Solar Penal 12V 50W

### 3.7.2 Battery

Battery 12 V was used in this project shown in Figure 3.2 to store energy of DC voltage that came from magnetic coil and solar cell and give supply to provide power to an output load in this project which is inverter. Every power supply must maintain their energy to continuously supply its load as well as any energy it consumed while performing the process. In this project, battery acted as storage to keep the output voltage from the generator and transferred it to convert DC to AC voltage.



Figure 3.3 Lead Acid Battery 12 V 35 AH

### 3.7.3 Inverter DC To AC Voltage

Inverter is an electronic device that used to convert the direct current (DC) comes from charge controller to alternating current (AC) most of the because home appliances use AC for the operating current. The product of this project was applicable at home and can also reduce electricity bills. Figure 3.3 shows the physical of the inverter.



Figure 3.4 Inverter 12 V DC To 220 V AC 1000 Watt

### 3.7.4 Charge Controller

Charge regulator in Figure 3.11 functioned to limit the rate of voltage. In this project, charge controller was set until 12 V because the input of the inverter only 12 V.

Figure 3.5 PWM Solar Change Controller 12 VDC 10 A

## 3.8 Project Design



Figure 3.6 Left view of the project