Electricity Meter Service App

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ELECTRICITY METER APP

PROJECT PROPOSAL

UNIVERSITY OF RWANDA | CST

2024

# **DECLARATION**

Hereby declaring that this report is our original work and has not been presented in any institution leading to the award of a degree or any other award.

**Student’s Name Sign**

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NIYOMUBYEYI Angelique ………………..

RURANGWA Kevin ………………..

Date: …. /…. /2024

I confirm that this proposal was written by the above-named students and has been submitted with our approval as supervisor.

Name: Dr. BAMURIGIRE Peace

Sign: ……………………. Date: …/…/2024

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# **List of Abbreviation**

REG: Rwanda Energy Group

**ABSTRACT**

The current manual system for requesting electricity meter services, such as applying for new connections, Maintenance, and replacement through the Rwanda Energy Group (REG) offices presents numerous challenges, including time-consuming processes, limited accessibility, and complex procedures. To address these issues, this project aims to develop a mobile application that allows users to request cash power services online, eliminating the need to physically visit REG offices. The proposed mobile app seeks to streamline the application process, enhance accessibility, and improve overall user experience. By leveraging mobile technology, the project aims to simplify the process of requesting Electricity meter services, reduce paperwork, and expedite service delivery. Through user-centric design and technological innovation, the project aims to revolutionize the way individuals interact with REG, making Electricity meter services more convenient, efficient, and accessible to all.

# **CHAPTER1: GENERAL INTRODUCTION**

## **1.1 Background Introduction**

Rwanda Energy Group (REG) is like the energy manager for Rwanda. It is an organization that is responsible for making sure people in Rwanda have access to electricity and other forms of energy. REG works on generating electricity, distributing it to homes and businesses, and ensuring that the energy supply is reliable and affordable for everyone in the country.

As of January 2024, the cumulative connectivity rate in Rwanda is 75.9% of Rwandan households whereby 54% of all households in Rwanda are connected to the national grid. The number of on-grid connections has grown more than 12 times over the last 20 years[1].

In Rwanda statistics of households having access to Electricity keeps increasing day by day where by September 2023 approximate 2,582,749 households got access to Electricity[2].

## **1.2. Problem statement**

Currently requesting Electricity meter services in Rwanda require individuals to visit the office of REG(Rwanda Energy Group) in person. This manual process presents several challenges and inconveniences for customers.

Firstly, it involves significant time and effort, as individuals need to physically travel to the REG offices, which may be located far from their homes or workplaces.

Secondly, the manual system lacks accessibility, as it may not cater to individuals who are unable to visit the REG offices due to various reasons, such as disability or geographical barriers. Therefore, the process may involve lengthy paperwork and complex procedures, further complicating the application process and delaying the provision of Electricity meter services to customers.

Additionally, manual systems may lead to delay in service requests where the customer may encounter long line on office and even mannual data entry of paperwork. This can result in delays in providing cash power services to customers, leading to dissatisfaction and frustration among users.

Furthermore, as in manual systems sometimes they try to use email for Electricity meter service requests where necessary. After that, their email becomes overloaded of a mixture of several emails with different requests that lead to the delay of response and sometimes never respond to the request.

Therefore, there is a pressing need to transition from the existing manual system to an online platform that enables customers to request Electricity meter services, such as applying for new connections, conveniently and efficiently from the comfort of their homes or workplaces.

## **1.3 Research Question**

1. How can the process of requesting new Electricity meter connections be simplified and made more accessible through a mobile application?
2. What are the key user requirements and preferences that need to be considered in the design and development of a mobile app for requesting Electricity meter services?
3. What technological solutions and functionalities can be implemented within the mobile app to streamline the application process?

## **1.4 Objectives**

### **1.4.1 General Objectives**

Our main objective is to create a Mobile app that consolidates all electricity meter-related services. This includes simplifying processes such as requesting a new connection, replacing meters, maintaining existing meters, and facilitating changes in meter positions.

### **1.4.2. Specific objectives**

* Develop a Mobile application for Electricity meter-related services
* Simplify, easy access and speed up the services
* Improve efficiency and effectiveness of Electricity service in Rwanda.

## **1.5 Hypothesis**

* Our mobile app will eliminate the long queues at electricity offices. With the app, customers can handle meter-related tasks from their smartphones, reducing the need for office visits and streamlining service delivery.
* Accessing electricity meter services will be quick and easy through our mobile app. Customers can manage requests like new connections and meter replacements effortlessly, saving time and effort with a user-friendly interface.
* No more office visits needed! Our mobile app brings electricity meter services to your fingertips wherever you are. From home to work, managing your meters is now convenient and hassle-free, eliminating the need for physical trips to offices.
* Our system will reduce physical space needed for data center(paperwork) through usage of servers and database

# **CHAPTER 2: LITERATURE REVIEW**

Md. Mejbaul Haque et al. [4], have discussed the prepaid electricity metering technique for single phase meter. A relay is used to connect and disconnect the supply when the energy units stored in the controller gets exhausted. In this design, the controller needs to be taken to the server unit to add energy units to it. Thus, the prepaid system is not fully automatic, since the location of recharge is fixed.

Sapna Ganurkar et al. [5] have designed a prepaid energy meter recharge card. A pin is entered on the keypad and then the meter is recharged with a particular amount. In this system a buzzer is used which turns on when balance gets exhausted. The sound of this buzzer is limited to the room or house.

# **CHAPTER 3: MATERIAL AND METHODS**

## **3.1 STUDY SITE**

Our research will be conducted at Rwanda Energy Group(REG). It is an organization that is responsible for making sure people in Rwanda have access to electricity and other forms of energy. REG works on generating electricity, distributing it to homes and businesses, and ensuring that the energy supply is reliable and affordable for everyone in the country.

## **3.2 STUDY DESIGN**

Administration and meter related service employees will be involved in our research activities for providing information about the Electricity meter-related services.

We'll gather all the details you need for different meter services, like how to request a new cash power step by step and what documents you'll need for it. We'll also cover how to maintain your current cash power meter and what's involved in replacing it.

## **3.3 STUDY POPULATION**

### **3.3.1 The Inclusion Criteria**

* Employees who will be involved in research must be the one who work in cash power related services.
* The customers who will be involved in this research are the ones who request the cash power services.

### **3.3.2 The Exclusion Criteria**

* If employee is not in cash power related service
* If customers do not use the REG services.

## **3.4 Data collection Method**

### **3.4.1 INTERVIEW**

We have discussed customer-care and some employees of Rwanda Energy Group(REG) Via face to face and even virtually about electricity meter services. They told us that, requesting Cash power services especially for new connection require individual to visit branch of Rwanda energy group(REG) in person with all required document which can be burden for those who lives far away from an branch of REG not only those one but also for some people living with disability and those having limited time. Moreover, they told us that when it comes to the condition where a client doesn't have a way to reach any of the offices of REG they attempt to orchestrate him in utilizing e-mail to yield the required report.

## **3.5 Underlying Technology**

### **3.5.1 Software Requirements**

* Dart programming language
* Flutter framework
* Android Studio

### **3.5.2 Hardware Requirements**

* Computer (8GB RAM,256 SSD)
* Smart Phone

# **WORK PLAN**

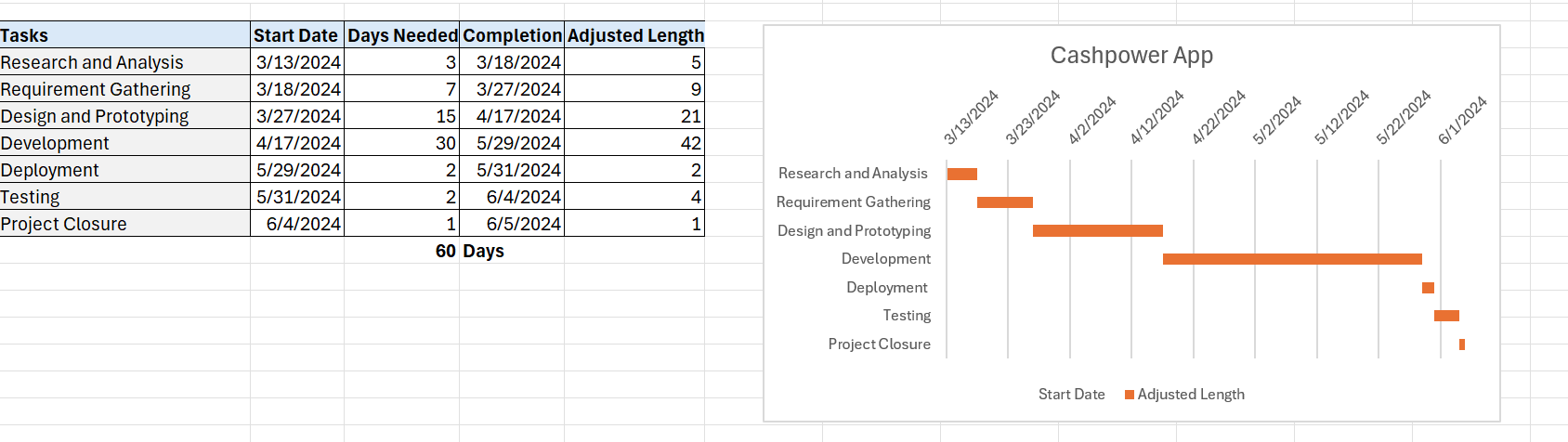


Figure 1: work plan

# **BUDGET**

|  |  |
| --- | --- |
| **Requirements** | **Costs ($)** |
| Equipment (software, Hardware, Network) | 150$ |
| Other costs (unexpected issues) | 20$ |
| **Total** | 170$ |

Figure 2: Budget

# **REFERENCES**

[1] Available at: https://www.reg.rw/what-we-do/access/ongrid/ (Accessed: 15 March 2024).

[2] Available at: https://www.reg.rw/home/ (Accessed: 15 March 2024).

[3] (No date) Available at: https://ieeexplore.ieee.org/document/9153974 (Accessed: 18 March 2024).

[4] Md. Mejbaul Haque, Md. Kamal Hossain, Md. Mortuza Ali and Md. Rafiqul Islam Sheikh, "Microcontroller Based Single Phase Digital Prepaid Energy Meter for Improved Metering and Billing System", International Journal of Power Electronics and Drive System, vol. 1, no. 2, pp. 139-147, December 2011.

[5] Sapna Ganurkar and Pravesh Gour, "Prepaid Energy Meter for Billing System Using Microcontroller and Recharge Card", International Journal Of Core Engineering & Management, vol. 1, no. 1, pp. 12-18, April 2014.