

**PERFORMANCE EVALUATION OF SUSTAINABLE ELECTROLYTE FOR  
ENERGY STORAGE DEVICE**

This project is presented in partial fulfilment for the award of the

**BACHELOR OF ENGINEERING (HONS)**

**ELECTRICAL ENGINEERING**

**FACULTY OF ELECTRICAL ENGINEERING**

**UNIVERSITI TEKNOLOGI MARA**



**AZFAR BIN AZNI**

**FACULTY OF ELECTRICAL ENGINEERING**

**UNIVERSITI TEKNOLOGI MARA**

**40450 SHAH ALAM**

## **ACKNOWLEDGEMENT**

First, I would like to thank Allah, the most beneficent and the most merciful for allowing me to complete this task.

Next, I would also like to use the opportunity to express the gratitude to my project supervisor, Madam Zuriati Janin, to all of my lecturers for the aspiring guidance and teaching in order for me to stand and achieve the success in completing final year project and my study.

Not to forget, a sincere grateful to my beloved parent, my wonderful family and friends who always been and hopefully will always be supporting and encouraging me in whatever task undertaken by me.

Thank You.

## **ABSTRACT**

This paper presents a study on the performance of the sustainable electrolyte for energy storage device. Two different combinations of soil and liquid are analyzed to determine the capacity of energy storage and power density capability. The results reveal that a combination of normal soil and sea water gives highest capacity storage of 2.24Volt as compared to a combination of burnt soil and seawater, which gives capacity storage of 2.19Volt.

## TABLE OF CONTENTS

SUPERVISOR’S APPROVAL .....	i
CANDIDATE’S DECLARATION .....	ii
Acknowledgement .....	iii
Abstract .....	iv
TABLE OF CONTENTS .....	v
LIST OF FIGURES .....	1
LIST OF TABLE .....	2
Chapter 1 .....	3
INTRODUCTION .....	3
1.1 Overview .....	3
1.2 Problem Statement .....	3
1.3 Objective of Study .....	4
1.4 Scope of Study .....	4
Chapter 2 .....	5
LITERATURE REVIEW .....	5
2.1 Electrolyte System .....	5
2.2 Electrical Resistivity And Ohm’s Law .....	5
2.3 Electrical Conductivity .....	6
2.4 Energy and Power Density .....	7
2.5 Microbial Fuel Cells .....	8
2.6 Stack of Serially-Connected Microbial Fuel Cells .....	9
2.7 Anode And Cathode Reaction .....	10

# **CHAPTER 1**

## **INTRODUCTION**

### **1.1 OVERVIEW**

A battery is an electrochemical device that has the ability to supply an electrical energy to a diverse range of applications. The basic structure of this energy storage includes an anode, a cathode, an electrolyte, separators and the outer case. In general, the type of electrode used and electrolyte determines the specific characteristics of batteries.

### **1.2 PROBLEM STATEMENT**

Nowadays, battery technologies have been surpassed by the forever-increasing power demands of new applications. A battery that can systematically store and deliver power on demand in stand-alone power plants as well as load leveling of the electrical grid in the integrated systems are playing a crucial role in renewable energy power resources field. The efficacy of batteries is generally directly related to their content in energy efficiency and lifetime.

More over natural disaster is one thing we do not want. As human beings can only predict but do not know the scale of it is going to hit. In Malaysia, the biggest disaster that ever happened was flooded. Floods caused by heavy rain for a long period of time without interruption. During flooding, all resources in the field of victims had to be cut include electricity. Electricity comes from a variety of sources such as hydro power, thermal and gas. Apart from that, we also can use other resources for small generators using natural resources such as solar energy, wind, and soil. During the flood season natural energy still to be found, but for solar and wind energy equipment requires large and numerous and high costs. For the soil the equipment also small and low cost. Furthermore soil also readily available everywhere. This project was conducted to provide a supply of low voltage supply like a battery for small loads such as small lamps and fans. In this modern era,