Session 1 Track B: Electrification

10:30-12:30 CAT
Room B
Part 1: Mini-grid implementations in displacement contexts

Moderator: Mattia Vianello
Practical Action
Part 1: Mini-grid implementations in displacement contexts

Richard Mori
Meshpower

Emmanuel Aziebor
Mercy Corps

Eva Hatzidemou
Shell

Kevin Mwangi
GIZ
Discussion and Audience Q&A

*Mini-grids*
Mahama Refugee Camp Mini-grid

Richard Mori, CEO MeshPower Ltd, May 16th 2022
Background to Mahama

1. Created in 2015
2. Hosts over 50,000 Burundian and Congolese refugees
3. Alight (formerly American Refugee Committee) runs the health clinic and managed the diesel generator powering the camp management facilities
Original aims for the project

1. Reduce diesel consumption
2. Promote economic development for the community through the provision of electricity
3. Demonstrate a sustainable model for camp electrification
Partners

• Alight as humanitarian partner and driving force for project
• Imperial College London and Strathmore University as research partners
• Funded by donors in the US and research funding from Imperial College London
Phase 1: PV system

- 18.36kWp AC coupled system
- 30kVA inverters
- 80kWh battery bank
- Original 20kVA generator used as automatic backup
Phase 2: connecting the market

• Extend distribution line to the market w/ streetlights
• Connect 12 market connections
• Evaluate demand and create structure to receive investment to scale up the project
Challenges & lessons learned

• Camp access, especially w/ COVID (1 year delay for phase 2)
• Limitation of donor model when dealing when needing to scale up
• Importance of a strong humanitarian partner; Alight was critical at every stage and a valuable partner
Welcome
Ethiopia Somali region: our vision

Enter Energy Ethiopia

Phase 1
- GODE: ESCO to phase-out diesel generators of UN and Mercy Corps facilities (40+kWp)
- JIJIGA: Solar-PV minigrid for refugee and host communities of Sheder camp (300kWp)

Phase 2
- DOLLO ADDO: ESCO to phase-out diesel generators of UN and Mercy Corps facilities (100+kWp)
- Solar-PV minigrid for refugee and host communities (Megawatt-scale)
Private Investors

ESCO Mini-grids

DEMAND ACTIVATION, LIVELIHOOD PROGRAMMING

OFFICES, FACILITIES
BUSINESSES
HOUSEHOLDS

Financing mechanism

Philanthropic Capital

Special Purpose Vehicle (HumEn PLC)

Patient Equity/Debt

MERCY CORPS

Ethiopia
Laying the grounds

The partnership between Shell and Mercy Corps allowed Enter Energy to:

- Investigate the **regulatory environment** and possible investment routes
- Build relationships with **national stakeholders**
- Navigate the **ease of doing business in Ethiopia**
- Engineer **livelihood opportunities**
- Attract partners for **EPC, O&M**
Lessons learned

• Understand regulations and how to navigate them

• Be ready to propose, test and adapt many times

• Diversification of revenue sources is essential

• Energy capacity gap extends beyond humanitarian actors

• Attract the right partners by offering a vision on scale up and financial backing.

• Demand stimulation is equally important as supply.
Why this model and what else is needed?

- Brings private sector-led renewable energy infrastructural investments with a humanitarian mandate
- **Ambitious** 36-month roadmap: portfolio of locations, business models and clientele
- **First mover advantage**: first commercially licensed minigrid operator with foreign investment

**CRITICAL NEXT STEPS**

- Diversify capital mix
- Regulatory approvals
- Commitment from humanitarian organizations
Electricity Access in Displacement Settings: Mini-grids in Kenya
Full project title: Support to UNHCR in the implementation of the Global Compact on Refugees (GCR)

Project Component: Energy Solutions for Displacement Settings (ESDS) - Kenya

Commissioned by: German Federal Ministry for Economic Cooperation and Development (BMZ)

Locality: Turkana West Sub-County

Partner: Kenyan Ministry of Energy, Turkana County Government (TCG) and UNHCR

Duration: July 2019 – December 2022
ESDS Project Intervention Areas

**Policy, Coordination and Capacity Development:**
- Development of Turkana County Energy Sector Plan
- Partner’s capacity development

**Greening infrastructure: UNHCR and Partner Organisation:**
- Technical advisory for development of energy delivery business models through market-based approaches

**High tier electricity access for refugee and host communities**
- Advisory service on sustainable energy business models and financing instruments for private sector and end-users
- Promoting access to energy for households and productive users
Established in June 2015 to ease congestion at Kakuma Refugee Camp

Occupies an area of 15 km² divided in 3 Villages

Population: 44,043 (Settlement), 2,174 (Host Town)

Households: 8,635 (KS), 426 (HT)
Mini-Grids Results-Based- Financing (RBF) Facility

<table>
<thead>
<tr>
<th>Project</th>
<th>Technology</th>
<th>Implemented by</th>
<th>Duration</th>
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</table>
Challenges & Opportunities of Electricity Access in Kakuma/Kalobeyei

- **Challenges:** Unregulated, risky and expensive electricity.
- **Opportunity for private sector (also local).**

Power generation system

Power distribution board
RBF Incentive Structure (special for displacement setting)

1. Power plant and distribution system commissioning incentive (premium paid on CAPEX) – 30% of total incentives

2. Connections made (premium paid per household connected and maintained for at least 3 months) – 70% of total incentives

➢ Incentives capped at 50% of project CAPEX; except for Kalobeyei Refugee Settlement and Host Community town mini-grids - @82% subsidy in order to achieve national utility tariff rates. [leave no one behind and do no harm principles]
Clean energy transition
Reliable Electricity for Health Service Provision
Experiences and lessons learned

- Plan how to manage unexpected demand growth while sustaining profitability
- Inclusivity of host and refugee communities to minimize conflicts
- The regulatory framework for development and operation of mini-grids should be flexible and responsive e.g., for tariff adjustments (draft Mini-grid regulations also under review)
- Private sector payback risk guarantee in cases of camp closure.
Experiences and lessons learned

• To ensure that electricity prices are affordable (LNOB, do-no-harm) sustainable subsidies are required.

• More intensive community engagement and buy-in from the onset will help to counter a recipient mentality among the communities and to identify early on site-specific socio-cultural, logistical and other challenges.

• Promote productive use of electricity for sustainability of mini-grids.

• Innovative integration of self generation plants by social institutions to mini-grids could be explored for optimum utilization.
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Discussion and Audience Q&A

Mini-grids
Part 1: Mini-grid implementations in displacement contexts

Moderator: Laura Clarke
Practical Action
Part 2: SHS and De-risking smaller solutions with end user subsidies

Jean Marie Vianney Twagirayezu
Belecom

Dysmus Kisilu
Solar Freeze

David Stonehill
USAID, PowerAfrica
2022 HUMANITARIAN ENERGY CONFERENCE

BELECOM LTD Input and Presentation at the HEC-16 May 2022, Kigali, Rwanda
Location

BELECOM Ltd is a private company operating in Rwanda in the field of construction materials, plumber, electricity and Solar with 20 years of experience. Its Head Office is in Kigali, Nyarugenge District; PO Box 379 Kigali-Rwanda.

In 2019, BELECOM LTD had a partnership with Practical Action and UNHCR in the project of Renewable Energy for Refugees (RE4R) to delivering Solar Home System to the Households in 3 refugee camps in Rwanda where each camp has a shop.

1. Kigeme refugees camp is located in Southern Province, Nyamagabe district. It was established in 2012.
2. Nyabiheke refugees camp is located in Eastern Province, Gatsibo District. It was established in 2005.
3. Mahama Refugees camp is located Eastern Province, Kirehe District. The camp population is mainly Burundians, others are Congolese who were relocated from Gihembe and Kigeme camps, among them are BELECOM Ltd customers.
In Rwanda’s refugee camps, around 60% of households either had no lighting at night or used only basic sources such as candles, kerosene lamps, burning sticks which are often inefficient, these cause high fuel and money consuming.

**Improved Solar Home Systems** are developed to reduce fuel consumption as well as Indoor Air Pollution and reduce risk of fire accidents.

Belecom is selling **affordable Solar Home system to any refugee and resident in host community around the camp** who need to use SHS as his primary source of light.

Also, most of household members in camps (90%) don’t have other source of income apart from UNHCR monthly contribution. Therefore, BELECOM initiate small businesses, trained beneficiaries on financial literacy and secured funding to implement the project, part of which is using to set up a **revolving fund to provide small loans for both refugees and host communities**. The fund promote financial resilience and **support the poorest households to increase their financial capacity and afford SHSs.**
The RE4R project uses market-based approaches to deliver renewable energy interventions.

Under Practical Action Interventions, BELECOM ltd is delivering the below products:

- **Affordable and all in one SHS**
  
  This enables refugees to have an affordable and portable power complete solar kit with lamps for light, a radio system, and ports for phone charging and for other devices like flash disk. The SHS price is almost a half of others on the market, and it is paid on monthly basis within 36 months.

- **Revolving Fund**
  
  The Revolving fund initiate, train and support small business income generating projects (such as selling food stuffs, hand crafts etc), promoting access to financing and private sector investment to increase opportunities for entrepreneurship and wage employment. Through group lending method, customers from low-income level form groups so that each guarantee for the others as they could not afford collateral for an individual loan.
AREA OF ENERGY INTERVENTION; work conducted by Belecom ltd

Below are some of the key activities held in every camp after signing a contract of partnership with Practical Action:

**Activity 1: Camp familiarization/operation arrangement and Promotional activities**
- Camp visit for understanding market details and build relationship with the community in camp
- Awareness raising of SHS in camps, including events and product demonstrations
- Sensitization on off grid solar systems
- Civil Education Program (CEP) to rise awareness of our services and technical questions on SHS
- Promotion of SHS for market activations

**Activity 2: Administrative and operation set up**
- Recruitments of staff and agent in all 3 camps
- Construction of Belecom outlet in all 3 camps
- Training of tech & sales agent agents in all camps
- Change SHS sun king 60 in to new brand SHS of Belecom KO25R
- Upgrade solar panels of customers from 12W up +20W for first 600 customers

**Activity 3: After sales services**
- Maintenance and Repairs of systems
- Payment monitoring (late payment, default)
- Risk management (stolen, returned, broken..)

**Activity 4: Set up revolving Fund**
- Pilot Phase (customer training, disbursement and follow-up)
- Capacity building and training of camp residents
- Contract extension and Roll out
- Capacity building and training of camp resident as loan officers and agents
- Support to vulnerable groups joining the revolving fund
- Payment monitoring and follow up
## AREA OF ENERGY INTERVENTION

### Achievements

<table>
<thead>
<tr>
<th>No</th>
<th>Activities</th>
<th>Achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SHSs installed in households</td>
<td>2508 (continuous)</td>
</tr>
<tr>
<td>2</td>
<td>Participants in Revolving fund as Household representatives (Funded and trained)</td>
<td>Rwf 71,250,600 served to 719 customers (continuous)</td>
</tr>
<tr>
<td>3</td>
<td>Refugees directly employed in the 3 camps</td>
<td>21</td>
</tr>
<tr>
<td>4</td>
<td>Refugees staff agents trained</td>
<td>40</td>
</tr>
<tr>
<td>5</td>
<td>Customers report they feel safer in their homes after dark</td>
<td>90%</td>
</tr>
<tr>
<td>6</td>
<td>Customers report they are able to study after dark</td>
<td>87%</td>
</tr>
<tr>
<td>7</td>
<td>Customers report they are satisfied with BELECOM services.</td>
<td>80%</td>
</tr>
<tr>
<td>9</td>
<td>Trained group leaders</td>
<td>186</td>
</tr>
</tbody>
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The RE4R project draws on Practical Action’s considerable experience in renewable energy programmes in developing countries – working directly with communities to deliver the best energy services and products possible. It also builds on existing tools and methodologies developed through our humanitarian energy work as part of the Moving Energy Initiative and the experiences of UNHCR and government ministries in Rwanda to improve energy access.

Under RE4R, BELECOM secured funding to implement the project to keep low the cost of SHS and revolving fund.

The Revolving fund support small business income generating projects (such as selling of food stuffs, hand crafts etc), promoting access to financing and private sector investment to increase opportunities for entrepreneurship and wage employment.

The subsidies was structured as follows:

- **Solar Home System:** Rwf248,334,000 (around 248,000$) was granted to support Belecom in various implementation activities such as retail outlet construction, training of retail and technician staff, administration cost, covid-19 operations cost etc.

- **Revolving Fund:** Rwf 64,630,800 (around 64,000$) as seed capital to be disbursed to support small business income generating projects.
Below are some of the challenges faced during project implementation:

• Consequences of covid-19; time to time lockdown slow not only the activities of our beneficiaries but also those of Belecom and its customers in general.

• Spare parts and maintenance cost is high comparing to the current market.

• Camp residents relocation (Gihembe and Kigeme)

• High rate of stolen items

• Increase of late payments and defaulters: Due to different challenges faced by refugees; their purchasing power became low which lead them to satisfy first their basic needs like foods instead of paying SHS.

• No provision on loans losses or insurance for stolen items
KEY LESSONS

• Inclusive market-based approach in our businesses

A market-based approach has great potential from the perspective of stakeholders involved from household to national level, to improve access to and use of renewable energy sources for lighting

• Sustainability Key Lesson:

BELECOM business model is tied to refugee needs and we ensure it is profitable to us through innovative and affordable product services eg: Belecom is selling segmented SHS like torches, single lamp etc

• Partnership Key Lesson:

As a private company, it was great opportunity to partnering with humanitarian organisations like PA, the GoR and UNHCR as key stakeholders in the humanitarian setting; this has improved our experience and our strategic market.

• Adaptation Key lesson

New initiatives were put in place to address the risks associate with camps lock down due to COVID 19 pandemic like online trainings, sending spare and new products by courier etc.

• Skills and leadership development

A number of staff within the camp was trained on financial literacy, technical skills for them to be able to train beneficiaries; customers get skills on how to use properly their finances as well as their SHS kits

Those customers work in group, each group has a leader or chairperson, a secretary and a treasurer. The groups are to choose their own leaders. This ensures internal rules, regulations and discipline in the group are followed
LOOKING FORWARD

• Include host communities partners (local leaders, beneficiaries representatives) from Project planning and implementation to ensure success and sustainable achievements over time. It was not easy to work with host community beneficiaries as Households in those places who need our services are far from the camps and they are so scattered apart for us to not reach them easily. As private company, it was more costly to replicate and scale services and products beyond the refugee camps into surrounding communities.

• Reinforce revolving fund modality to create acceptable community savings and lending groups. Integrate awareness rising about formal credit options into technical and business management training and productive use of energy workshops for entrepreneurs.

• Further reduce financial barriers that inhibit uptake of renewable energy products and services.

Advocate for private companies or financial institutions to develop loan products suitable for displaced communities and where possible, work with existing structures to strengthen business owners’ collateral by facilitating the formalization and registration of business activities and capital assets.

• Support Private Sector to work with vulnerable people;
Together with Humanitarian settings, private sector can help refugees, resettled populations from high-risk zones, rural model villages, and urban and peri-urban citizens to switch from non-renewable energy sources to solar lighting and financial support in way that beneficiaries participate in those activities.
THANK YOU!
Provide temperature control via PAYGO

**THE DEAL**

**SOLAR FREEZE**
- Cold chain as a Service
- 5000 KSH or USD$50

**SME’s, Clinics**
1. Kakuma camp is a melting pot of more than 160,000 refugees and displaced people, with over 2,000 businesses that meet daily needs.

1. Small and Medium Sized Businesses (SME’s), Clinics and with unreliable and expensive power grid.

3. Pioneering PAYGO for cold storage service offering chest freezers between 200Lts to 350Lts for as low as KSH.5000 per month.
Profit comparison

<table>
<thead>
<tr>
<th></th>
<th>Diesel Connected Freezer</th>
<th>Solar Freeze PAYGO</th>
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<tbody>
<tr>
<td>Income Per Day</td>
<td>$ 25</td>
<td>$45</td>
</tr>
</tbody>
</table>
PRODUCT

120w Solar Panel

Automatic 12 or 24VDC operation

Dual port USB for charging phones

Fully Solar powered

Paygo option (Offline & online) via Mpesa from as low as Ksh. 200 per day for 18 months

12 hrs compressor run time

1 year limited warranty

Scratch resistant galvanised steel exterior
PAYGO for Cold Chain

- Pioneer PAYGO solution MPESA payments, can be accepted in remotely

- The sensors are powered by IoT (Internet of Things) and help in data collection together with analytics
COMPETITIVE ADVANTAGE

- Better Pricing
- Steady Supply
- Pay as You Store
- Cooling
- Increase Sales
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The University of Nairobi-Bachelor or Agribusiness Sales

CORAZON MWENDE- PR
The University of Nairobi- Master of Arts Communication Chartered Institute of Public Relations
Lessons Learned from USAID/Power Africa and the Smart Communities Coalition (SCC)

David Stonehill, Beyond the Grid Team Lead, USAID/Power Africa
May 16, 2022
Highlights of Activities to Date

- **Smart Communities Coalition (SCC):** Founded SCC in 2018 with Mastercard
- **SCC Innovation Fund:** First round launched in 2020, grants awarded in 2021
- **SCCIF Second Round** announced today focused on energy-connectivity-digital tools nexus in Uganda
- **Rwamwanja Settlement Mini-Grids** announced today: $850K in catalytic grants to 2 developers expected to benefit 1,300 homes
- **Uganda PAYGO De-Risking Grants:** $700k for 3 companies entering refugee settlements, over 4k new systems sold & all companies have plans to stay
Lessons Learned

• Knowledge products - **white paper** and **pilot playbooks**
• Examples of lessons learned:
• **Supply-side/supplier financing only works well for productive uses**, as these projects have associated revenue streams that support the ongoing operations; bottom of the pyramid households require demand-side subsidies paired with livelihood stimulation
• **Unexpected partnerships** are often best
Discussion and Audience Q&A

SHS and Electricity Services
Thank you for attending the Electrification Deep Dive session at #HEC2022!