

**BUSITEMA UNIVERSITY
FACULTY OF ENGINEERING
DEPARTMENT OF COMPUTER ENGINEERING**

**A PREPAID BILLING ELECTRIC POWER UNIT SHARING AND
BORROWING SYSTEM**

BY

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Engineering in partial fulfillment for the award of Computer Engineering
Degree of Busitema University**

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DECLARATION

I, Kibego Gilbert do hereby declare that this Project Report is original and has not been submitted for any other degree award to any other university before.

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LIST OF ACRONYMS

CEPT	Conference of European Posts and Telegraphs
WENRECO	West Nile Rural Electrification Company
UBOS	Uganda Bureau of Statistics
MW	Megawatts
GWh	GigaWattHour
UMEME	UMEME Ltd
KWh	Kilowatt-hours
M2M	Machine to Machine
IOT	Internet of Things
ETSI	European Telecommunication Standards Institute
GSM	Global Systems for Mobile Communication
AMPS	Advanced Mobile Phone System
TACS	Total Access Communication System
POTS	Plain Old Telephone Service
ISDN	Integrated Services Digital Network
PSDN	Packet Switched Public Data Networks
CSDN	Circuit Switched Public Data Networks
ITU-T	International Telecommunication Union for standardizations in Telecommunication
SMS	Short Message Service
SMSC	Short Message Service Center

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ABSTRACT

An electrical utility industry is the major provider of energy in most of the countries all over the world. Electricity is one of the key elements for a developing country like Uganda. It is used in factories, commercial establishments, homes and also during recreational activities. The absence or lack of electricity can not only lead to inconveniences but also to a very high economic loss to the country both directly and indirectly.

Despite the existing prepaid electric power billing systems in Uganda, there was a need for a system that allows sharing of electric power units between customers or the access of power units through borrowing from these power utility companies in a safe and secure way at no extra cost.

The main objective of this project was to design and implement a prepaid billing electric power unit sharing system that enables customers of electric power distribution companies that use prepaid billing systems to share electric units amongst themselves using the system and also borrow units from the system. The system is able to authenticate the customer through a secure Personal Identification Number (PIN), after which he/she is given an interface based on a menu to navigate the functionality of the system. The menu provides options for sharing units, borrowing units, resetting the PIN and contacting the electric power distribution company via a text message.

One of these options such as sharing is used to send units via an SMS text message through a GSM module to the customer who makes the request. The SMS text contains a fourteen digit token that is used to increment the units of this customer on input. The borrowing option helps a user to initiate an auto increment of specified customer units to the system that makes the request.

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CHAPTER: ONE

1.0 INTRODUCTION:

An electrical utility industry is the major provider of energy in most of the countries all over the world. Electricity is one of the key elements for a developing country like Uganda. It is used in factories, commercial establishments, homes and also during recreational activities. The absence or lack of electricity can not only lead to inconveniences but also to a very high economic loss to the country both directly and indirectly. This chapter seeks to explain the relevance of the system in the economic development of Uganda.

1.1 BACKGROUND:

[1] Uganda generates electricity from hydroelectric power stations located at Nalubaale, Bujagali and Kiira Power Stations (formally Owen falls dam) in Jinja. In addition, there are thermal, mini and micro-hydro power stations located in the country which either contribute to the national power grid or directly serve specific communities and individuals. These include Kisiizi Hospital mini Hydro power plant, Kihiki generation plant for thermal power, and the West Nile Rural Electrification Company (WENRECO) thermal plant among others.

According to the Statistical Report, by the Uganda Bureau of Statistics, the total installed capacity of electricity power plants increased by 4.8 percent from 827.5 MW in 2013 to 867.0 MW in 2014. This was due to a 0.5 percent increase in the installed capacity of hydro electricity from 691.5MW in 2013 to 695.0 MW in 2014 and a 36.0 percent increase in the installed capacity of Thermal electricity from 100 MW in 2013 to 136 MW in 2014[1][2].

The total units of electricity sold by Uganda Electricity Transmission Company increased by 5.7 percent from 2,930 GWh in 2013 to 3,098 GWh in 2014 and the total number of UMEME customers increased by 13.2 percent from 574,465 customers in 2013 to 650,573 customers of which 590,677 were domestic customers of which the cost of each unit is UgX 520.6 per KWh for domestic customers which is expensive.

There are a number of electric power distribution companies in Uganda with the largest being UMEME additional but smaller distributional companies include The West Nile Rural Electrification Company (WENRECO) and Ferdult Engineering Services Ltd. In a bid to speed

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