

Mock Proposal: “Kitala Community Solar Mini-Grid Project”

Submitted by: SolTech Africa

Location: Kitala, Makueni County, Kenya

Date: July 2025

Executive Summary

SolTech Africa proposes a 50 kWp solar mini-grid system to electrify the off-grid village of Kitala in Makueni County. The system will connect **420 households, 15 SMEs, two primary schools, and a level 2 health center**, all currently reliant on kerosene and diesel. The project emphasizes gender inclusion, productive use enablement (PUE), and sustainable local operation through a hybrid tariff + cross-subsidy model.

1. Project Objectives

- Electrify 100% of Kitala's population with 24/7 clean energy access.
 - Reduce diesel consumption by 95%, avoiding **~135 tons of CO₂ per year**.
 - Enable **8 new microenterprises** (tailoring, cold storage, mobile charging, milling).
 - Improve educational outcomes for ~650 students through lighting and device charging.
 - Expand health service hours via refrigeration, lab equipment, and night lighting.
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2. Technical Approach

- **System size:** 50 kWp solar + 240 kWh lithium battery bank
- **Distribution:** 3-phase AC distribution to homes and institutions
- **Backup:** 15 kVA diesel genset (emergency only)
- **Technology partners:** Victron Energy inverters, Pylontech batteries
- **Quality assurance:** Systems meet IFC Lighting Global standards

- **Smart metering:** STS-certified prepaid meters for demand management
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3. Load Forecast and Design

- Load assessment conducted via community surveys and appliance audits
 - Estimated peak load: **28 kW**, average daily demand: **220 kWh/day**
 - Seasonal variation accounted for in crop processing loads
 - Future-proofed for 25% demand growth over 10 years
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4. Financial Viability

- **CAPEX:** \$182,000
 - **OPEX (Yr 1):** \$12,000
 - **Tariff model:** Blended block tariff — USD 0.22/kWh for households, USD 0.28/kWh for SMEs
 - **Subsidy:** Upfront results-based financing (RBF) grant of 40%
 - **Revenue forecast:** \$18,500 annually from energy sales
 - **LCOE:** \$0.25/kWh
 - **Cost per connection (CPC):** \$433
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5. Gender and Social Inclusion

- 2 of 4 local energy committee leads are women
- Solar sewing hub established with a women's cooperative
- Training provided to 6 female technicians in system O&M

- Monitoring of girl attendance at electrified schools
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6. PUE Strategy

- Business training for 12 entrepreneurs in agro-processing and solar appliance use
 - 3 solar fridges installed for dairy and fish traders
 - Solar mill installed for post-harvest processing
 - \$3,500 budgeted for productive use appliance financing
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7. Environmental Impact

- Replaces 3,500 liters of diesel annually
 - Estimated **CO₂ avoided**: 135 tons/year
 - E-waste plan: Lithium batteries recycled via M-KOPA's licensed partner
 - All panels warranted for 25 years, batteries for 10
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8. Implementation Timeline

Phase	Timeline
Feasibility & Community Entry	Aug–Sep 2025
Procurement	Oct 2025
Installation & Commissioning	Nov–Dec 2025
Training & Go-Live	Jan 2026

9. Monitoring & Sustainability

- Remote monitoring via GSM-integrated charge controller
 - Local technician contracted on monthly retainer
 - Energy committee reviews tariffs quarterly
 - Independent evaluator to assess outcomes in 12 months
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10. Ask to Funders

- **\$109,200 grant** requested (60% CAPEX)
- Co-financing committed: \$72,800 (developer equity + local contributions)
- RBF model possible via milestone verification