



HUMANITARIAN **ENERGY** CONFERENCE

16 May 2022
Kigali, Rwanda

#HumanitarianEnergy
#HEC2022

Cohosted by



Sponsored by



Norwegian Ministry
of Foreign Affairs



GPA is steered by



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

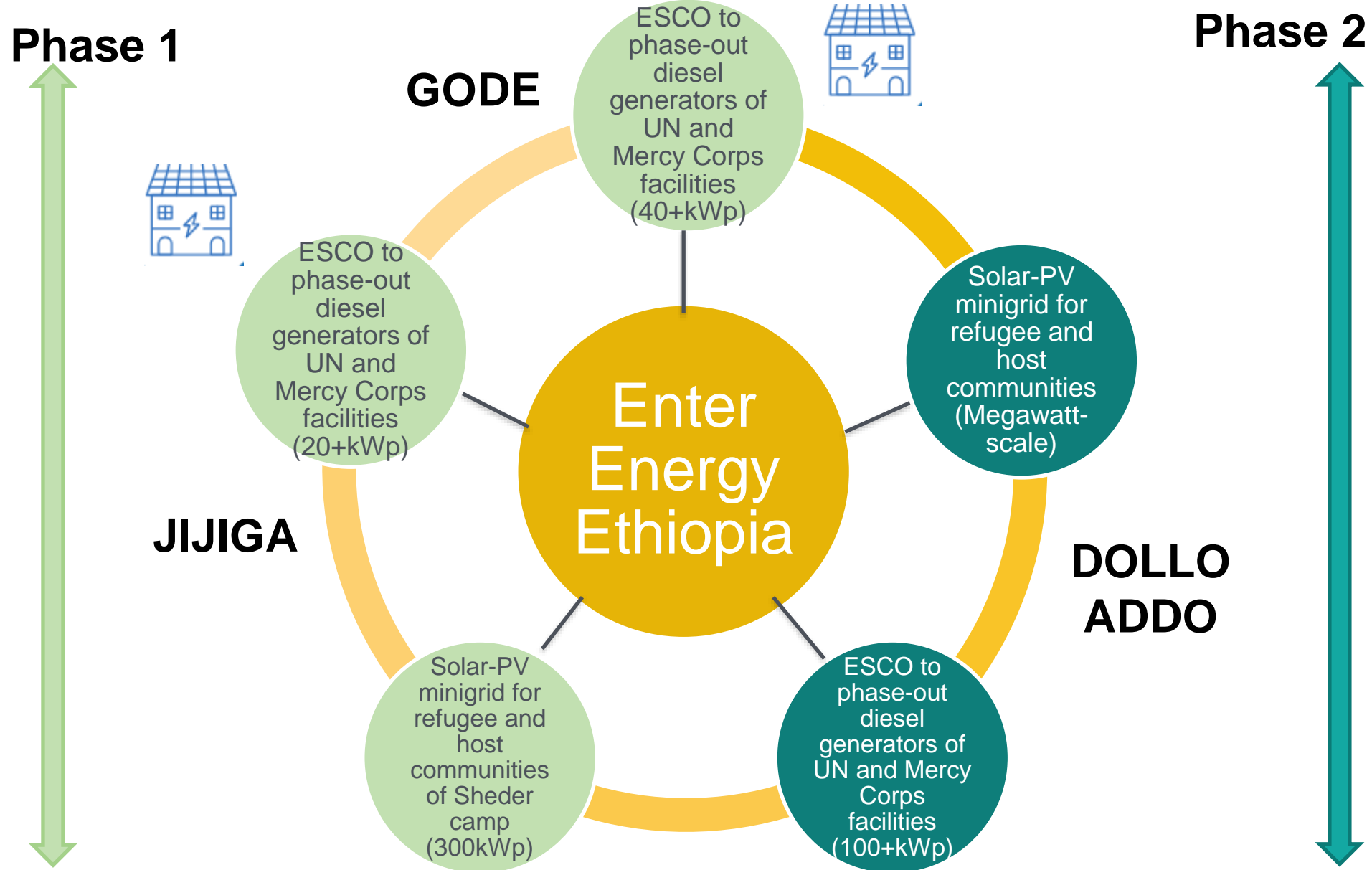
- Camp access, especially w/ COVID (1 year delay for phase 2)
- Limitation of donor model when dealing when needing to scale up
- Importance of a strong humanitarian partner; Alight was critical at every stage and a valuable partner



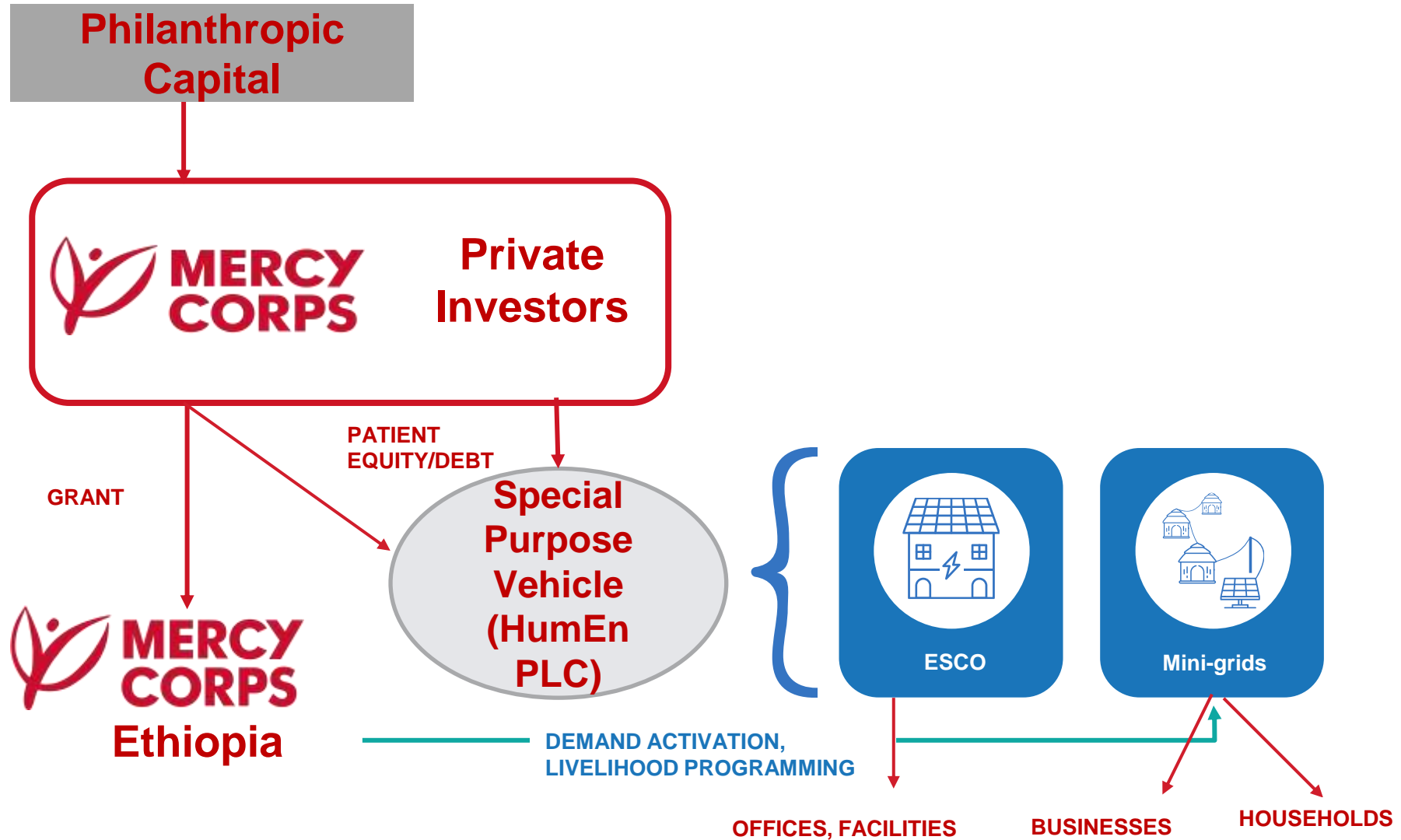
A woman with a warm smile is the central figure, wearing a vibrant, multi-colored patterned headscarf and a matching patterned shirt. She is leaning her chin on her right hand, looking directly at the camera. The background is a densely packed shop or warehouse, with shelves and boxes filled with various goods, including what appear to be food items and household supplies. The lighting is bright, highlighting the woman's features and the colorful patterns of her clothing.

Welcome

Ethiopia Somali region: our vision



Financing mechanism



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



CECILIA RAGAZZI Director | Energy Access
cragazzi@mercycorps.org

EMMANUEL AZIEBOR
Regional Energy Advisor – Africa
eaziebor@mercycorps.org



Electricity Access in Displacement Settings: Mini-grids in Kenya

ESDS 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



Project Area: Kalobeyei Integrated Settlement and Host Town



Figure 1 - Panorama view of Kalobeyei settlement. Credit: Mwangi Kirubi/USAID



Established in June 2015 to ease congestion at Kakuma Refugee Camp



Occupies an area of 15 km² divided in 3 Villages

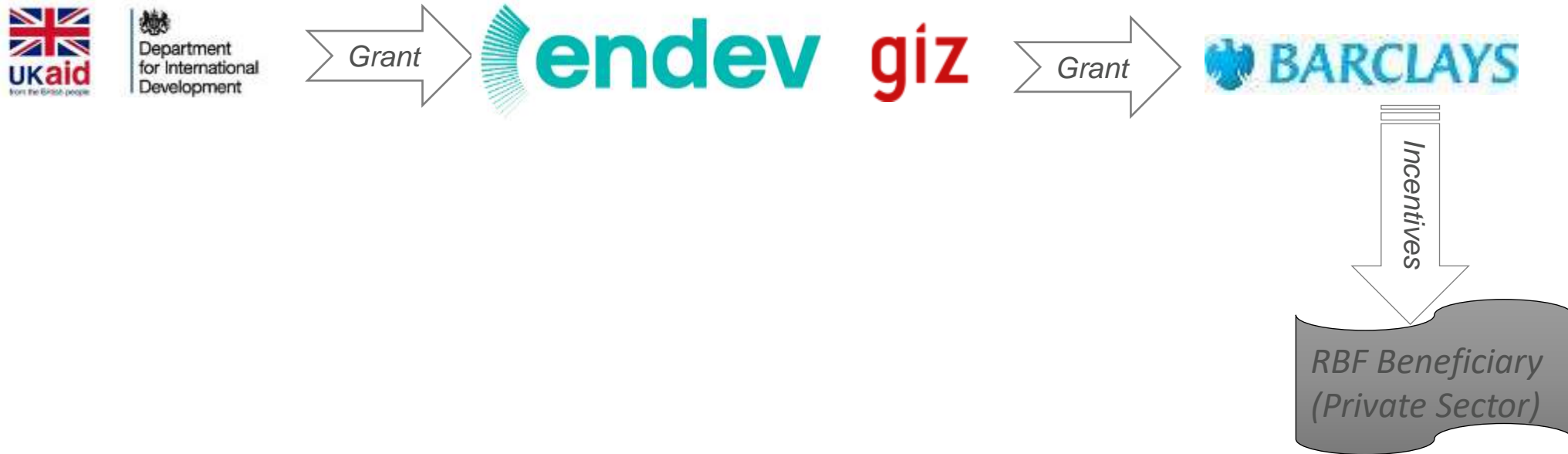


Population: 44,043 (Settlement), 2,174 (Host Town)



Households: 8,635 (KS), 426 (HT)

Mini-Grids Results-Based- Financing (RBF) Facility



Project	Technology	Implemented by	Duration
Market creation for private sector owned and operated off-grid mini-grids	Solar PV -hybrid mini-grids	GIZ/EnDev Kenya and BBK (Absa Kenya)	July 2014 – March 2020

Challenges & Opportunities of Electricity Access in Kakuma/Kalobeyei



Power generation system

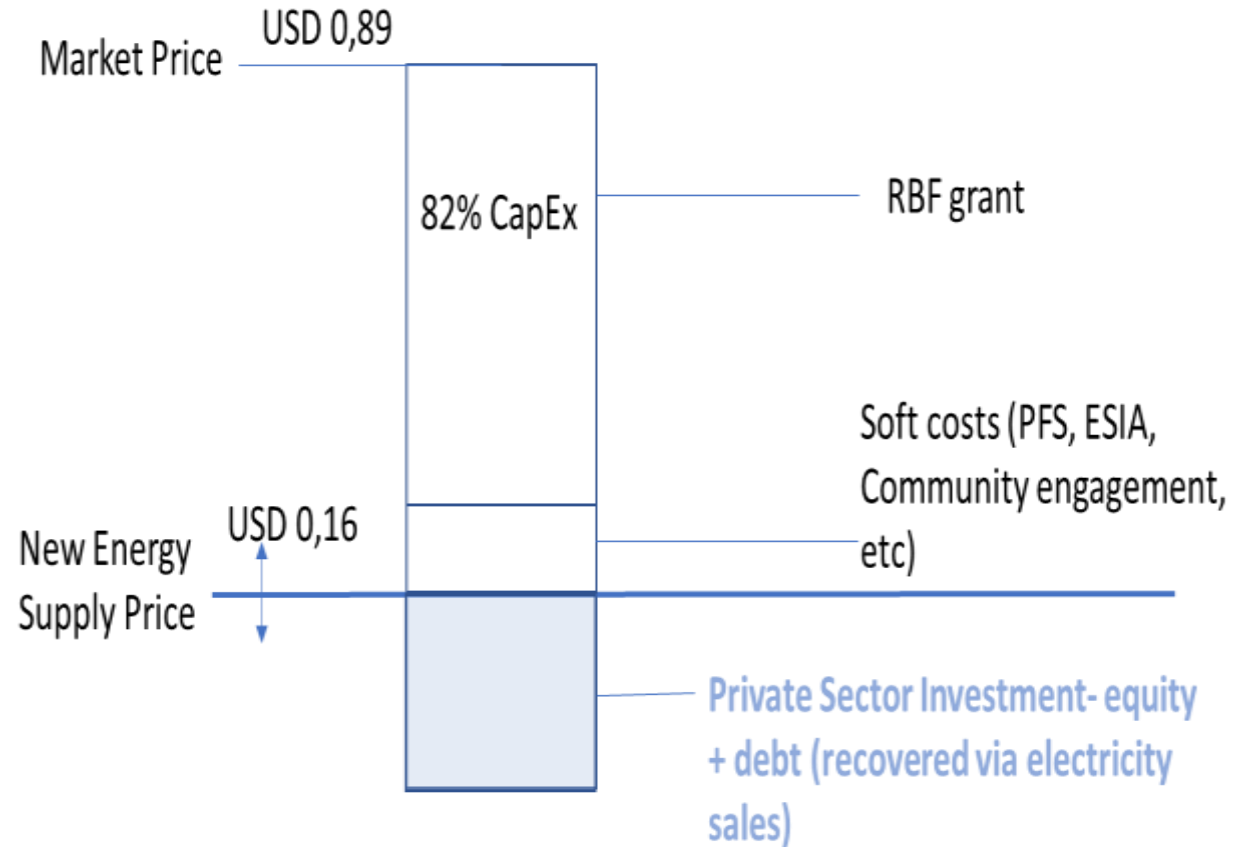


Power distribution board

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

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 Kalobyei 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.

Contact



Kevin Mwangi

Technical Advisor - ESDS Kenya

E: kevin.mwangi@giz.de

Jackson Mutonga

Team Leader - ESDS Kenya

E: jackson.mutonga@giz.de

Cathleen Seeger

Team Leader ESDS Global

E: cathleen.seeger@giz.de

T: +49 303 3842 4401



<https://www.giz.de>



https://www.twitter.com/giz_gmbh



<https://www.facebook.com/gizprofile/>

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



BELECOM LTD

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 Distrcit. The camp population is manly Burundians ,others are Congolese who were relocated from Gihembe and Kigeme camps , among them are BELECOM Ltd customers.

END USERS

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**.

AREA OF ENERGY INTERVENTION

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. Trough 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 hold 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 question 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

- Explanation/document for customer education guide.
- 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

No	Activities	Achieved
1	SHSs installed in households	2508(continuous)
2	Participants in Revolving fund as Household representatives(Funded and trained)	Rwf 71,250,600 served to 719 customers (continuous)
3	Refugees directly employed in the 3 camps	21
4	Refugees staff agents trained	40
5	Customers report they feel safer in their homes after dark	90%
6	Customers report they are able to study after dark	87%
8	Customers report they are satisfied with BELECOM services.	80%
9	Trained group leaders	186

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.

KEY CHALLENGES

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 !



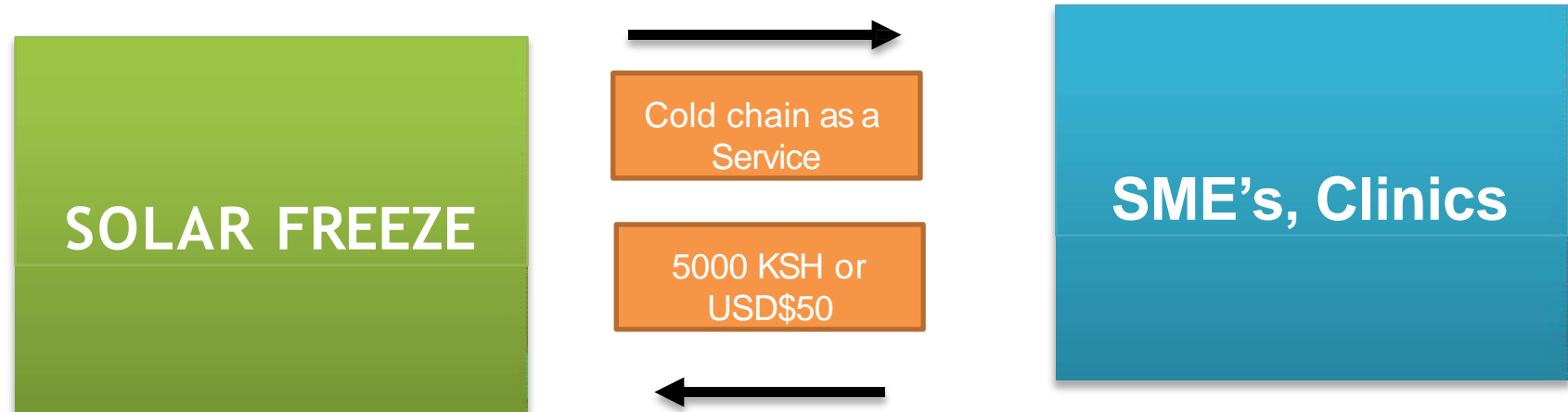
SOLAR FREEZE




www.solarfreeze.co.ke

THE DEAL

Provide
temperature control via PAYGO



MARKET SEGMENT

- 
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



CUSTOMER VALUE PROPOSITION

Profit comparison

	Diesel Connected Freezer	Solar Freeze PAYGO
Income Per Day	\$ 25	\$45

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

PRODUCT



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



TEAM



DYSMUS KISILU-CEO
The University of California, Davis-
Renewable Energy



RYAN DION-PRODUCTION
The University of California Davis-
Bsc. Chemical Physics Director- Re
newable Energy SIG- National Soci
ety of Black Engineers



SYLVESTER NDUNGU-I.T DEV
Kenya Methodist University-
Bachelor of Computer Information S
ystems -Computer Science



FADEKUNAYO ADENIYI- R&D
Doctoral researcher Renewabl
e
Energy- University of
Durham in England



RUTH WANJIKU-SALES
The University of Nairobi-Bach
elor or Agribusiness Sales



CORAZON MWENDE- PR
The University of Nairobi- Mast
er of Arts Communication Char
tered Institute of Public Relatio
ns

THANK YOU



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



[Assessment of Market-Driven Solutions for Energy Access in Refugee Settlements in Sub-Saharan Africa](#)



[Pilot Playbook: De-Risking Pay-As-You-Go Solar Home Systems in Uganda Refugee Settlements](#)

Discussion and Audience Q&A

SHS and Electricity Services

Thank you for attending the Electrification Deep
Dive session at #HEC2022!