

Ghana Solar Nastech

Country	Ghana
Name of Company / Implementer	Nastech Power Solutions
Type of Business Model	Validation and comparison of pay-as-you-go and subscription-based
Type of Use Case	Solar micro-grid and individual solar generators made from repurposed e-waste

Summary

Nastech Power Solutions (NASTECH) in Ghana has validated innovative solar energy solutions combining micro-grids and individual solar generators made from electronic waste with the vision to improve sustainable energy access in off-grid communities. Throughout the SESA project, NASTECH scaled operations, trained 225 youth in solar technologies, and repurposed over 255 tons of e-waste, including lithium-ion batteries, into affordable energy systems. Their circular economy model addresses both energy poverty and environmental hazards from battery waste. NASTECH's subscription-based model and direct sales have enabled electrification of rural homes and businesses, boosted local economies and created 52 jobs.

The model

Testing and Validation of Subscription-based solar micro-grids and generators for rural off-grid communities:

- Micro-grid: GHS 700 connection fee + GHS 100/month
- Solar generators: GHS 1000–1500 subscription fee + GHS 50–200/month
- Systems range from 1KW to 10KW, with battery packs from 2.5KWh to 30KWh
- Customer segments: rural households, urban homes, small businesses
- Products certified by GSA and EPA

Direct Sales or Pay-Go of individual solar home systems:

- 1455 products produced, including 775 battery banks, 320 inverters, and 360 solar generators
- Competitive pricing using repurposed batteries (e.g., 150AH 48V battery at GHS 12,000 vs. GHS 30,000 for new)



Figure: Nastech staff and Nastech micro-grid

Key figures under the SESA project

- 3 micro-grids installed with 54 subscribers
- 40 solar home systems subscriptions
- 255 tons of e-waste recycled
- 1455 products produced
- 225 youth trained
- 52 jobs created (22 direct, 30 indirect)

Key Lessons Learnt

Product Innovation through Circular Economy

Repurposing lithium-ion batteries from e-waste proved to be a game-changer. By transforming discarded batteries into high-capacity energy storage systems, NASTECH not only reduced environmental hazards but also significantly lowered the upfront cost of solar energy solutions. This approach made solar systems more accessible to low-income communities and demonstrated the viability of circular economy models in energy access.

Customer Segmentation and Revenue Optimization

Nastech tested micro-grid systems in rural, low-income communities using a subscription model to improve energy access. However, the micro-grid approach presented challenges, including high capital expenditure, maintenance costs, complex infrastructure requirements for connecting homes, payment delays with the subscription model, and slow customer onboarding due to trust-building needs. These issues made micro-grids difficult to scale and impacted the profitability calculations from the business side. In response, Nastech pivoted to providing individual solar home systems while continuing to offer Paygo options for rural off-grid communities with low purchasing powers. This shift allowed for more flexible deployment, reduced overhead, and improved cost recovery.

Technical Adaptation and System Efficiency

Feedback from users highlighted issues such as slow battery charging and reduced runtime. Nastech responded by redesigning systems, switching from PWM to MPPT charge controllers, optimizing battery-to-panel ratios, and replacing transformer-based inverters with more efficient transformer-less models. These changes significantly improved system performance and customer satisfaction.

Market Strategy and Branding

Nastech's intensified use of social media, e-commerce platforms, and community engagement helped boost visibility and sales. The company's branding efforts and customer-centric product design-built trust and increased adoption, especially in urban areas.

The next steps include

- Focus on direct sales to middle-income and commercial customers
- Expand production of high-capacity systems (e.g., 18.68KWh battery packs)
- Strengthening partnerships with GIZ and other stakeholders for battery repurposing
- Enhance marketing via social media and e-commerce platforms
- Continuing training and job creation in solar energy technologies

About the company/implementer

Nastech Power Solutions is a Ghana-based SME specializing in affordable solar energy systems developed from repurposed e-waste. Founded to address energy access and environmental sustainability, Nastech provides micro-grids and solar generators to underserved communities and businesses.

FINAL PUBLIC D3.4 REPORT

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