EEP AFRICA MARKET SURVEY REPORT

2023

EEP Africa

NDF Nordic Development Fund

Cover Photo: Supamoto employee demonstrates the efficient biomass cookstove and pellets

This study was produced by Open Capital in their capacity as Business Development Support providers for the EEP Africa Trust Fund.

Open Capital

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Introduction

The Energy and Environment Partnership Trust Fund ("EEP Africa") is a multi-donor trust fund that is focused on supporting early-stage, innovative renewable energy projects, technologies and business models. The fund is managed by the Nordic Development Fund (NDF), with funding from Austria, Denmark, Finland, Iceland, Norway, Switzerland and NDF.

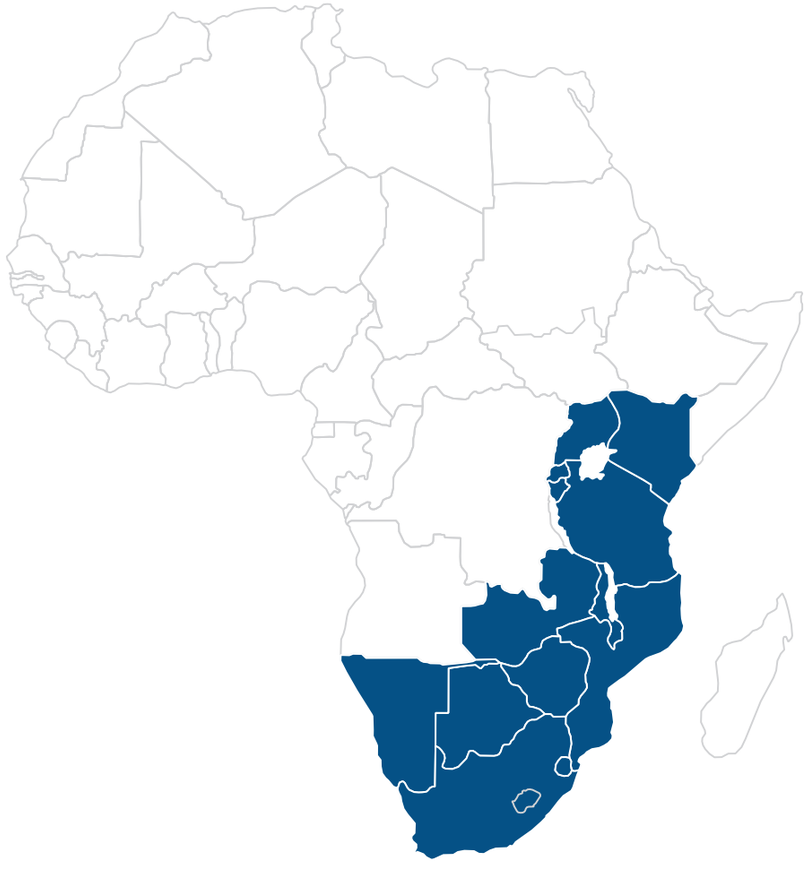
The objective of the fund is to enhance clean energy access, development, and investment, with a particular focus on benefiting vulnerable and underserved groups. Investments to date have focused on clean energy technologies and business models across 15 countries in Eastern and Southern Africa: Botswana, Burundi, Eswatini, Kenya, Lesotho, Malawi, Mozambique, Namibia, Rwanda, South Africa, Tanzania, Uganda, Zambia, and Zimbabwe (Figure 1), as well as Seychelles which was phased out in 2024.[1]

As part of the 2023 Call for Proposals, applicants were asked to respond to a brief market survey around the technological sector they are operating in, the geographic market landscape, and enabling environment. Applicants submitted projects across seven technology focus areas: productive uses of energy, residential electricity access, clean cooking, mobility, mini-grids, power generation, and energy efficiency & storage.

Out of the 507 applications submitted, the survey received 495 valid survey responses from applicants across 13 out of the 15 eligible countries. The distribution of responses by technology and geography is summarised in Figure 2.

Against the backdrop of the geographic and technological split across the submitted survey responses, this report highlights the key trends and insights from the survey analysis. The most relevant insights related to market profitability, financing gaps, and supply chain constraints.

Figure 1: EEP Africa countries of operation for CfP2023



[1] Comoros, Madagascar and Mauritius were added in 2024

TECHNOLOGY FOCUS DEFINITIONS

PUE
Clean energy technologies used to generate additional income and revenues.

Clean cooking
Clean cookstoves and fuels for residential, institutional, and commercial purposes.

Residential electricity access
Technologies enabling electricity access for households such as solar home systems and other products.

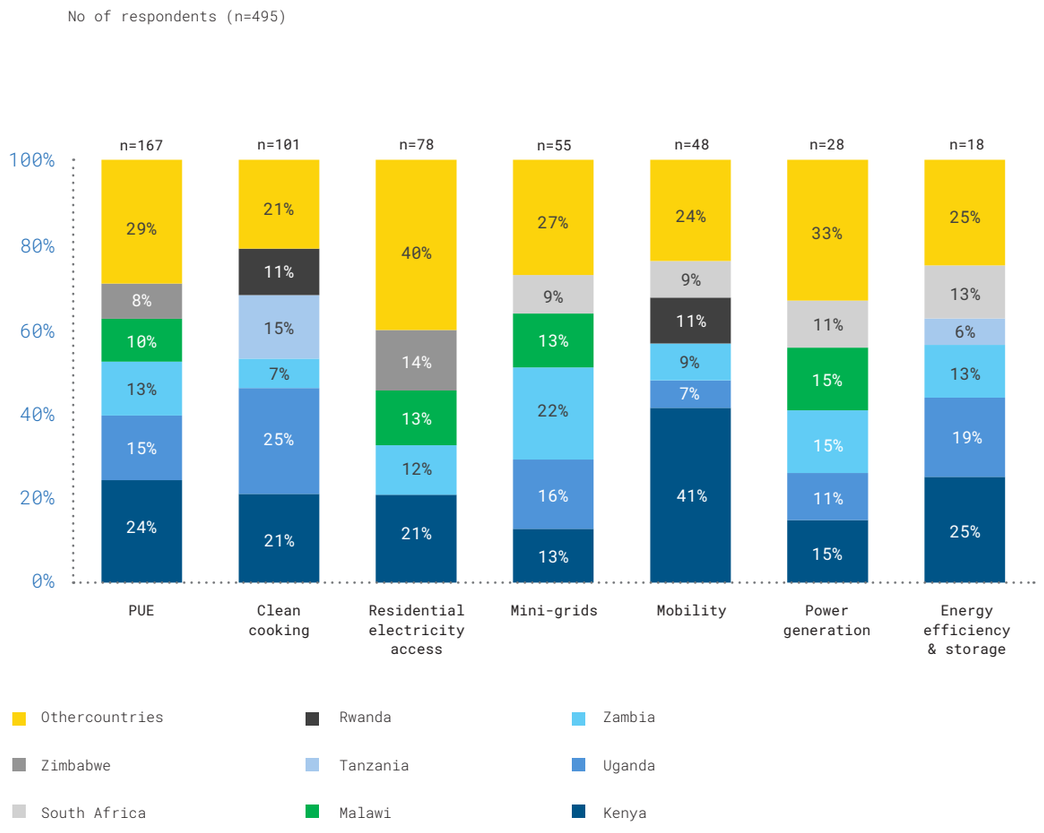
Mini-grids
Micro and mini-grids, as well as distribution related activities.

Mobility
Decarbonised transport of people and goods, including vehicles, infrastructure, and fuels.

Power generation
Power generation based on renewable sources of energy.

Energy efficiency & storage
Technologies for energy storage and the promotion of efficient uses of energy.

Figure 2: Technology breakdown by country for EEP Africa CfP 2023



1. Market Trends

44% of respondents classify the market they operate in as being in the piloting stage, while 55% of respondents also viewed the market they operate in as being limited in competition. A common view among respondents is that businesses are looking to set themselves apart by piloting not only new technologies but also business models that promise greater affordability of renewable energy products for customers and increased profitability for companies.

Improved equipment efficiency and affordability is expected across residential electricity access and mini-grid projects, with improvements aimed at enhancing efficiency and reducing the cost of specific input components. For these sectors, advancements in solar panel technology would lead to cheaper production costs and more efficient systems over time.

Increased use of Energy as a Service (EaaS) models is seen across PUE, clean cooking, residential electricity access, mini-grids, and mobility. Continued adoption of the EaaS model can reduce the upfront costs paid by customers for energy access. This is expected to benefit both consumers and companies by increasing affordability of renewable energy technologies and increasing the target market potential respectively.

Portfolio diversification in PUE, residential electricity access, and mini-grid sectors is expected to boost company revenues by diversifying product offerings. Some PUE and residential electricity access companies plan to add the sale of mobile phones to enhance the value of existing offerings such as solar home systems. Meanwhile, mini-grid companies plan to integrate PUE sales and multiple renewable energy products into their portfolios to stimulate electricity demand.

Local manufacturing of inputs across PUE, residential electricity access, clean cooking, and energy efficiency & storage technologies are expected to reduce production costs. Key inputs such as solar panels, cookstoves and batteries manufactured locally will also foster local expertise thereby bolstering regional innovation.

Figure 3: Market trends noted by respondents across EEP technology sectors

Technology categories	Improved equipment efficiency and affordability	Increase in use of EaaS model	Portfolio diversification	Local manufacturing of inputs
PUE	✓	✓	✓	✓
Clean cooking	✓	✓		✓
Residential electricity access	✓	✓	✓	✓
Mini-grids	✓	✓	✓	
Mobility	✓	✓		
Power generation	✓			
Energy efficiency & storage	✓			✓

2. Profitability Trends

Profitability trends vary across technology categories and countries as seen in Figure 4, with companies in the mini-grid sector perceived to be the most lucrative investment. On average, 38% of respondents consider their markets profitable, particularly in Kenya, Malawi, and Zimbabwe, where renewable energy companies state that they have moved past break-even point. On the other hand, 42% of respondents stated that their companies were still struggling financially and cited operational challenges related to cost management and limited access to financing.

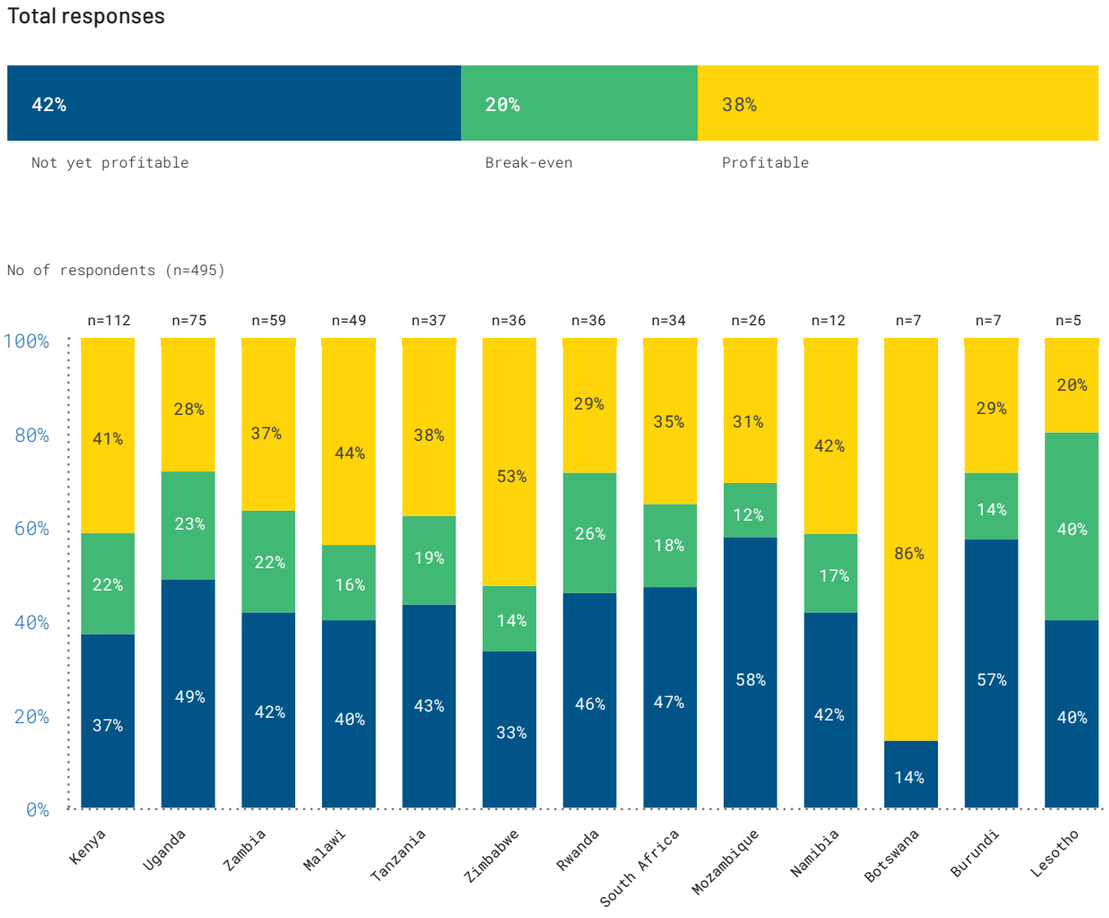
Increasing awareness of the benefits of renewable energy technologies is allowing users to either increase their income or save costs, which has been cited as a key driver of profitability in markets. In Kenya and Zambia, 26% of PUE respondents highlighted this for cooling and irrigation solutions, leading to an increased number of farmers purchasing these products or services.

Increased funding for demand stimulation has been identified by mini-grid respondents in Kenya, Zimbabwe, and Namibia as a key driver of improved profitability. Respondents have been able to attract funding to facilitate demand stimulation efforts through the introduction of PUE products that increase end consumer utilisation of electricity.

High operating costs, including high power generation and component/input costs, are not always covered by the revenues from sales. Mini-grid respondents in South Africa and Rwanda elaborate that the tariffs set by the respective national electricity board do not match the overall cost of power production which makes it difficult to achieve profitability.

High logistics costs are highlighted by respondents in Zambia and Rwanda in the residential electricity access technology category, naming the land-locked nature of the countries and resulting transportation cost as a key barrier to companies achieving profitability.

Figure 4: Profitability trends across countries



3. Technology Financing Gaps

The survey findings show that 78% of respondents, spread across all seven technology sectors, identified financing gaps in their markets, with respondents from the clean cooking sector facing the largest financing gap (See Figure 5). Respondents feel that additional renewable energy-focused investment products that could feature reduced risk premiums, extended tenors, and fit the unique requirements of the sector are required.

Inability to access commercial capital sources, especially from local banks, is identified as a significant challenge by respondents. This is more pronounced for companies in the PUE, clean cooking, and residential electricity access sectors, who grapple with strict collateral requirements and are unable to secure working capital. Clean cooking projects also face hurdles in accessing carbon credit markets due to the high upfront costs for market entry which are beyond their current capacity.

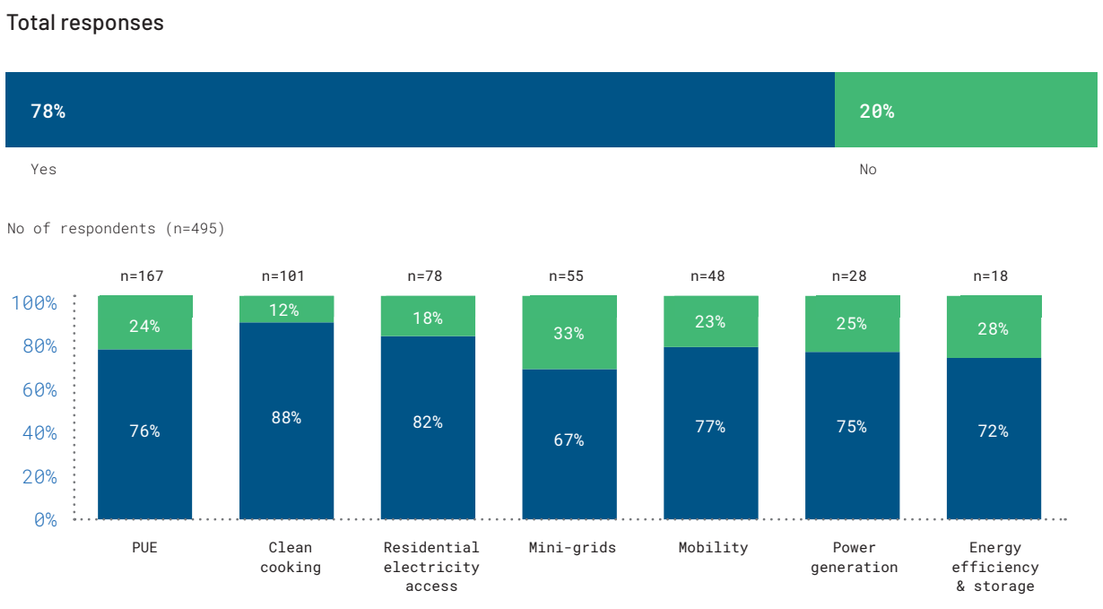
Lack of funding for early-stage companies presents a significant challenge across mobility, residential electricity access and PUE sectors according to survey respondents. In the aftermath of the COVID-19 pandemic, reduced investor appetite hindered the growth and development of promising startups and innovative ventures. Residential electricity access companies in Kenya also highlight that the majority of funding is being channeled to a handful of established market leaders.

Insufficient donor funding is seen as a gap according to some respondents in the residential electricity access, mini-grid, and power generation markets. The survey responses for residential electricity access show that current financing has been inadequate to achieve universal access for the bottom-of-the-pyramid. For power generation and mini-grid markets, the initiatives implemented by donors are too limited to achieve long-term sustainability for companies.

Lack of patient capital is found to be a common gap across mini-grid, power generation and energy efficiency & storage sectors. The findings indicate that high premiums, lack of local currency financing and short tenors are not aligned with the long-time horizons required for investments in the renewable energy sector. The mini-grid companies require patient debt capital with longer than average tenors to account for the longer time to achieve returns. This financing gap compelled some respondents to rely on savings and investments from family and friends with existing financing options seen as too expensive or risky.

Lack of equity for mini-grid and energy efficiency & storage companies has led to a heavy reliance on grants and debt. However, respondents have expressed the desire and necessity of diversifying their financing sources through equity investment that can strengthen their financial position and drive sustainable expansion.

Figure 5: Presence of gaps in available financing sources



4. Supply Chain Constraints

The survey data reveals that import costs and global supply shortages are prevalent challenges across all seven technology sectors, impacting 47% of respondents. These constraints arise from macroeconomic disruptions in supply chains, alongside specific issues within technology value chains, impacting various technology sectors to varying extents (see Figure 6).

Global supply shortages have emerged as a concern across all technology categories following the COVID-19 pandemic. For example, respondents in the power generation, mini-grid and energy efficiency & storage sectors have experienced challenges in securing lithium-ion batteries. This hampered the respondents' capacity to meet electricity demand from customers by limiting energy storage capabilities of their systems.

High import costs are viewed as a significant supply chain constraint for all companies operating across the different technology sectors. Respondents in the residential electricity access and mini-grid sectors explicitly call out high import costs associated with solar panels. Mini-grid respondents also highlighted that inconsistencies in tax policies were a key supply side constraint. Abrupt fluctuations in the taxation of technologies and a lack clarity on the appropriate tax treatment for innovations are identified as a key bottleneck.

Lack of technical expertise has emerged as a significant supply chain constraint affecting mini-grids, mobility, and power generation. In these sectors, respondents have encountered significant gaps in the availability of skilled workers capable of performing essential repairs and maintenance tasks. The shortfall of such expertise can lead to increased downtimes, maintenance costs, and operational inefficiencies. In the mini-grid and power generation sector, the challenge is more nuanced, as there is also a shortage of professionals who possess a comprehensive understanding of how the systems function.

Last mile distribution challenges were observed as a concern by some respondents, particularly when it comes to providing services to rural areas. Respondents across PUE, residential electricity access and clean cooking categories have highlighted the inadequacies in road infrastructure as a major limitation in delivering their products or services to underserved regions.

Figure 6: Supply chain constraints noted by respondents

Technology categories	Global supply shortages	High import costs	Lack of technical expertise	Last mile distribution
PUE	✓	✓		✓
Clean cooking	✓	✓		✓
Residential electricity access	✓	✓		✓
Mini-grids	✓	✓	✓	
Mobility	✓	✓	✓	
Power generation	✓	✓	✓	
Energy efficiency & storage	✓	✓		

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