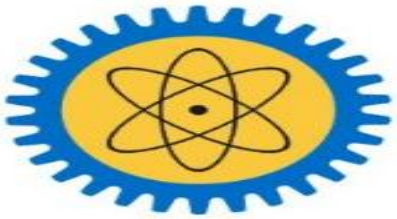

BUSITEMA UNIVERSITY

FACULTY OF ENGINEERING

DEPARTMENT OF WATER RESOURCES AND MINING ENGINEERING

WATER RESOURCES ENGINEERING PROGRAMME

FINAL YEAR PROJECT

DESIGN AND CONSTRUCTION OF A GALVANIC WATER BATTERY AS A LOW COST POWER ALTERNATIVE FOR RURAL LIGHTING

BY

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ABSTRACT

A reliable light energy system is a basic need for every man's welfare in the rural areas. Available energy sources are unaffordable and unreliable for the people in rural areas for instance hydropower electricity and the solar lighting systems. Hence making rural people resort to local harmful means.

The purpose of the study was to develop a low power cost galvanic water powered battery to enhance lighting and charging of phones in the rural areas to enhance a good life in the rural areas.

The study objectives were to design the components of the galvanic water battery, construct a prototype, test for the performance of the prototype and carry out an economic evaluation of the lighting system. These were done and achieved by using the knowledge of engineering drawing to come up with the sketches of the drawings for the design. Measurements were done using ruler and tape measure to come up with the required material sizes and dimensions from which the construction was done and they included joining through gluing and tightening of the wires

The study was limited to designing, constructing, testing for the performance, and economic evaluation of galvanic water battery. The tests carried out were voltage test, current test and the on load test for the lighting and charging system. Results for testing were tabulated for different times interval in minutes to evaluate the performance of the galvanic battery. Discussion, conclusion and recommendations were derived from the testing results and finally an economic analysis of the system.

This technology has implication on the recovery of the power crisis in rural and remote areas where the national electricity supply is inaccessible. This approach is also convenient for portable use of electricity in household purposes.

Contents

List of table iv

ACKNOWLEDGEMENT vi

DECLARATION vii

APPROVAL viii

CHAPTER ONE: INTRODUCTION 1

1.1Background 1

1.2 Problem statement 3

1.3 Purpose of the study 3

1.4 Justification 3

1.5 Objectives 3

1.5.1 Main objective 3

1.5.2 Specific objective 3

1.6 Scope 4

2.1.1 Types of cells: 5

2.1.2 Types of processes 8

2.2 processes in an electrolysis 8

2.3 Half-cell reaction of water and brine 8

2.4 Cell potential 9

2.5 Electrodes 9

2.5.1 Electrode materials 9

2.5.2 Electrical conductivity 10

2.6 Lighting systems 12

Indoor Lighting 12

CHAPTER THREE: METHODS AND METHODOLOGY 14

3.0 System description 14

3.1 Data collection methods 14

3.1.1 Materials and equipment 15

3.2 SPECIFIC OBJECTIVE ONE: DESIGNING THE GALVANIC WATER POWERED LIGHTING SYSTEM 15

3.2.1 Functional requirements considered 15

3.2.2 Non-functional analysis 15

3.2.3 Design of the cell 15

3.3 SPECIFIC OBJECTIVE TWO: CONSTRUCTION OF THE GALVANIC WATER BATTERY. 21
3.2.1 Criteria for Selection of materials for the prototype 21
3.2.2 Tools used to assemble the components; 22
3.2.3 Construction procedures 22
3.4 SPECIFIC OBJECTIVE THREE: TESTING THE PERFORMANCE OF THE SYSTEM 22
3.4.1 Procedures 22
3.4.2 Batch experiment 23
3.5 SPECIFIC OBJECTIVE FOUR: ECONOMIC ANALYSIS 23
CHAPTER FOUR: RESULTS AND DISCUSSIONS 24
4.1 ANODE 24
4.2 Cathode design. 24
4.3 Anode design 25
4.4 Electrolyte 26
4.5 Concentration selection 26
4.5.1 Borehole water 26
5.2.3 Rainwater 27
4.6 Electrolyte delivery 29
4.7 Housing of the cell 31
4.7 Summary of the results 32
4.8 Construction of the system 32
4.8 Performance test 33
4.8.1 Lighting 33
4.8.2 Charging 35
4.9 Batch test 36
4.9.1 ECONOMIC ANALYSIS 37
CHAPTER FIVE: CONCLUSION AND RECOMMENDATION 40
5.0 Conclusions and Recommendations 40
5.1 Conclusions 40
5.2 Recommendations 40
REFERENCES 41

List of table

Table 1: Materials of construction and their uses.....21
Table 2: showing the variation of voltage, current and power at different salt concentration using borehole water......26
Table 3: Showing the variation of voltage, current and power at different salt concentration using rain water.....27
Table 4: Showing the E^o calculation.....30
Table 5: Showing the summary of results 32
Table 6: Showing the variation of voltage, current and power when the system is lighting a bulb......33
Table 7: Showing the variation of voltage, current and power when the system is charging a phone..35
Table 8: showing variation of current, voltage and power when using potassium hydroxide as electrolyte when it's lighting a bulb 36
Table 9: Costing of the galvanic water battery system.....37

DEDICATION

I dedicate this report to my beloved parents **Mr. Ocitti John** and **Mrs. Acan Stella Ocitti** whose love and guidance have given me a great appreciation for knowledge, hard work and personal excellence.

I also dedicate it to my **Aunt Abalo Grace** and **Mr. Ivan Opiyo** whose mentor and guidance inspires me to become a self-built well established person in life.

And above all to God Almighty

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May the Almighty God bless you all.

DECLARATION

I **ABER HOPE MERCY** declare that the work presented in this project proposal is as a result of my own research and has never been submitted to any institution of higher learning for any award whatsoever.

Signature……

Date……

APPROVAL

This proposal on the assessing the efficiency of a galvanic water battery as a low cost power alternative for rural lighting has been written under the supervision of;

Main supervisor

Mr. Maseruka S Bendicto

Signature ……..……

Date……..

Co supervisor

Mr. Wangi Godfrey Mario

Signature…….

Date…….

CHAPTER ONE: INTRODUCTION

1.1Background

A reliable energy source is an essential component of any modern human society, yet roughly 23% of the world's population is currently experiencing energy poverty. According to a report issued by the United Nations, 1.6 billion of the 7.1 billion people in the world had no access to electricity as of 2010, the vast majority of who live in developing countries or regions.(Linder, Linder and Erlich, 2012)

550 million people in Africa and 400 million people in India still live in the dark. The current pace of electrification would have to double in order to achieve universal energy access by the year of 2030.(Linder, Linder and Erlich, 2012)

Uganda's electricity access was 9% compared to Kenya (15%) and Tanzania (11.5%) in 2008. The access in the urban areas in Uganda was 39% as compared to 3% in the rural areas where 88% of the population lives. Inaccessibility to electricity has slowed down socio-economic development and led to high dependence on wood fuel. 97% of Ugandan households (Uganda Population and Housing Census, 2002) depend on wood fuel and this has led to loss of forest cover whose annual cost is estimated at US$ 3-6 million(Abdallah, Zain and Sopin, 2014)

Uganda relies solely on hydropower for energy production needed for all socio-economic activities. The current installed capacity of only 260MW is grossly inadequate to meet the national demands. The current low level of economic development in Uganda is partly attributed to the inadequate power.(Abdallah, Zain and Sopin, 2014)

The Government of Uganda (GoU), recognizing the importance of electricity in improving the welfare of people and saving the environment, implemented structural reforms which were in line with the Millennium Development Goals (MDG's) and the Poverty Eradication Action Plan (PEAP) to reduce poverty. The Rural Electrification Agency (REA) was established to spearhead the implementation of the rural electrification program which was aimed at ensuring equitable regional distribution of electricity and increasing rural electricity access from 1% in 1999 to 10% by the year 2012. In order to implement this program, the GoU and development partners spent Shs 197 billion in the financial years 2006/07- 2009/10 on the rural electrification program.(Statistics, 2014)

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