

POLITEKNIK SULTAN SALAHUDDIN ABDUL AZIZ SHAH

PORTABLE BATTERY POWERED GENERATOR

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JABATAN KEJURUTERAAN ELEKTRIK

JUN 2019

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This report is submitted to the electrical engineering department in compliance with some of the requirements of conferring a Diploma in Electronic Engineering Control

JABATAN KEJURUTERAAN ELEKTRIK

JUN 2019

A DECLARATION OF AUTHENTICITY AND TILTE

TITLE : PORTABLE BATTERY POWER GENERATOR

SESSION : JUN 2019

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2. We acknowledge that 'the project above' and its intellectual property are the originals of our original works / creations without taking or imitating any intellectual property from others.

3. We agree to transfer the intellectual property of 'the project' to 'the polytechnic' to meet the requirements for the grant of a **Diploma in Electronic Engineering Control** to us.

Made and acknowledged by:)

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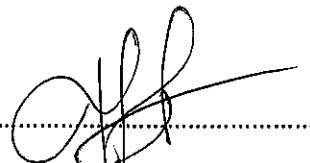
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di, pada

In front of me, WAN MOHD ZAMRI

BIN WAN AB RAHMAN (730820-09-6540))

as the project supervisor on the date:.....)



WAN MOHD ZAMRI BIN
WAN AB RAHMAN

APPRECIATION

The authors wish to record their sincere appreciation to the project supervisor, for the guidance and discussions provided throughout the duration of the project.

This award is also given to anyone who either directly or indirectly assisted in the production of this project.

ABSTRACT

We created this tool to provide convenience to all users in doing their daily work no matter where they are. The portable battery power generator is mainly focused for those who are experiencing electrical power problems. The main purpose of developing this project is to create an environmentally friendly product to all consumers and to reduce the usage of petrol. The advantage of this tool is that it does not produce any noise. It makes life easier for those who like to go for a picnic with family, those who need electricity to light up their stall in the night market or camping in the jungle because it recharges the batteries once it is dead by using solar power. Moreover it also does not need any expensive services. To keep an eye on the capacity of the battery, we add an electronic bluetooth device to the tool which will notify the user of its percentage left through an application in the users smartphone. It is also fixed with LCD display to show the voltage and time. We have also upgraded our tool by adding USB port to charge your smartphones and other devices. This tool is also suitable for AC power appliance such as a table fan. This device is also very simple to use. When the batteries are dead, the application or the LCD display will notify the user to charge them. To charge those batteries, simply connect the solar panels to the batteries and place the solar panels under the sunlight. After few hours later the tools is ready to be used again.

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

We created this tool to provide the convenience of all users in doing their daily work no matter where they are. With this portable battery power generator it facilitates those who are experiencing electrical power problems. It also does not produce any noise. Not only that, it makes it easier for those who like to do picnic activities in the jungle or those who love to travel out of the country. To find out the level of the battery, we can check on the phone or the electronic device that has bluetooth because at this generator there is a bluetooth that can send the signal to the user if the battery level is low or almost full when charged. It also contains LCD display to know the time and the battery level.

1.2 BACKGROUND PROJECT

Energy resources have become an importance when we are out for outdoor activities. If it rains, camp fires will die out and torch light batteries usually do not last long. Besides that, hawkers from the night market also rely on generators to provide light. The world is full of alternative energies such as the heat from the sun, wind and hydro power. These energies can be harness to reduce relying totally on the supplied electricity. Moreover, some of the electrical devices and home lightings use only little power. Harnessing the natural energies can save money paid for the electricity and help to save our world. Hence the purpose of this project is to design a fully automated low cost power generation system that will harness solar energy and then convert it into electrical energy to power some of the electrical devices at home and for outdoor lighting.

An additional feature is the solar tracking method of the panel which can maximize the energy harnessed. The system will also include a backup battery which will store the extra charge giving the system to provide longer energy supply. The cost for the project will be emphasizing on low cost to produce so that it will be affordable to be installed for every home. Moreover, the design of the low cost mobile power generator will be convenient to be carried around to places where availability for electricity is an issue.

1.3 PROBLEM STATEMENT

In this modern days, everybody needs electricity in their daily life. So we had done some survey to find out the problems faced by daily consumers of an old generator.

a) Old generators produces loud

-Hawkers in the night market often have to deal with the noise of the generator when it comes to talking to a customer. They have to use a high pitch voice to communicate with their customers.

b) Cost of using petrol

-Old generator uses petrol to produce electricity. The price of the petrol is also not in a stable mode which worries the consumers. Moreover, burning of fuel in the generator produces unhealthy gas which may spoils the food.

c) Outdoor activities

-For those who goes for camping or picnics does not have a power supply to charge or use their electrical appliance. Some which prefers to stay in the jungle needs electric to power their lamps at night.

1.4 OBJECTIVE RESEARCH

The objective of this tool is created are listed in the below. The main purpose of developing this project is to create an environmentally friendly product to all consumers.

- a) To design and construct a tool which does not make any loud sound and irritates other customers.
- b) To develop a tool that does not uses petrol to produce electricity and in the same time reduces cost of petrol.
- c) Able to bring this tools anywhere such as for camping and picnic

1.5 QUESTION RESEARCH

The research questions are as follows:

- i. Does this project produce noise?
- ii. Does this project use fuel such as gasoline?
- iii. Is this project easy to carry anywhere?

1.6 SCOPE OF THE RESEARCH

This scope comprises of public, schools and institutions of higher learning in Malaysia.

1.7 THE IMPORTANT OF RESEARCH

Nowadays, electricity is very important to do daily work. With this project, it can make it easier for us to do our daily work when having problems with power outages. In addition, this project will protect the environment around not using oil to turn it on.

1.8 DEFINITION OF OPERATION / TERM

Environment: In this research, the environment refers to the care of the environment this project can reduce environmental pollution. For example, solar energy is used to power and to charge this project. Also, no carbon dioxide gas release when using it. In addition, this project does not interfere with the environment

1.9 CHAPTER SUMMARY

The summary of this chapter summarizes the main sub-sections that have been presented in Chapter 1 as an introduction, background, problem statement, research objective, research question, the scope of the study, the importance of research and definition of operation/ term. With this sub-sections it can assist in furthering the study in the next chapter

CHAPTER 2

LITERATURE RESEARCH

2.1 CHAPTER INTRODUCTION

Literature review is a study about the project and this chapter covers the fundamental concepts of Portable Solar Generator (PSG) and the fundamentals of PSG applied to concentration.

It involves all the aspect which can be linked to the project or research which is available in outside world. The research is not mainly focus directly to research which is already performed but also focused on fact research and references of studies. The source and information can be available from internet, library, and also from a person who has high knowledge about the research. This research is important because it resemble the starting point to creating, upgrade and producing a quality research which have trustable result obtained.

From past research that had been done, lot of knowledge can be obtained such as the equipment needs to be used, type of disadvantages can be expected, the basic knowledge need to master to run the experiment and the expected result to be obtained. This will help to reduce the time and cost used for performs of the research.

2.2 CONCEPT / THEORY

Solar energy is the light and radiant heat from the Sun that influences Earth's climate and weather and sustains life. Solar power is sometimes used as a synonym for solar energy or more specifically to refer to electricity generated from solar radiation. Solar radiation is secondary resources like as wind and wave power, hydroelectricity and biomass account for most of the available flow of renewable energy on Earth. Solar energy technologies can provide electrical generation by heat engine or photovoltaic means, space heating and cooling in active and passive solar buildings, potable water via distillation and disinfection, day lighting, hot water, thermal energy for cooking, and high temperature process heat for industrial purposes.

2.3 PREVIOUS RESEARCH

Solar Energy

Solar energy is radiant light and heat from the Sun that is harnessed using a range of ever-evolving technologies such as solar heating, photovoltaics, solar thermal energy, solar architecture, molten salt power plants and artificial photosynthesis. The conversion of sunlight into electricity, either directly using photovoltaics (PV), or indirectly using concentrated solar power (CSP). CSP systems use lenses or mirrors and tracking systems to focus a large area of sunlight into a small beam. PV converts light into electric current using the photoelectric effect. Solar power is anticipated to become the world's largest source of electricity by 2050, with solar photovoltaics and concentrated solar power contributing 16 and 11 percent to the global overall consumption, respectively. In 2016, after another year of rapid growth, solar generated 1.3% of global power.

Photovoltaics

In the last two decades, photovoltaics (PV), also known as solar PV, has evolved from a pure niche market of small scale applications towards becoming a mainstream electricity source. A solar cell is a device that converts light directly into electricity using the photoelectric effect. The first solar cell was constructed by Charles Fritts in the 1880s. In 1931 a German engineer, Dr Bruno Lange, developed a photo cell using silver selenide in place of copper oxide. Although the prototype selenium cells converted less than 1% of incident light into electricity, both Ernst Werner von Siemens and James Clerk Maxwell recognized the importance of this discovery. Following the work of Russell Ohl in the 1940s, researchers Gerald Pearson, Calvin Fuller and Daryl Chapin created the crystalline silicon solar cell in 1954. These early solar cells cost 286 USD/watt and reached efficiencies of 4.5–6%. By 2012 available efficiencies exceeded

20%, and the maximum efficiency of research photovoltaics was in excess of 40%.

Concentrated Solar Power

Concentrating Solar Power (CSP) systems use lenses or mirrors and tracking systems to focus a large area of sunlight into a small beam. The concentrated heat is then used as a heat source for a conventional power plant. A wide range of concentrating technologies exists; the most developed are the parabolic trough, the concentrating linear fresnel reflector, the Stirling dish and the solar power tower. Various techniques are used to track the Sun and focus light. In all of these systems a working fluid is heated by the concentrated sunlight, and is then used for power generation or energy storage.

2.4 CHAPTER SUMMARY

The summary of this chapter is about concept of Portable Solar Generator (PSG) and the fundamentals of PSG applied to concentration. This research is important because it resemble the starting point to creating, upgrade and producing a quality research which have trustable result obtained. This research will help to reduce the time and cost used for performs of the research.

CHAPTER 3

METHODOLOGY RESEARCH

3.1 CHAPTER INTRODUCTION

Methodology is a set of methods used to conduct research on a particular subject of study. Therefore, this section will discuss the study design, data collection methods, research instruments, sampling techniques and data analysis methods in order to produce evidence that can support a study. Methodology describes how a problem is studied and why a particular method and technique is used. The purpose of the methodology is to help better understand the application of the method by providing a description of the research process.

3.2 RESEARCH DESIGN

This research will be conducted using quantitative methods

3.3 METHOD OF DATA COLLECTION

Data collection is the most important process in any study. Therefore, quantitative methods were selected for data collection using questionnaire. The questionnaire was distributed to respondents online. During the course of the study, various responses were received from the respondents. This feedback is very useful in this study.

3.4 INSTRUMENT RESEARCH

An instrument is a tool for collecting the required data to answer a given research question. The research instrument is required to delve into concepts related to attitudes, perceptions, background information and all primary or secondary sources. In this study the instrument used to obtain the data was using the questionnaire form.

3.5 SAMPLING TECHNIQUES

This section briefly describes the sampling techniques to be used in the study to be conducted. Sampling allows for inference to be made on a population without having to involve every individual in the population. If a sample is used for data collection, it is important for researchers to try to ensure that the selected respondents accurately represent the population.

The sampling technique used is purposive sampling. This technique is popular in qualitative research. Researchers specify specific information or features that need to be included in the sample. Researchers make judgments based on the knowledge and purpose of the study in selecting the sample.

3.6 METHOD OF DATA ANALYSIS

The data and information obtained will be analyzed and processed to draw conclusions and solutions to the research conducted. This data and information will also be analyzed for the relevance of the data as well as the comparison between the data obtained.

The data obtained were analyzed using Frequency Analysis and Average Index. The results of the analyzed data are further illustrated in pie charts to facilitate the reader's understanding of the conclusions and conclusions of the study.

3.7 CHAPTER SUMMARY

At the end of this chapter, the sub-sections presented in chapter 3 are as chapter introduction, research design, data collection method, research instrument, sampling technique and data analysis method. This sub-sections can assist in conducting research and in addressing research issues.

CHAPTER 4

RESULT

4.1 CHAPTER INTRODUCTION

In this chapter will show the results that we gain from making this project. Moreover we will also show the data of feedback rate that we took from our survey upon consumers such as students of polytechnic, night market hawkers, and residents. Further more we had also tested our project many times and came up with a better result and our project works perfectly and it is suitable for any occasion.

4.2 FEEDBACK RATE

After we had completed our project we put the battery power generator to a test. We test our project by using it in the night market for the hawkers light up their stall with the portable generator. As a result the consumers are quiet happy and satisfied with this technology. They also said that this would help them reduce the cost for the old noisy generator.

Secondly, we put our project to the test in our polytechnic itself. We test our portable generator during the camping in the forest whereby our uniformed unit joins their camping trip to the forest. We finally had a good feedback from our students where the portable generator helped them in a way where they need electricity to charge up their electronic equipment when they needed.

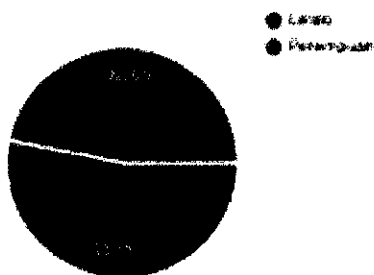
4.3 FINDINGS

Borang soal selidik (Portable Battery Powered Generator)

32 responses

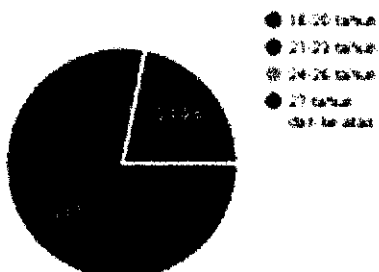
Jantina

32 responses



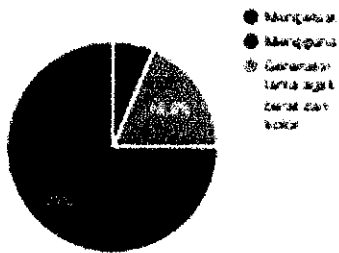
Umur

32 responses



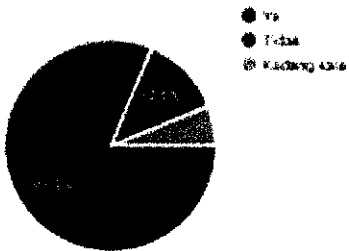
Apakah masalah yang anda hadapi sewaktu menggunakan generator lama?

02 Responden



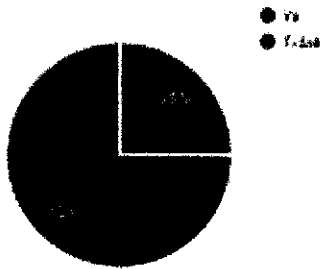
Pemahkah anda menyertai aktiviti luar rumah/ aktiviti perkhemahan /aktiviti berkhelah?

02 Responden



Adakah anda pernah mengalami masalah tiada bekalan elektrik sewaktu kecemasan?

72 Respondents



Apakah masalah yang kerap anda hadapi apabila tiada bekalan elektrik?

72 Respondents

Tidak boleh caj telefon bimbit

Kepanasan

Terputus bekalan elektrik

Over heat

Panas disebabkan tiada angin

Tidak

Sutar unt membuat kerja-kerja perisik seperti belajar

1) Rumah panas

2) Tidak boleh menggunakan peralatan yg perlukan Elektrik

Tidak boleh tidur dengan selesa

Tidak dapat melakukan kerja yang memerlukan elektrik.

Tidak boleh melihat

Menghadapi masalah

Panas Dan tidak boleh menjalankan kegiatan harian dengan mudah

4.4 CHAPTER SUMMARY

The summary of this chapter summarizes the main sub-sections that have been presented in Chapter 4 as a feedback rate and findings. With this sub-sections it can assist in furthering the study in the next chapter

CHAPTER 5

DISCUSSIONS, CONCLUSION AND SUGGESTIONS

5.1 CHAPTER INTRODUCTION

Discussion is an action or process of talking about something in order to reach a decision or to exchange ideas. In this discussion we will talk about our project portable battery power generator. Next, we concluded our project after doing some research and testing. Moreover we would talk about the impact of our project to the consumers that we had gave to test our project. Finally after we had a listen to our supervisors and from our surveys, we came with some suggestions and improvements that we can make to this project.

5.2 DISCUSSION

In discussion, we had created a very useful product that would help solve many problems for those who needed. We had done a many research on old generators and surveys upon our project among consumers. We had also listened to advices and suggestions to improve our project. As a result we had some improvements whereby we installed a Bluetooth device, an Arduino UNO R3, and connect it to application in a smartphone. By doing this we had increase our project quality and its productivity. This system helps the consumer to know the information of the generator through an application. Finally we receive a good feedback and our portable battery power generator has been a success.

5.3 CONCLUSION

In the end of this project, we have developed and upgraded an equipment that would provide an emergency electricity to those who needed. We also learnt how to create and apply a software system into our project such as Arduino. Moreover we also had a great opportunity to gain experience by using our knowledge and studies in developing this project.

5.4 IMPLICATIONS OF THE STUDY

- i. Created an environmentally friendly product to all consumers
- ii. Reduce the usage of petrol
- iii. Helps many people to get electricity during emergencies

5.5 SUGGESTION

We improved our project by applying software system such as an Arduino Uno which connects with a bluetooth device to send any information about the battery to our mobile phone through an application. Moreover we also fixed an dc to ac inverter to our project so that consumers are able to use any electronic devices that need an ac voltage.

- i. Create something lighter and more capacity
- ii. Upgrade our project into wireless charging
- iii. Make our project easy to carry every where

5.6 CHAPTER SUMMARY

At the end of this chapter, the sub-sections presented in chapter 5 are as chapter introduction, discussion, conclusion, implication of study and suggestions. With this sub-sections we would conclude and end our report for this portable battery generator.

REFERENCE

- i. Thomas Roy Crompton, Thomas P. J. Crompton Newnes, 25 May 2000(Battery Reference Book)
- ii. Massimo Banzi ,Maker Media, Inc., 6 Sep 2011(Getting Started with Arduino)
- iii. Albert S. Huang, Larry Rudolph(Bluetooth Essentials for Programmers)

ATTACHMENT

GANIT CHART

AKTIVIT PROJEK	MINGGU	LW	LW	LW	LW	LW	LW	LW	LW	LW	LW	LW	LW	LW	LW	LW
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
PEMBENTANGAN PERKEMBANGAN PROJEK AKHIR																
PERSEDIAAN FINAL REPORT																
MENGHASILKAN PROJEK																
UJILARI																
UJILARI																
PEMBENTANGAN PROJEK AKHIR BERSAMA SUPERVISOR																
PENULSAN REPORT																
PERSEDIAAN PERTANDINGAN AKHIR																
PERTANDINGAN PROJEK AKHIR																

ATTACHMENT 2- PROGRAMMING

```
#include <Wire.h> // Comes with Arduino IDE
#include <LiquidCrystal_I2C.h>

#include <SoftwareSerial.h>

LiquidCrystal_I2C lcd(0x27, 2, 1, 0, 4, 5, 6, 7, 3, POSITIVE); // Set the LCD
I2C address

float Sens1;
float Sens2;
float Voltage,Bat,Solar;
int Sens1Pin = 0;
int Sens2Pin = 1;
int MODE=0;//auto
float Percentage=0;

void setup() {

  Serial.begin(9600);

  lcd.begin(16, 2);

  lcd.setCursor(0, 0);
  lcd.print("  WELCOME");

  delay(3000);

  // reserve 200 bytes for the inputString:
  lcd.clear();
  lcd.setCursor(0, 0);
  lcd.print(" WELCOME..");

  delay(3000);
}

void loop() {
```

```
Sens2 = analogRead(A0); //read the value from the sensor
Sens2= (5.0 * Sens2)/1024.0; //convert the analog data to moisture level
Bat=Sens2*4;
```

```
lcd.clear();
lcd.setCursor(0, 0);
```

```
lcd.print("Bat:");
lcd.print(Bat,1);
Percentage=( 2-(6-Bat))/2*100;
if (Percentage<0){
  Percentage=0;
}
if (Percentage>100){
  Percentage=100;
}
lcd.print(" ");
```

```
lcd.print(Percentage,0);
```

```
lcd.print("%");
```

```
Serial.println(Bat,1);
delay(150);
```

```
}
```

ATTACHMENT 3- PICTURE OF PROJECT

