TIEC3.0 Principal Sponsor

Energy innovations. Powerful collaborations.

TIEC3.0 Poster Title

Name: Rèkool Access Technology

Affiliation : Bayero University, Kano

Proposed Solution

Vacci-Safe is a portable, solar-powered vaccine storage fridge specifically designed for healthcare facilities in rural and off- communities to bridge the cold chain gap in the healthcare sector.

Vacci-Safe helps to maintain the World Health Organization's recommended temperature range for vaccines (2°C to 8°C), ensuring the potency and safety of vaccines and medical supplies.

It is portable and lightweight making it ideal for use in remote healthcare facilities, mobile immunization campaigns, and outreach programs where access to reliable electricity is limited or nonexistent. By providing consistent, off-grid cold storage, Vacci-Safe helps bridge critical cold chain gaps, reduce vaccine spoilage, and expand access to life-saving immunizations in underserved areas.

Technical Design

- **120W mono PERC solar panel:** with lithium-ion battery backup (48Ah)
- **Phase Change Material (PCM):** For thermal stability and passive cooling
- **Smart digital thermostat:** Has ±0.5°C accuracy
- **GSM/IoT dashboard:** For real-time temperature monitoring and alerts
- **DC variable-speed compressor:** For energy-efficient cooling (2–8°C)
- **IP65-rated chassis**, lightweight, portable, and durable built for off-grid conditions

Fig. 1: Vacci Safe Prototype Sample. Dummy Design by Technology Incubation centre Kano

Economic feasibility/Proposed Business Model

Unit Cost: ₦315,000 | **Selling Price: ₦**450,000 | **Net Margin:** 32.4%
Business Model:

- Direct sales to and partnerships with NGOs, governments, and health agencies
- Lease-to-own & Pay-As-You-Go (PAYG) options for rural clinics
- Subscription-based support/maintenance service
- Grants and subsidies leveraged for affordability
- Locally sourced and assembled components reduce cost and support job creation

Timeline for developing prototype/trial

Prototype Development & Trial Timeline (4 Months)
Month 1–2: Design Finalization & Component Sourcing

- Finalize the CAD design and technical schematics for the third iteration of the Vacci-Safe unit.
- Identify, evaluate, and procure all required mechanical, electrical, and thermal components for prototype construction.
- Ensure component selection aligns with environmental durability, energy efficiency, and cold chain performance requirements.

Month 2–3: Prototype Construction & IoT Integration

- Assemble the 3rd MVP incorporating improved thermal insulation, solar integration, and modular refrigeration components.
- Integrate IoT-enabled features including real-time temperature monitoring, GSM-based alerts, and mobile app connectivity.
- Conduct internal validation of hardware-software interfacing for system reliability and data accuracy.

Month 3–4: Performance Testing & Field Validation

- Execute comprehensive system testing to evaluate cooling performance, battery autonomy, sensor responsiveness, and IoT functionality.
- Perform monitoring and evaluation using the mobile application to validate end-to-end functionality under simulated field conditions.
- Deploy the prototype for a controlled **pilot trial at Bayero University Health Clinic**, gathering real-world performance data and user feedback for optimization.

Budget & Target User/Market/Scale

Budget Required:
~~₦~~1,290,000 million (approx. **$870**) for a 4-month pilot development and testing phase.

Target Users:

- Primary healthcare, Community health workers conducting immunization outreach, Rural pharmacies and maternal health clinics storing temperature-sensitive medicines and vaccines

Acknowledgements

Bayero University, Kano, Sustainable Energy for All, Climate Lunch PAD
Technology Incubation Centre, Kano