



# Promoting Market Based Energy Access for Cooking and Lighting in Kakuma Refugee Camp

Experiences and lessons learned

July 2020

# Content

- 1. Introduction ..... 5**
  - 1.1 Background ..... 5
  - 1.2 The Market-based Energy Access project..... 6
  
- 2. Project Activities & Results..... 7**
  - 2.1 Activities ..... 7
  - 2.2 Results ..... 8
  
- 3. Key lessons and recommendations ..... 11**
  - Recommendations in short..... 15
  
- Want to know more? ..... 16**

# Exhibits

## List of Tables

Table 1 MBEA project objectives ..... 6

## List of Figures

Figure 1 Cookstove sales ..... 9  
Figure 2 Solar product sales ..... 9  
Figure 3 Industrial stoves sales per camp unit ..... 10  
Figure 4 Solar product sales per camp unit ..... 10  
Figure 5 Monthly income distribution per location ..... 13

## Promoting Market Based Energy Access for Cooking and Lighting in Kakuma Refugee Camp: Experiences and Lessons Learned.

**Published by:**

**Deutsche Gesellschaft für  
Internationale Zusammenarbeit (GIZ) GmbH**

Registered offices Bonn and Eschborn,  
Germany

Dag-Hammarskjöld-Weg 1-5  
65760 Eschborn, Germany

E [info@giz.de](mailto:info@giz.de)  
I [www.giz.de](http://www.giz.de)

**SNV Netherlands Development Organisation**

Parkstraat 83  
2514 JG The Hague  
The Netherlands

**Contact**

Energising Development

E [endeve@giz.de](mailto:endeve@giz.de)  
I [www.endeve.info](http://www.endeve.info)

**Photos:**

© SNV and EnDev

**Author:** Karlijn Groen, SNV

**Publication date:** July 2020

# 1. Introduction

This publication presents the results and key lessons learned from the Market-based Energy Access (MBEA) project in Kakuma Refugee Camp and Kalobeyei Integrated Settlement that ran from October 2017 to September 2019. The project was designed under the Energising Development (EnDev) programme and implemented by SNV Kenya. The project promoted supply, distribution and use of clean cooking and solar-powered solutions through a market-based approach while also driving systemic change through partnerships. By engaging private sector partners, SNV supported the development of local distribution channels through technical assistance and financial support and contributed more broadly to market development through awareness-raising campaigns.

## 1.1 Background

Kenya hosts over 477,000 refugees, of which 191,500 live in Kakuma refugee camp and Kalobeyei Integrated Settlement in Turkana County, Northern Kenya. The host community in Kakuma is estimated at 60,000 inhabitants. Neither the refugees, nor the host community have access to energy from the national grid. Most people rely on cooking and lighting solutions which are typically characterised as expensive and inefficient with adverse effects on health and the environment:

- *A basic allocation of firewood is provided for free to refugees and supplemented by purchases or gathering:* every two months, the local NGO LOKADO supported by UNHCR distributes 10 kg/person of free firewood rations to people in the camp. The rations cover only one-third of households' fuel requirements. Most households therefore purchase additional firewood from the host community for an average of \$5 per month, accounting for almost 20% of the median monthly income<sup>1</sup>. Firewood collection has led to substantial environmental degradation within the surroundings of the camp over the years.<sup>2</sup>
- *Basic cooking approaches prevail.* The three-stone open fire (TSOF) and locally produced Maendeleo stove, which is distributed for free by UNHCR to new refugees arriving in the camp, are the dominant approaches used for cooking. Basic charcoal stoves are also increasingly used. Industrially manufactured stoves are present in the camp and sold in Kakuma town, but uptake remains limited and use of TSOF and basic wood and charcoal stoves prevails.
- *Reliance on basic, unsafe and costly lighting solutions.* Many people in the camp use basic lighting solutions such as open fires, dry-cell torches or kerosene lamps. Small-scale petrol and diesel generators operated by individual entrepreneurs who charge high-monthly fixed fees also provide lighting and basic electricity services. Prior to the start of the MBEA project, solar products were either received as donations or, if purchased from the open market, often had quality issues and lacked warranties.

---

<sup>1</sup> Moving Energy Initiative, 2018. Prices, Products and Priorities. Meeting Refugees' Energy Needs in Burkina Faso and Kenya. Retrieved from <https://www.chathamhouse.org/sites/default/files/publications/research/2018-01-30-meeting-refugees-energy-needs-burkina-faso-kenya-mei-corbyn-vianello-final.pdf> .

<sup>2</sup> LOKADO's collection radius for firewood spans 100km around Kakuma camp. Soil erosion from deforestation is only contained by the rapid spread of the invasive prosopis juliflora/mathenge plant which was introduced in the area in the 1980s.

Market spaces exist and the local economy is active. However, a donation-based approach to meeting refugees’ energy needs was preventing market development for energy access products and private sector investment in sales and distribution channels. Indeed, Kakuma refugee camp has an active market economy with over 2,500 registered businesses and acts as a local trading hub<sup>3</sup>, and Kalobeyei Integrated Settlement also includes a number of markets<sup>4</sup>.

## 1.2 The Market-based Energy Access project

The MBEA project was designed to drive a paradigm shift from the humanitarian, donation-based approach of meeting refugees’ energy needs towards a greater focus on private sector delivery. In collaboration with UNHCR, the project set out to provide clean, safe and affordable cooking and lighting solutions to refugees and the host community through market development.

Population density, market size and economic activity in the camp showed sufficient potential to create demand and supply for stoves, fuels and solar lighting products. The goal of the project was to build a value chain for energy products while involving a variety of stakeholders including the refugee community, private sector companies, humanitarian agencies and local public and private stakeholders.

Specific project objectives (Table 1) focused on awareness creation and diversification of available, higher quality energy solutions.

**Table 1 MBEA project objectives**

Activity area	Specific objectives	Targets
Stoves	<ul style="list-style-type: none"> <li>• Awareness creation for improved cookstoves</li> <li>• Development and construction of a stove production unit in the refugee camp</li> <li>• Greater variety of affordable stoves within the refugee and host community</li> <li>• Increased sales of improved stoves</li> </ul>	<ul style="list-style-type: none"> <li>• 550 industrial cookstoves sales</li> <li>• 2,750 locally made improved cookstove sales</li> </ul>
Fuels	<ul style="list-style-type: none"> <li>• Broader range of alternative fuels, e.g. ethanol and briquettes</li> </ul>	<ul style="list-style-type: none"> <li>• 3 new fuel types</li> </ul>
Solar	<ul style="list-style-type: none"> <li>• Enhanced last mile distribution of solar products</li> <li>• Increased awareness of quality solar products</li> </ul>	<ul style="list-style-type: none"> <li>• 7,700 lanterns and SHS sales</li> </ul>

<sup>3</sup> IFC, 2018. Kakuma as a Marketplace. Retrieved from <http://documents.worldbank.org/curated/en/482761525339883916/pdf/125918-WP-Kakuma-as-a-Marketplace-PUBLIC.pdf>

<sup>4</sup> Kalobeyei Integrated Settlement was specifically designed as an alternative to a refugee camp, promoting integration and the self-reliance of refugees and host communities.

## 2. Project Activities & Results

The MBEA project was designed and planned in coordination with UNHCR and in consultation with humanitarian agencies, local organisations, and refugee community leaders. The project is coordinated from SNV's Kakuma office with a team of Local Capacity Builders from the host community and incentive workers from the refugee camp to support day-to-day operations of the project.

### 2.1 Activities

The project activities were primarily aimed at addressing market entry barriers for solar and clean cookstove companies. Market barriers were identified in consultation with private sector players and included a) poor supply and distribution infrastructure, including lack of local sales agents, leading to high delivery costs; b) low product awareness in the camp; c) limited purchasing power among refugees and lack of prepayment plans; and d) low per capita energy consumption.

#### Setting up operations of cookstove and solar companies

Key activities focused on working with private sector companies to create supply chains and an enhanced last-mile distribution network for clean energy products. The project recruited solar and clean cooking companies willing to set up operations in Kakuma and provided support depending on company-specific needs. Through financing activities, the project mobilised companies to invest and allocate resources to set up successful operations in the camp.

Specific activities included market activation events (i.e. product demonstrations and roadshows), and development of marketing materials (i.e. radio advertisements, promo videos and banners). In terms of setting up of last-mile distribution channels, linkages with local traders were set up and Last Mile Entrepreneurs (LMEs) from the camp and host community were trained to market the products in the camp, helping the companies to reduce complexity and time of setting up local operations and sales channels within the camp.

In addition, efforts focused on introducing alternative cooking fuels into the camp. Cookstove companies offering alternative fuels such as bioethanol, pellets and briquettes were supported through co-financing of activities, and fuel traders received entrepreneur training to sell alternative fuels. The project also intended to train people on briquettes production from human waste, but this was not realised due to unavailability of a quality trainer and low acceptance of the product, leading to low interest in the venture.

#### Awareness raising and community sensitisation

The project focused strongly on creating awareness across camps on the disadvantages of traditional energy products and the benefits of investing in safe and reliable alternatives. One of the main challenges at the start of the project was the aid-dependence of refugees due to the free supply of firewood, cookstoves as well as other energy products. As a consequence, a lack of understanding of quality standards for clean energy products and low willingness to invest dominated among the target communities. General awareness-raising activities complemented the company-specific market activations through community training, roadshows, product

demonstrations, radio talk shows, and sensitisation meetings with community leaders. The project developed context-specific marketing and training materials which included videos on clean cooking and lighting products in Swahili language which were utilised during the events.

### **Establishment of Stove Production Unit**

A large group of refugees and host community members cannot afford industrially manufactured stoves and continues to rely on traditional or artisanal cooking approaches. To increase the availability of high quality and affordable artisanal charcoal and wood stoves, a Stove Production Unit (SPU) was established by the project team in Kakuma refugee camp in the end of 2018. 65 artisans, including both refugees and host community members, were trained on liner production and the fabrication of five types of cookstoves in the SPU.

The stoves were specifically introduced to provide a locally produced, higher quality and more affordable alternative to the Kenya Ceramic Jiko (KCJ) and Kenya Uhai stoves imported from Nairobi and Kisumu. The designs included three KCJ stove types in different sizes and two multi-purpose stove types. To commercialise the SPU after it was established, SNV tendered the opportunity for a private sector company to run and manage the SPU facility. Sunken Limited expressed interest and formally took over the management of the SPU in 2019.

## **2.2 Results**

The activities supported under the project lowered the barriers for companies to move into the camp and enter the market by mitigating part of the extra costs and risks associated with entering remote and challenging markets. Several solar companies set up operations in the camp with support from MBEA, including Raj Ushanga House (Azuri distributor), Greenlight Planet, Pawame, Sollatek and Sunken.

In total, the beneficiary companies sold 2,556 solar lanterns and 4,322 Solar Home Systems (SHS) to the host and refugee community throughout the project's duration. The sales target achievement is 84%. The main reason for underachievement was a relatively slow uptake, initial lack of product availability and limited spending power among refugees. Prices varied greatly from KSh550 for a solar lantern to approx. KSh60,000 for a SHS package including TV. Upfront and pay-as-you-go payment methods were available, using both cash and mobile money (MPESA/Airtel money) as payment modes.

The cookstove companies supported within the project included Global Supply Solutions (GSS), Ikobriq, Sustainable Community Development Services (SCODE), Sunken, Rural Development Solutions (RUDESO), Nyalore Impact and Sanivation. Together they sold 2,005 industrial stoves and 277 locally made stoves (produced in the SPU). The number of industrial stoves sold overachieved the sales target. However, the locally made stoves did not meet their target due to a late start of operations at the SPU.

In addition, the project introduced 3 types of alternative fuels to the camp, including bioethanol, briquettes and pellets. Especially bioethanol-fuelled stoves experienced a positive uptake in the camp. However, bioethanol supply shortages emerged towards the end of the project due to restrictions on transporting liquid fuels. LPG stoves were removed from the list of eligible fuels

under MBEA but nevertheless saw an uptake in the market during the project duration and are still being sold in both Kakuma town and Kakuma camp.

Market development activities included strengthening of distribution channels and awareness raising campaigns. 120 LMEs were trained to sell the clean energy products, strengthening distribution. Marketing and awareness raising campaigns contributed to demand creation for the products. 40 radio spots were aired, 3 videos developed, 2 main events and 108 mini market activations events organised.

The period 2017-2019 showed a rapid increase in the adoption of clean energy products across both the refugee and host community (Figure 1 and Figure 2), with a comparatively higher uptake of products among the host community. Cookstoves sales were boosted by high interest in bioethanol stoves, especially in the host community with higher disposable incomes; however, fuel supply challenges meant that demand dropped in 2019. Uptake of lighting solutions was also stronger among the host community (60% of sales), but sales among refugees show steady demand across both years.

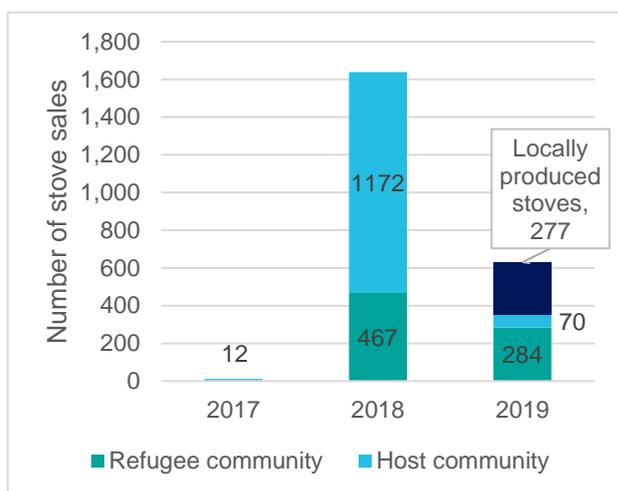


Figure 2 Cookstove sales

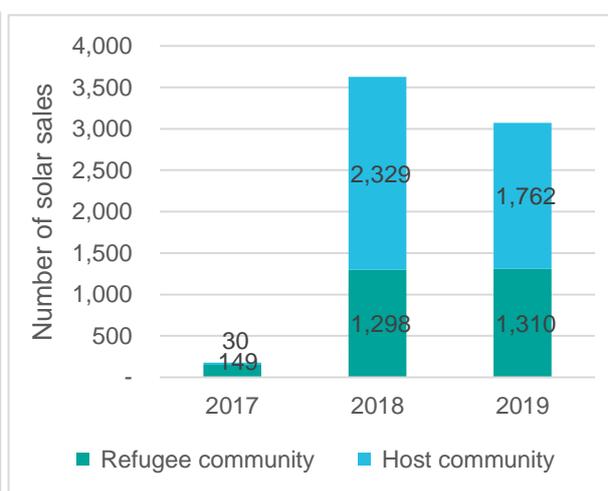
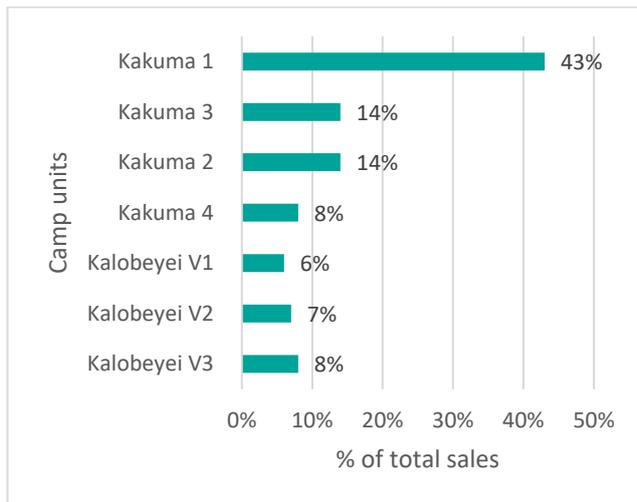


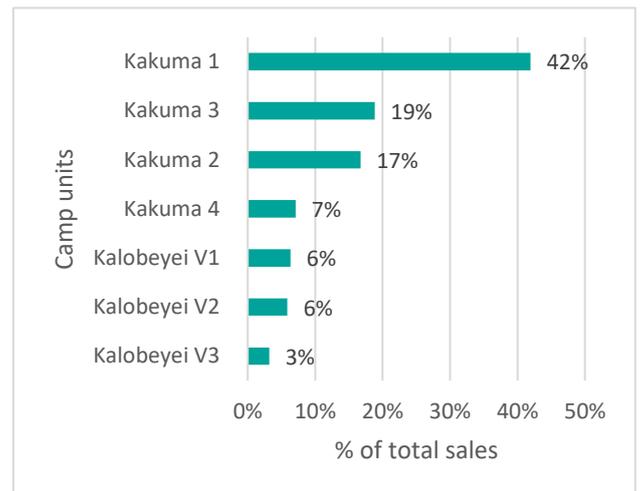
Figure 1 Solar product sales

Most sales in the refugee community were made in Kakuma subcamp 1 (Figure 3 and Figure 4). Kakuma 1 is the oldest camp among the four sub-camps and nearly half of businesses are based here (45%)<sup>5</sup>, hence the concentration of sales in this sub-camp.

<sup>5</sup> IFC, 2018. Kakuma as a Marketplace. Retrieved from <http://documents.worldbank.org/curated/en/482761525339883916/pdf/125918-WP-Kakuma-as-a-Marketplace-PUBLIC.pdf>



**Figure 3 Industrial stoves sales per camp unit**



**Figure 4 Solar product sales per camp unit**

Based on the sales figures achieved under the first phase of the project, the MBEA approach appears to be more effective in promoting lighting solutions and higher quality cookstoves. The higher uptake of energy access products among host community households shows the importance of higher disposable income and ability to pay among the target market in driving uptake. Nevertheless, the steady uptake for lighting solutions among refugees demonstrates a willingness to pay even among lower-income households.

The lower end cookstoves market is served by the free stoves provided to new arrivals in the camps and has otherwise been supplemented through past projects undertaken by UNCHR and partner agencies. The SPU and individual businesses selling artisanal stoves located within the refugee camps and host community also continue to serve this market segment.<sup>6</sup>

<sup>6</sup> Sawa Consulting, 2019. End term evaluation MBEA I.

### 3. Key lessons and recommendations

The MBEA project has shown promising results in transitioning to market-based models for energy provision in a humanitarian setting. However, challenges remain and learning and recommendations from this project are feeding into the ongoing subsequent interventions, including the MBEA II follow-up phase.

The following lessons and subsequent recommendations were identified:

#### Stakeholder & private sector involvement

Multi-stakeholder involvement is key to make the transition to a sustainable market-based energy access model in the camp and host community. All stakeholders must be willing to commit to achieving the transition.

- Close coordination with local government and local stakeholders is key. The firewood and charcoal business is an important source of income for the host community. The economic interests and livelihoods of the host community must be considered when introducing alternative fuels to the camp to ensure buy-in and sustainability. In addition, the host community showed a significant opportunity for sales and should continue to be integrated into the project design and sales strategies for companies.
- Involving refugee community leaders is a key factor in successful market building. Negative experiences with certain types of products or companies can potentially harm the refugee communities' acceptance and lead to market spoilage. To prevent this, regular sensitisation and involvement of community leaders is important.
- Private sector engagement should continue to be stimulated, for companies to commit to a long-term presence in the camp and host community, and broader expansion into the county. Key is to leverage the private companies' capital and expertise in identifying market needs without too much guidance by the project. This includes the recruitment and training of LMEs for local distribution - experience shows that companies working with existing LMEs or small businesses performed better than those using the LMEs selected and trained by the project.
- Coordination between humanitarian agencies and more technical support and alignment in the design of energy interventions will lead to the complementarity of interventions and maximisation of synergies to drive more sustainable technical solutions for businesses and institutions.

#### Awareness raising and behavioural change

Marketing efforts need to be complemented with awareness raising and sensitisation to increase acceptance and adoption of clean energy products. Within the refugee community, specifically among zonal and block leaders, there was an initial resistance against introducing market-based models based on the argument that refugees have no capacity to purchase such products. In addition, traditional open-fire cooking practices are deeply rooted in the day-to-day routines of many refugees. Considering different languages and cultural differences and

sensitivities within the design of the awareness-raising campaigns was essential in delivering the message to the various groups living in the camp.

Awareness creation, educational activities and events were an effective tool to increase acceptance and demand for clean energy products, but their duration was considered too short and implementation too fragmented. However, the private sector companies indicated that for the size of the market, the pricing levels, competing products and the level of awareness of new products, the duration of the marketing and awareness campaign was considered too short. To create a meaningful market and stimulate uptake, these activities should be sustained continuously for at least 6-12 months.

In addition, refugees and host community members continue to use firewood. Besides increasing the availability of improved stoves and alternative fuels, more efforts are required to drive deeper behavioural change to realise a transition from open-fire cooking towards using improved cookstoves and/or alternative fuels. Alternative communication channels, such as digital platforms providing bulk messaging to reach refugees and host community should be explored to serve these efforts.

### **Improved cookstoves and alternative fuel supply**

Solar companies were quick to enter the camps and deliver results, while attracting cookstove companies, in particular those that supply stoves with alternative fuels, turned out to be more challenging. So far, the cooking solutions available in the market are mainly wood and charcoal-based stoves; refugees and host community members continue to predominantly use firewood.

Although bioethanol stoves were successfully sold in the camp under the project, the main challenge was continued and steady supply of bioethanol fuel. The project partner who sold bioethanol stoves in the camp was unable to maintain fuel supply to the camp, which has led to customers not being able to use their stoves. This uncertainty of fuel supply negatively impacts the willingness of refugees to move to cleaner fuels and needs to be addressed to prevent market spoilage of future efforts. Going forward, the sustainability of alternative fuel supply needs to be ensured by stove suppliers prior to the start of their marketing activities.

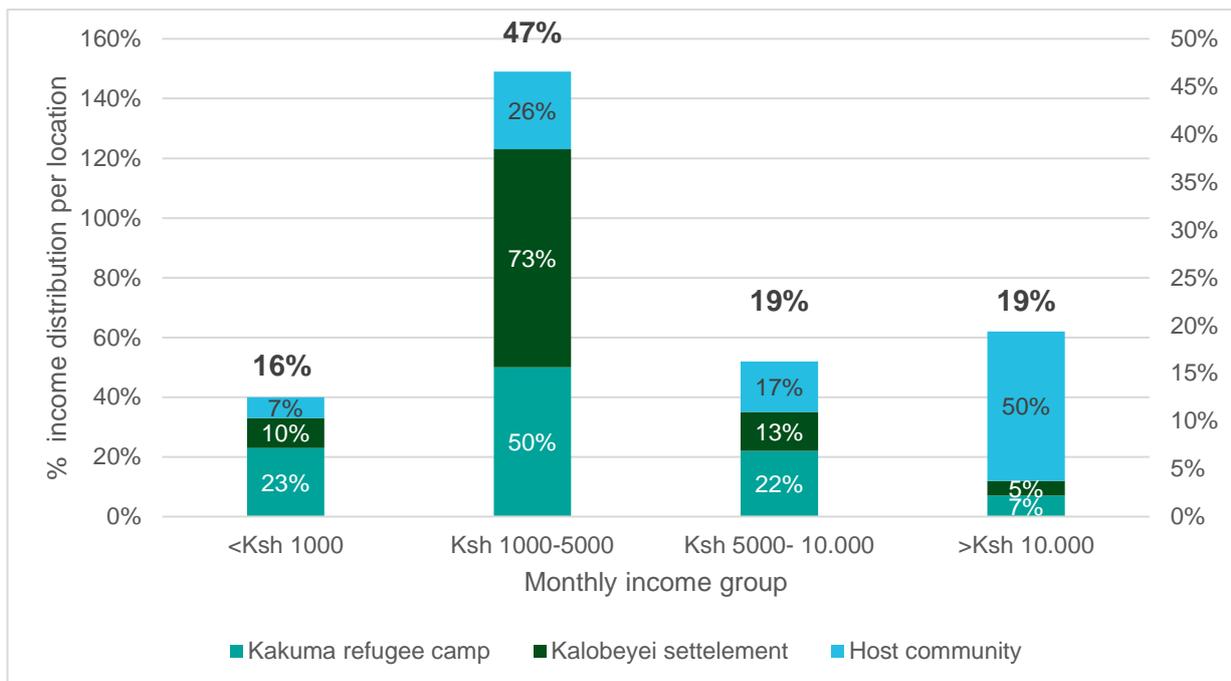
Lastly, the high upfront payment costs for industrially manufactured stoves is a main barrier preventing people in the lower income segment from purchasing new stoves. A solution could be based on paying for stoves in instalments via fuel payments overtime. Further suggestions are provided in the next section on access to finance.

### **Access to finance**

The reported sales figures demonstrate a degree of purchasing power among the refugees and the host community, at least for part of the population. However, at least 16% of both the refugee and host community earn less than KSh1,000 per month<sup>7</sup> (Figure 5). Those people living in the camp will likely remain dependant on UNHCR support. This needs to be considered in future access to energy initiatives.

---

<sup>7</sup> Move on Afrika Ltd. 2019. Sales monitoring assessment for MBEA.



**Figure 5 Monthly income distribution per location**

A few observations and challenges with regards to payments and access to finance were identified:

- Pay-as-you-go payments for solar products were well accepted by customers due to the relatively high penetration and awareness about Safaricom’s mobile money platform (MPESA) in the host community and within the camp. However, a refugee-ID can only subscribe to an MPESA account for a maximum of 3 months. Based on anecdotal evidence from companies, this can make it more difficult for companies to sell their products using mobile money payments. The inability to track customers among refugees also resulted in a high risk of defaulting payments for pay-as-you-go SHS. MPESA registration issues should be addressed to increase the use of pay-as-you-go payment methods.
- Small businesses selling solar products and cookstoves often lack the capital to purchase sufficient stock up-front. This creates a dependence on companies and suppliers to provide favourable payment terms which increases the risk for those companies to operate in the camp. The potential of microfinance institutions to provide credit to end consumers and stock financing to small businesses should be explored and facilitated.
- LMEs are typically paid a commission per sale, so they don’t earn if no sale is made. This can lead to a lack of due diligence and/or inadequate provision of information on the product or sales terms to the end customers, leading to insufficiently informed customers and defaults. Continuous training should be provided to LMEs to improve their interaction with customers, and commission-based engagements should be reviewed. Additional or alternative incentives might motivate LMEs to apply more due diligence and improved information sharing to end consumers.
- The lack of purchasing power among refugee households remains a barrier for people with low income levels to access clean energy products. Targeted interventions could increase the uptake of solar and stoves within this group:
  - A longer duration of payment terms leading to smaller monthly repayment rates can make a product more accessible to those with inconsistent sources of income.

- Community self-help groups can enable members to support each other and act as guarantors for the purchase of solar products.
- A cash-based initiative for energy that targets diversification of fuel supply (away from free firewood allocations) can potentially unlock access to cleaner cooking solutions for refugee households with low purchasing power.

### Decentralised operations

Decentralisation of supply and maintenance operations leads to improved customer service and should be expanded further to drive market sustainability:

- Ready availability of products in the camp has at times been an issue. Logistics and delivery costs for companies can be reduced by setting up a local logistics system, e.g. through a shared storage space.
- Spare parts needed to repair malfunctioning solar products are often not available in the camp, leading to long repair times. This discouraged people from purchasing products. Solar companies can make spare parts available locally and set up repair centres to speed up repair processes.
- The area lacks a framework for the safe disposal of products that reach their end of life. A policy and/or requirement for private sector project partners with regards to e-waste should be explored (within the wider context of e-waste management).

## Recommendations in short

1. **All stakeholders must be included and willing to commit to achieving the transition to a market-based model for energy access.**
  - Stimulate continued **private sector engagement** to ensure long-term commitment and expansion.
  - Coordinate closely with **local government and stakeholders** to drive acceptance and uptake of products, including community leaders.
2. **Coordinate closely with partner organisations to maximise synergies and complementarity of interventions.**
3. **Complement marketing efforts with awareness raising and sensitisation to increase acceptance and adoption of clean energy products.**
4. **Focus on attracting industrially-manufactured, high quality cookstove suppliers while ensuring sustainable supply of alternative fuels.**
5. **Address access to finance barriers and payment challenges:**
  - Address **Mpesa registration issues** to increase use of pay-as-you-go payment methods.
  - Explore **micro-finance solutions** for end consumer credit and stock financing to small businesses.
  - Provide **continuous training to LMEs** to improve their interaction with customers, review commission-based engagement and explore alternative incentive approaches.
  - Explore **targeted interventions to promote uptake among low income households** such as longer repayment periods, use of self-help groups and cash-based initiatives.
6. **Decentralise maintenance operations to local level for improved customer service.**
  - Set up **joint storage spaces** to reduce logistics and delivery costs.
  - Invest in **local maintenance** services to speed up repair time.
  - Investigate need for **e-waste** management framework for private sector project partners.

### MBEA II project

The [MBEA II project](#) was designed based on the learnings from MBEA I and started in September 2019 with an envisaged end date of March 2023. The project continues to support solar and clean cooking companies in promoting stoves and solar for **households**. The project scope was further expanded to solar-powered **productive use technologies for businesses** in the camp. In addition, the new phase also explicitly focuses on the promotion of stoves and small-scale solar solutions for **social institutions** in the camp. Specific attention is given to promoting **innovative and sustainable financing mechanisms** through stimulating access to finance for stoves and solar products through supporting existing financial intermediaries. Within these project components, special attention is also given to **behavioural change** and awareness raising to further stimulate the adoption of clean energy products, especially for clean cooking.

# Want to know more?

Email the MBEA project team on [snvendev@snv.org](mailto:snvendev@snv.org) or visit the [MBEA II project webpage](#)

## MBEA project team:

Karlijn Groen  
Merijn Havinga  
John Njogu  
Susanne Hounsell

## Funded by:



## Coordinated and implemented by:

