

PROJECT PROPOSAL

TITLE

Design and Development of a Solar Powered Coin-Operated Cigarette Vending Machine for Tanzania

PREPARED BY

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1.1 EXECUTIVE SUMMARY

This project proposes the design and development of a Solar Powered Coin-Operated Cigarette Vending Machine that enables customers to purchase cigarettes automatically without the assistance of a shopkeeper. The machine is designed to operate using Tanzanian coins and solar energy, making it suitable for both urban and rural areas.

The vending machine will display available cigarette brands and prices on a digital screen. Customers will insert coins, select their preferred product using a keypad, and receive the selected cigarette automatically. The machine will also be capable of selling small complementary products such as matches.

The innovation aims to improve convenience, reduce operating costs, provide 24-hour service, and promote the use of renewable energy technologies.

2.1 BACKGROUND OF THE PROJECT

Cigarette sales in Tanzania are mostly conducted through retail shops and kiosks that require continuous human supervision. This creates operational costs and limits service availability during certain hours.

With advancements in automation technology, vending machines can provide a practical solution for product distribution. However, vending machine technology remains limited in many parts of Tanzania. This project seeks to introduce an affordable, locally designed vending machine powered by solar energy and capable of operating with coin-based transactions.

3.1 PROBLEM STATEMENT

Many retail businesses depend on attendants to sell products. This increases labor costs and restricts service hours. Customers may also experience inconvenience when purchasing products during late hours.

There is a need for an automated system that can provide convenient, reliable, and efficient cigarette sales while minimizing operational costs.

4. MAIN OBJECTIVE

To design and develop a solar-powered coin-operated cigarette vending machine suitable for Tanzanian conditions.

5.1 SPECIFIC OBJECTIVES

5.1 To develop a coin-based payment system.

5.2 To design a digital product display system.

5.3 To create multiple product compartments for different cigarette brands.

5.4 To automate product dispensing.

5.5 To integrate solar power technology for sustainable operation.

5.6 To improve customer convenience through self-service purchasing.

6.1 PROJECT DESCRIPTION

The machine will consist of:

A. Product Compartments

Separate compartments for storing different cigarette brands.

Example:

- Product 01 – Nyota
- Product 02 – Sportsman
- Product 03 – Embassy
- Product 04 – Sweet Menthol
- Product 05 – Matches

B. Digital Display

The display will show:

- Product code
- Product name
- Product price
- Inserted amount
- Customer instructions

C. Coin Payment System

The machine will:

- Accept Tanzanian coins
- Calculate inserted money

- Verify payment
- Release selected product automatically

D. Product Dispensing System

A motorized mechanism will release one product after successful payment and selection.

E. Solar Power System

The machine will be powered by:

- Solar Panel
- Rechargeable Battery
- Charge Controller

This enables operation even in areas without electricity.

7.1 TARGET MARKET

The machine can be installed in:

- Bus terminals
- Shopping centers
- Entertainment venues
- Hotels
- Retail business centers

8.1 EXPECTED BENEFITS

Economic Benefits

- Reduced labor costs
- Increased business efficiency
- Additional income opportunities

Social Benefits

- Faster customer service
- 24-hour product availability

- Promotion of technological innovation

Environmental Benefits

- Reduced electricity consumption
- Use of renewable solar energy

9.1 REQUIRED MATERIALS

- Arduino Mega
- Coin Acceptor
- LCD Display
- Keypad Buttons
- Servo Motors
- Solar Panel
- Battery
- Charge Controller
- Metal Cabinet
- Wiring Components

10.1 PROJECT IMPLEMENTATION PLAN

Phase 1:

Concept Development and Design

Phase 2:

Prototype Construction

Phase 3:

Testing and Improvement

Phase 4:

Pilot Deployment

Phase 5:

Commercial Production

11.1 ESTIMATED IMPACT

The project has the potential to introduce affordable vending machine technology in Tanzania while creating opportunities for local manufacturing, employment, and entrepreneurship.

12.1 CONCLUSION

The Solar Powered Coin-Operated Cigarette Vending Machine presents an innovative business and technology solution that combines automation, renewable energy, and digital payment systems. The project can contribute to technological advancement and business modernization in Tanzania while offering a sustainable and scalable commercial opportunity.

13.1 APPENDIX

Supporting diagrams, technical drawings, show the expected picture of the machine

