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The Solar Grating Point

Bringing zero-fuel, industrial-grade cassava processing to the farm gate

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Proposed Solution

Nigeria leads the world in cassava production at over 63 million tonnes per year, yet farm-gate losses for roots and tubers run as high as 50–60% [5][1]. Roots rot within 48 hours of being uprooted, mills are too far from the farm gate, and the petrol and diesel engines that power existing graters cut directly into the farmer's already-thin margin.

> We propose the Solar Grating Point — a modular, solar-powered Business-in-a-Box that brings industrial-grade cassava grating directly to the farm gate. A locally-fabricated 1HP stainless-steel grater is powered by a dedicated 3 kVA hybrid solar system and housed in a lockable prefab kiosk that ships flat-packed and deploys in under a day.

Productized service. Farmers pay per bag grated, not for the machinery. No upfront cost barrier.

100% solar. 1.1 kW panel array + LiFePO₄ battery — no fuel, no grid, no downtime.

Local content. 1HP grater fabricated by Nigerian engineers in the Idu Industrial District, Abuja.

Local content (full unit): 100% of grating machinery, kiosk fabrication, and installation labour is Nigerian-sourced; the Operator and Hub Manager are recruited from the host village.

Technical Design

The complete unit is sized for the rural cassava-belt load profile: it must run a 1HP motor at full duty for at least 6 hours per day on solar input alone, with battery storage to cover cloudy mornings and pre-sunrise startup.

Grating machine	1HP (0.75 kW) stainless-steel electric grater · Niji-style fabrication, Abuja
Solar array	2 × 550 W monocrystalline panels (1.1 kW total, ~5 m² roof footprint)
Inverter	3 kVA / 24 V hybrid pure sine-wave inverter with LCD load display
Battery storage	24 V · 100 Ah LiFePO₄ — rated 6,000 cycles (~10 years), 5× lead-acid life
Enclosure	Lockable prefab metal kiosk; ships flat-packed, deploys in under a day

Daily throughput: 15 bags (50 kg) of cassava roots per kiosk per day at ₦500 per bag — sustained for 25 working days per month.

Cost-Benefit Outlook

Cumulative cash position over the first 60 months of operation. CAPEX of ₦3M is recovered around month 25; thereafter the unit produces ~ ₦1.4M/year in pure profit with zero fuel cost.

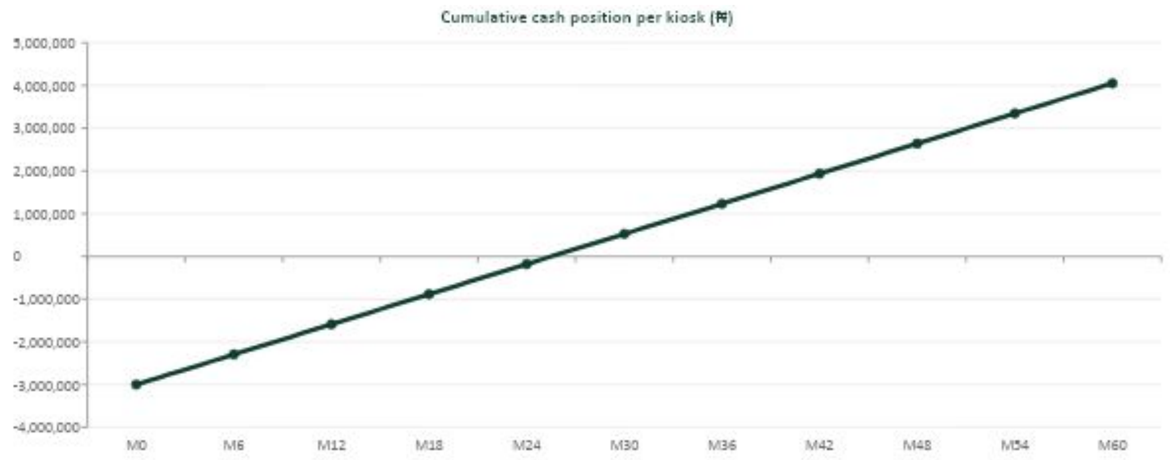

Figure 1: Cumulative profit per Solar Grating Point over a 5-year operating horizon. Breakeven at month 25.

Economic Feasibility / Proposed Business Model

One Solar Grating Point operates as a single-asset micro-enterprise. CAPEX of ₦3M per unit pays back in roughly 25 months and produces ₦1.4M+ in annual profit thereafter, with zero recurring fuel cost.

CAPEX per unit	
3 kVA solar kit *Inverter, panels, LiFePO₄ battery*	**₦1,600,000**
1HP stainless-steel grater *Niji-style fabrication, Abuja*	**₦650,000**
Prefab lockable kiosk *Secured shop structure*	**₦550,000**
Installation and logistics *Site setup and transport*	**₦200,000**
Total CAPEX	**₦3,000,000**

₦187,500
Monthly revenue
15 bags/day × ₦500 × 25 days

₦117,500
Net monthly profit
After ₦70k OPEX

~25 mo
Payback period
Then ₦1.4M+/yr, zero fuel cost

Productized service. Recurring revenue. Eliminates fuel costs entirely.

Timeline for Developing Prototype / Trial

Month 1–2	**Procurement & build**	Source grater and 3 kVA solar kit; fabricate kiosk; finalise BOM and supplier MOUs.
Month 3	**Pilot deployment**	Install first kiosk at a partner village in Kogi or Benue cassava cluster.
Month 4–6	**Field trial**	Operate unit; record daily throughput, revenue, downtime, and farmer satisfaction.
Month 7–9	**Scale validation**	Refine BOM and operating SOP; secure follow-on funding for 10-kiosk rollout.

Budget & Target User / Market / Scale

Target user. Smallholder cassava farmers and rural processors in clusters of 200+ farms within a 5 km radius, currently losing harvest to spoilage or paying premium fees to distant petrol mills.

Market: Nigeria's cassava belt (annual output, million tonnes)

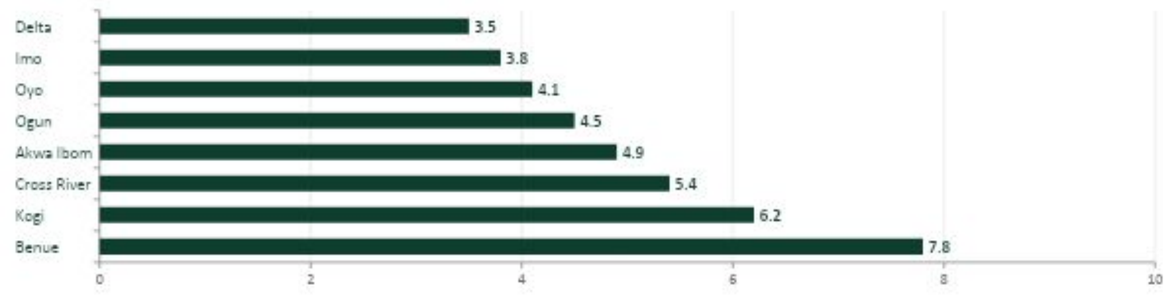

Figure 2: Eight states dominate Nigeria's >63 M-tonne annual cassava output (indicative shares). Each Solar Grating Point targets the farm-gate processing demand within one such cluster.

Scale roadmap

1 — PHASE 1
1 pilot kiosk
TIEC-funded pilot at a host village. Validate unit economics.

2 — PHASE 2
10 kiosks · 3 states
Cluster rollout: Kogi, Benue, Ogun. Hub Manager model.

3 — PHASE 3
100 kiosks by 2028
Full cassava-belt network. ₦140M+ annual ecosystem profit.

Impact

+30%
Farmer income
Reclaimed post-harvest losses

~1.2 t
CO_2 avoided/yr
Per kiosk; displaces petrol grating

2 jobs
Per kiosk
Operator + Hub Manager (local youth)

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