Faculty of Engineering

PREPAID ENERGY METER SYSTEM

(ANDROID APPLICATION)

Aurereas Tan Kheng Tzeh

Bachelor of Engineering (Hons) in Electronics (Computer)

2018

UNIVERSITI MALAYSIA SARAWAK

Grade: _____

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Final Year Project Report	√
Masters	
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PREPAID ENERGY METER SYSTEM
(ANDROID APPLICATION)

AUREREAS TAN KHENG TZEH

A dissertation is submitted as partial fulfilment of the
requirement for the Bachelor of Engineering (Hons)
in Electronics (Computer)

Faculty of Engineering
Universiti Malaysia Sarawak

2018

The Final Year Project (FYP) attached here:

Title : Prepaid Energy Meter System (Android Application)

Student Name : Aurereas Tan Kheng Tzeh

Matric. No : 46361

has been approved by:

_____ _____

DR. NORDIANA RAJAEE Date

(Supervisor)

To my beloved family and friends

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ABSTRACT

Prepaid Energy Meter System is a system which will improve cost management, reduces billing problems and improve accuracy in taking meter readings. This project introduces a design whereby the system is used to reload a certain amount into a particular account and this credit is used to generate electricity for everyday usage. This system also served as monitory system to manage the flow of electricity. Android Studio is used as the software to design and build the Graphical User Interface (GUI) of this whole system. The basic idea of this system is "use as you pay" which means that consumers will have to pay or top-up first before they can use the electricity. Electricity will be generated based on the amount that the consumers reloaded. When the credit reaches zero, electricity will be cut off until the consumer top-up or reload a new credit. Consumers can choose whether to reload RM10.00 or RM20.00 depending on their own personal preferences.

ABSTRAK

Sistem Meter Tenaga Prabayar adalah sistem baru yang akan membantu dalam pengurusan kos, mengurangkan masalah pengebilan dan mengurangkan ketidaktepatan dalam mengambil bacaan meter. Kertas projek ini memperkenalkan satu rekabentuk di mana sistem itu digunakan untuk memuatkan sejumlah kredit ke dalam akaun tertentu dan kredit ini akan digunakan untuk menjana elektrik bagi penggunaan seharian. Sistem ini juga digunakan untuk memantau serta menguruskan aliran elektrik. Android Studio digunakan sebagai perisian untuk mereka bentuk dan membina Antaramuka Pengguna Grafik (GUI) sistem ini. Idea asas sistem ini adalah berdasarkan "gunakan sebanyak yang anda bayar" yang bermaksud pengguna perlu membayar atau memuat kredit terlebih dahulu sebelum mereka dapat menggunakan elektrik. Elektrik akan dijana berdasarkan jumlah yang dimuatkan oleh pengguna. Apabila semua kredit habis digunakan, tenaga elektrik akan dipotong sehingga pengguna memuatkan semula kredit. Pengguna boleh memilih sama ada untuk memuat RM10.00 atau RM20.00 bergantung pada pilihan peribadi mereka sendiri.

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LIST OF ABBREVIATIONS

AVD	-	Android Virtual Device
DBMS	-	Database Management System
GUI	-	Graphical User Interface
PEMS	-	Prepaid Energy Meter System
RM	-	Ringgit Malaysia
SEB	-	Sarawak Energy Berhad
TNB	-	Tenaga Nasional Berhad
XAMPP	-	Cross-Platform (X), Apache (A), MariaDB (M), PHP (P) and Perl (P)

LIST OF SYMBOLS

E	-	Energy
Hz	-	Hertz
H	-	Hour
J	-	Joule
kWh	-	Kilo-Watt-Hour
M	-	Meter
P	-	Power
W	-	Watt

CHAPTER 1

INTRODUCTION

1.1 Introduction

Nowadays, the concern about the electric efficiency and power saving has been the main topic among citizens and this is also due to the increase in the electric billing. For this reason, people nowadays are looking for a better solution rather than the conventional postpaid energy meter. The conventional postpaid energy meter enables the users to use as much electricity as they wanted to and a billing statement will be issued at the end of a month. This method of electricity billing is not very efficient as users have little control over the amount of electricity that they used because it is very hard to keep track of the energy consumption.

With this enormous disadvantage of conventional postpaid energy meter, there comes another alternative method which is called the prepaid energy meter. A prepaid energy meter works by providing the target amount by the users themselves at the beginning of the month or they can have the option to actually top-up any amount anytime within a month so as to use the electricity.

In the prepaid energy meter system, electricity will only be supplied once there is available amount in a particular account. Once the available amount is used off, the electricity will automatically be cut off until users have top-up new amount or else the electricity will remain blocked.

With this prepaid energy meter, users will also be able to control the use of electricity in their houses remotely. For example, if a particular user is often travelling, he or she will be able to control when they want to switch on the air-conditionals or refrigerators so that they can have a comfortable and cosy environment the moment they reach home. All of this is made possible with the use of mobile android application.

A prepaid energy meter system is designed to control the amount of electricity used based on the requirements of the users themselves. This facility is certainly useful when users are really in need to control the amount of electricity they used in order to prevent unwanted wastage and to promote energy efficient environment.

However prepaid energy meter systems are still not widely accepted by the crowds as they need time to shift from a conventional energy meter and there is not much exposure and awareness about prepaid energy meter systems. Furthermore, it is quite costly to fully implement prepaid energy meter systems in a building or housing areas as it requires multiple supporting tools such as the internet connections.

1.2 Problem statements

Although conventional energy meters are very convenient to implement and are widely accepted by the crowds, they have numerous limitations and weaknesses. Some of the problems are common while some others are unique and often ignored by citizens. The limitations and weaknesses are as follows.

- The rise of human errors due to manual reading of the energy meter for billing purposes
- The delay in issuing of bills due to lack of man-powers or the increase in housing areas which caused the high demands of man-powers
- Lack of maintenance which caused the inaccurate measurements and unexpected wastages
- Over charges by the local electricity suppliers
- Illegal usage electricity or electric thefts

1.3 Objectives

The objectives of this project are stated as follows.

- To develop a new prepaid meter design (Android application)
- To promote energy efficient environment and power saving
- To provide a more convenient payment options to users

1.4 Scopes

The scope of this project is to design a functional Android application for a prepaid meter system utilizing. This Android application will collaborate with Sarawak Energy Berhad (SEB) in the future for commercialized implementations.

To design a fully functional prepaid energy meter system, there are a few stages which are described as follows.

First Stage:

Design and Planning of Layout for the Graphical User Interface (GUI) of the energy meter system.

Second Stage:

Development of the prepaid energy meter system using Android Studio which involves a series of programming and linkages of one features to another.

Third Stage:

Connectivity of prepaid energy meter system whereby the user will be able to perform reload, check balance amount, energy consumption etc.

1.5 Expected Outcomes

Prepaid energy meter system is expected to replace conventional energy meter system in near future. This is because prepaid energy meter system offers numerous advantages which are typically not found in conventional energy meter system. With this system, users or consumers have the ability to control the amount of electricity that runs through their houses or buildings. The controlling abilities are more visible in this prepaid meter system as compared to conventional energy meter.

1.6 Chapter Outlines

Chapter 1: Introduction

This chapter introduces the basic knowledge or the background about the topic of this whole project which is the prepaid energy meter. Problem statements, objectives, scopes and expected outcomes are also found in this chapter.

Chapter 2: Literature Review

A review of past researches by researchers from around the world are found in this chapter. A detailed description about different research aspects such as prepaid, postpaid, monitoring systems can also found in this chapter.

Chapter 3: Methodology

This chapter introduces various methods used to complete this whole project. Flow-charts and software tools utilized are also included in this chapter.

Chapter 4: Results and Discussions

In this chapter, the results of the project are presented in details, together with the discussions on problems encountered throughout this project.

Chapter 5: Conclusions and Recommendations

The overall summary about the whole project is concluded in this chapter. Further recommendations for improvement are also mentioned in this chapter.

1.7 Summary

In conclusion, this chapter introduces the general ideas and give readers an opening idea to understand the basic knowledge before proceeding to the actual development. Problem statements and addresses the current problem and issues and in a way it also acted as the hypothesis of this research project. Objectives highlights the main purpose of this research paper and how the newly application can help to overcome the current problems.