Household Electricity Access in Displacement Settings: Mini-grids in Kenya

german cooperation
DEUTSCHE ZUSAMMENARBEIT

Implemented by
giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

UNHCR The UN Refugee Agency

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 – October 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

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 km^2 divided in 3 Villages

Population: 40,846

Households: 7,961

Project Area: Kalobeyei Host Community Town

Figure 2 - Panorama view of Kalobeyei host community town. Credit: Renewvia

Occupies a settlement area of about 2 km^2

Population: 1,000

Households: 195

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

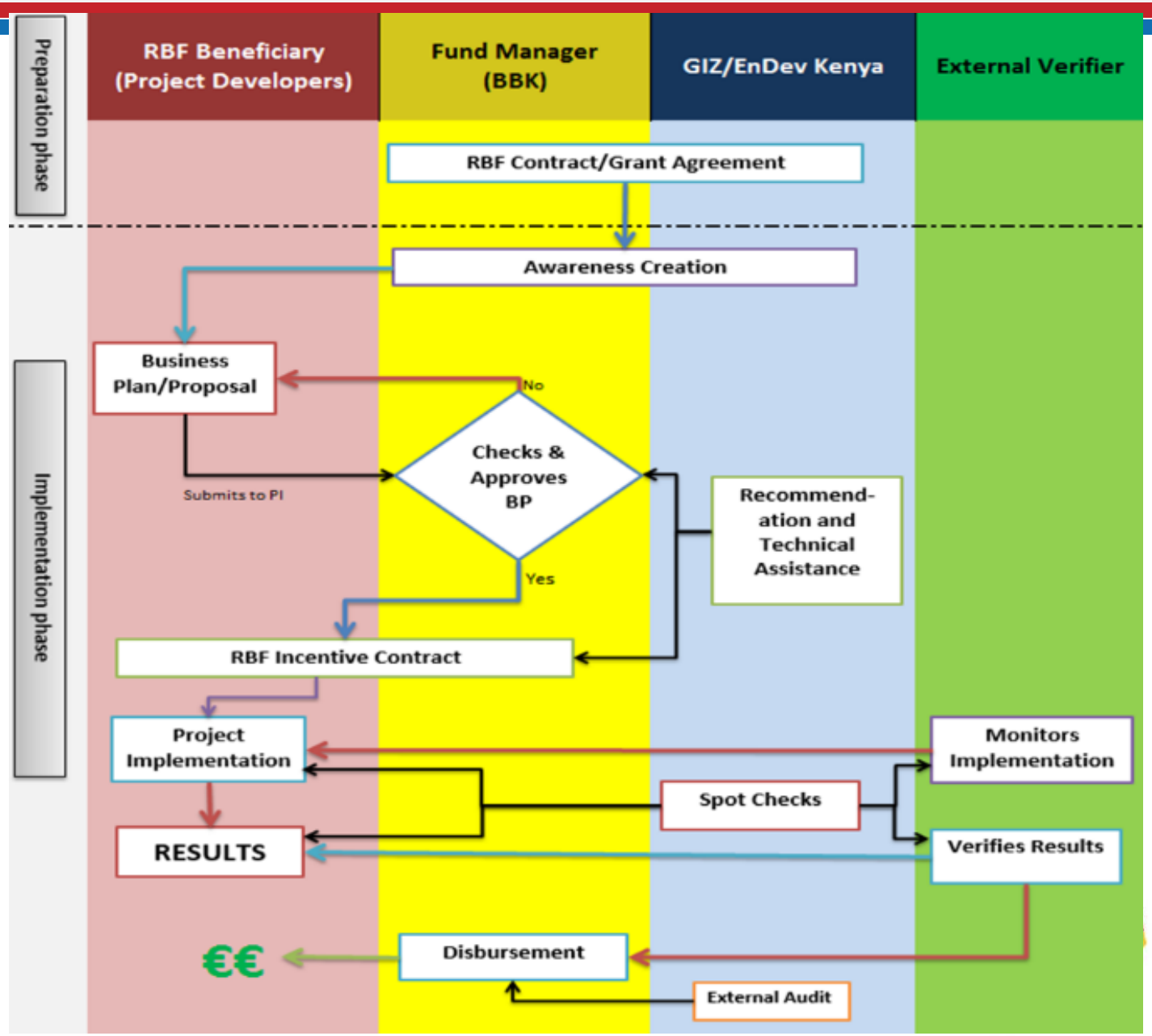
Project	Technology	Implemented by	Duration
Market creation for private sector owned and operated off-grid mini-grids	Solar PV -hybrid mini-grids	GIZ/EnDev Kenya and BBK (Absa Kenya)	July 2014 – March 2020

german cooperation
DEUTSCHE ZUSAMMENARBEIT

Implemented by giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

UNHCR The UN Refugee Agency

RBF Implementation Structure



Challenges & Opportunities of Electricity Access in Kakuma/Kalobeyei

Power generation system

Power distribution board

Challenges & Opportunities of Electricity Access in Kakuma/Kalobeyei

Power distribution network

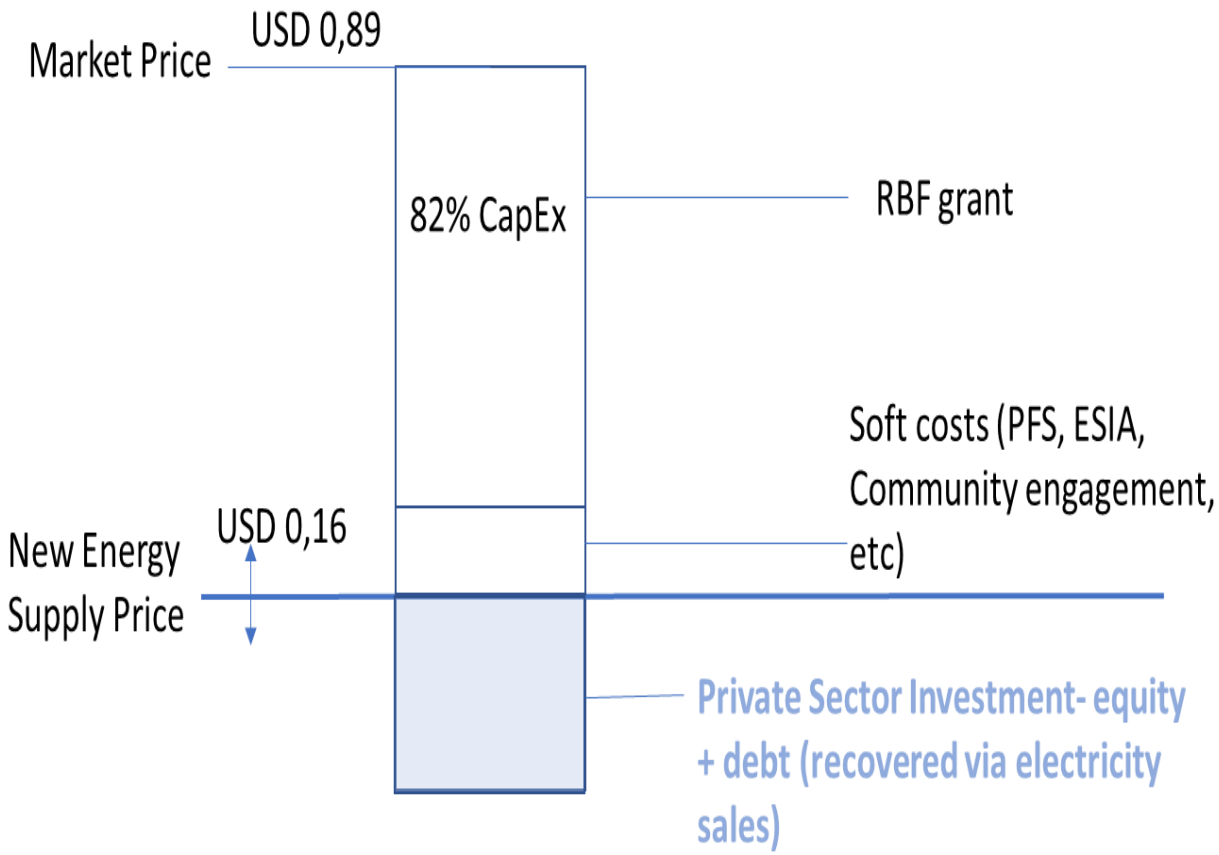
- **Challenges:** Unregulated, risky and expensive electricity.
- *Opportunity for private sector (also local)*.

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 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]*



Project Implementation Process

1. Feasibility studies
2. Approvals (National & County Governments)
3. Tendering and Contracting private sector
4. Stakeholder engagements and land acquisition
5. Permitting (Power supply and ESIA licenses)
6. Financing and EPC
7. Commissioning, Verification & Disbursement
8. Operation & Maintenance and Scaling Up

Stakeholders and Roles

Layers of intervention

Who?

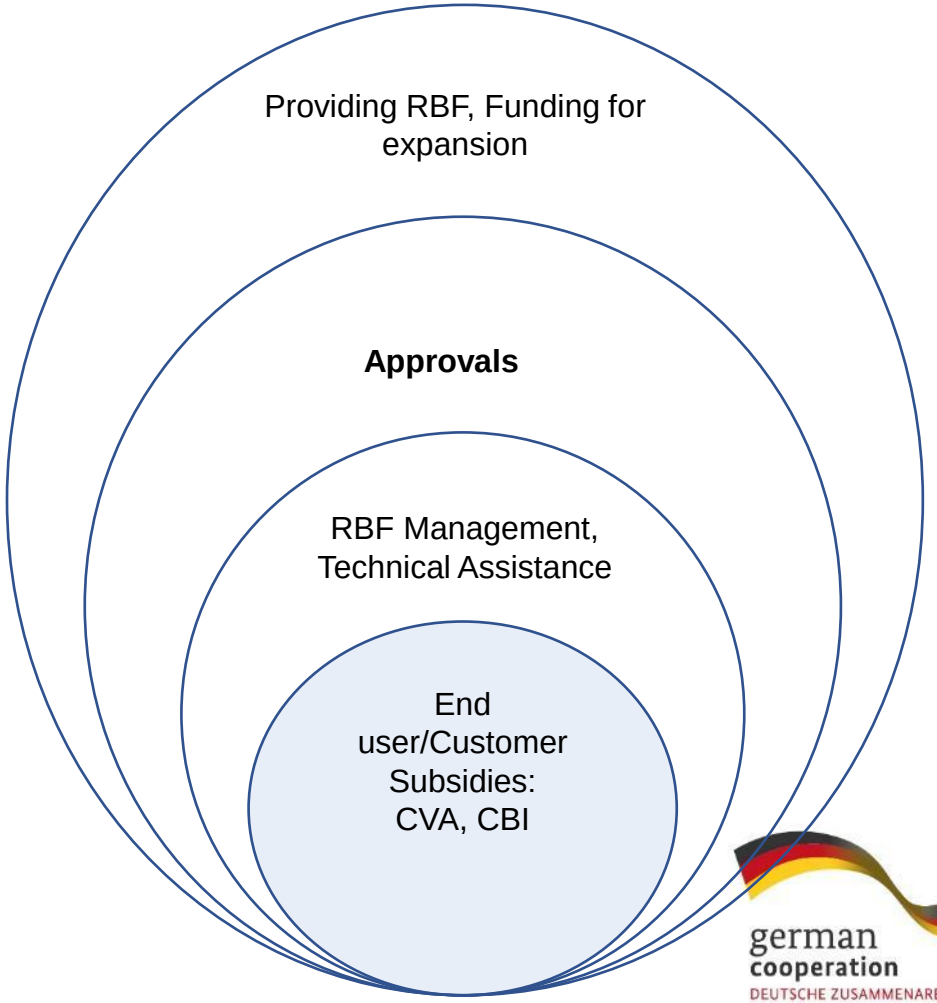
Sponsor and Funder
DFID/FCDO, BMZ

National Supply
MoE, County Government, NEMA, EPRA

Implementing Partner
Private Sector, GIZ, BBK/ABSA

Humanitarian Service Provider
UNHCR, RAS, WFP etc

How?



Doing What?

Drivers for Energy Transition

Power Supply permits and licences approvals

Project **Management and Implementation**

Shelter, **Protection**, WASH, Health, Food, Agriculture, Education, business environment

german cooperation
DEUTSCHE ZUSAMMENARBEIT

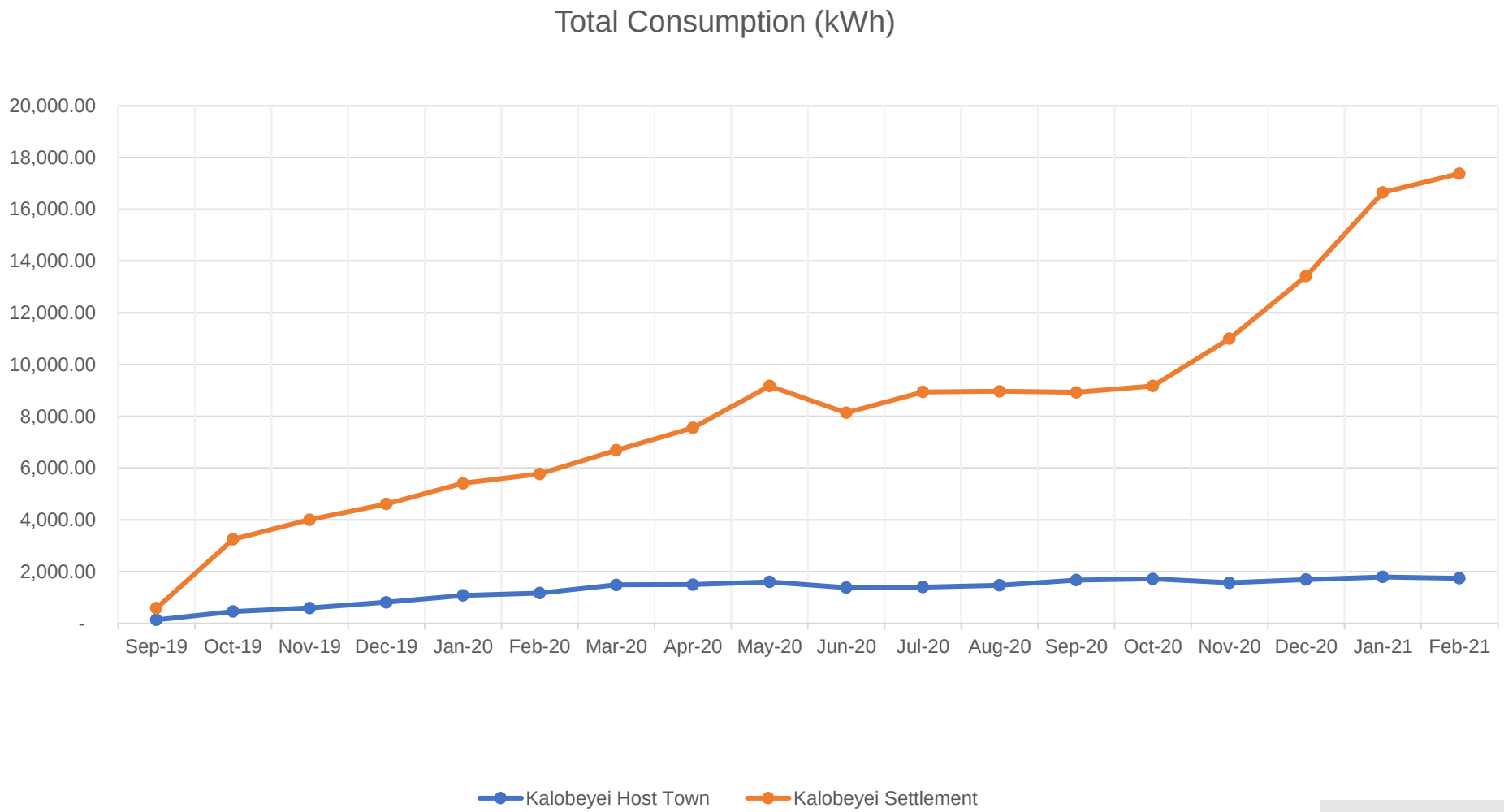
Implemented by giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

UNHCR The UN Refugee Agency

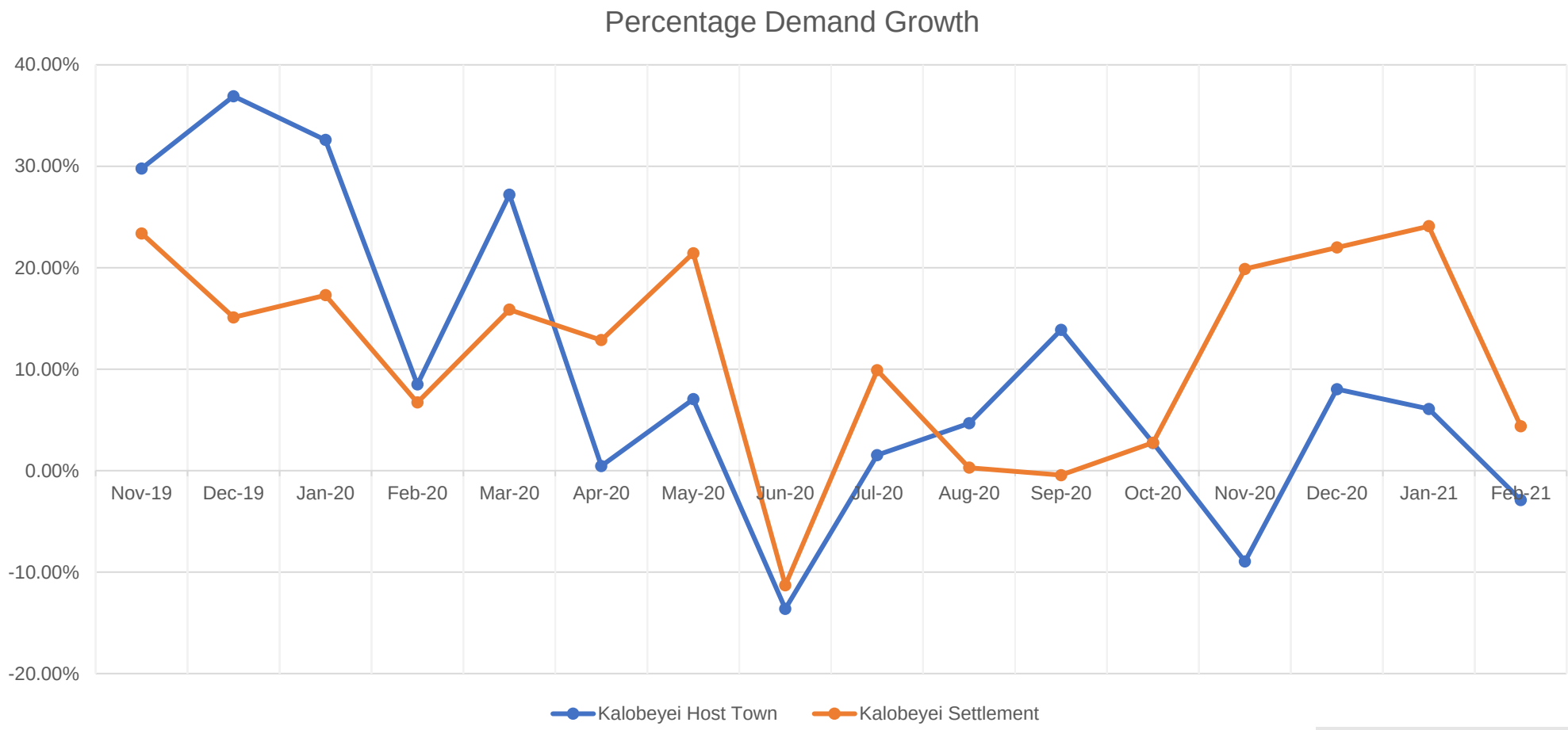
Project Specifications Summary

	Kalobeyei Settlement	Kalobeyei Host Community
Project type	Hybrid Mini-Grid	Hybrid Mini-Grid
Daily production per household	254 Wh	187 Wh
Indicative appliances	Light, Phone, TV	Light, Phone, TV
# hours serviced	24 hours	24 hours
Cooking optional	No	Yes
PUE	Yes, for commercial customers	Yes, for commercial customers
Project Total power supply capacity (Wp)	60 kWp, 100KVA DG, 120kWh batt	20 kWP PV, 10KVA DG, 60kWh batt
# of households supplied	347	97
Connected to the grid (Y/N)	N	N
Hybrid (other connection)	Genset & battery	Genset & battery
Project Cost (USD) per kWp Installed	7,663.45	7,663.45
Monthly USD paid by the beneficiaries for the electricity delivered	Residential 0.16 USD/kWh Business/Institution: 0.20 USD/kWh	Residential 0.16 USD/kWh Business/Institution: 0.20 USD/kWh
Payback period (for the minigrid)	5 years	5 years
Country Implementation	Kenya	Kenya
Rural/Urban	Rural	Rural
Settlement duration and profile	Protracted (6 years)	N/A
Any other relevant information to the specific solution	……	

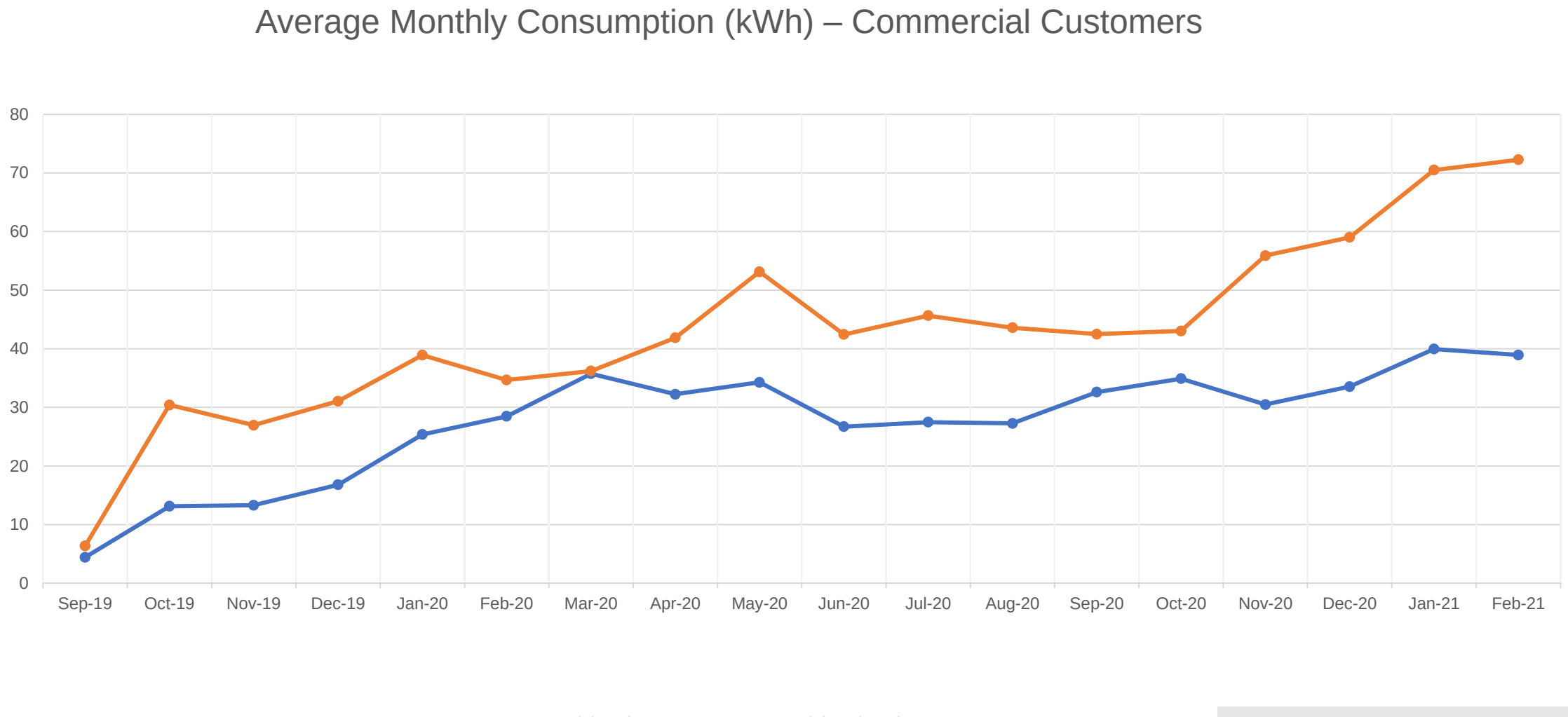
Electricity Consumption Patterns



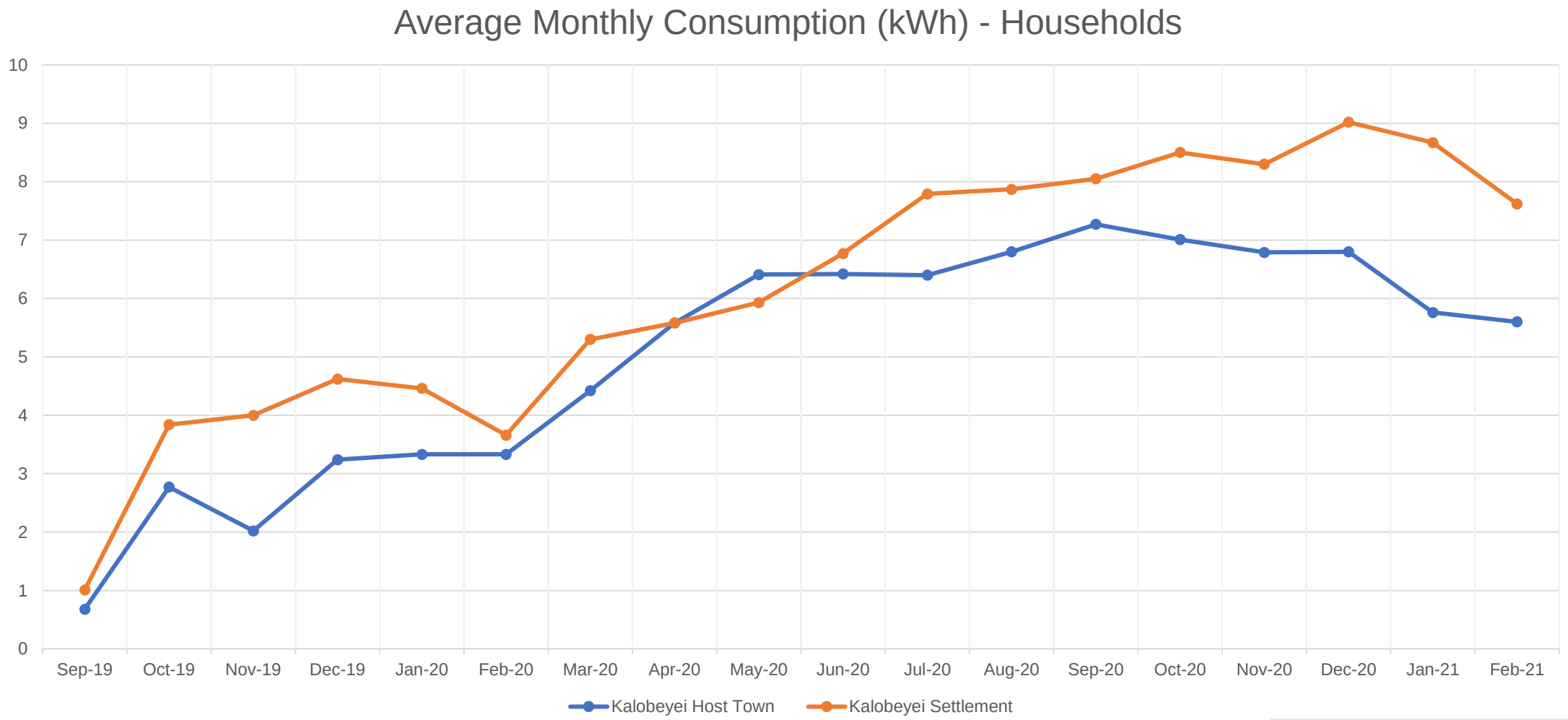
Electricity Consumption Patterns



Electricity Consumption Patterns



Electricity Consumption Patterns

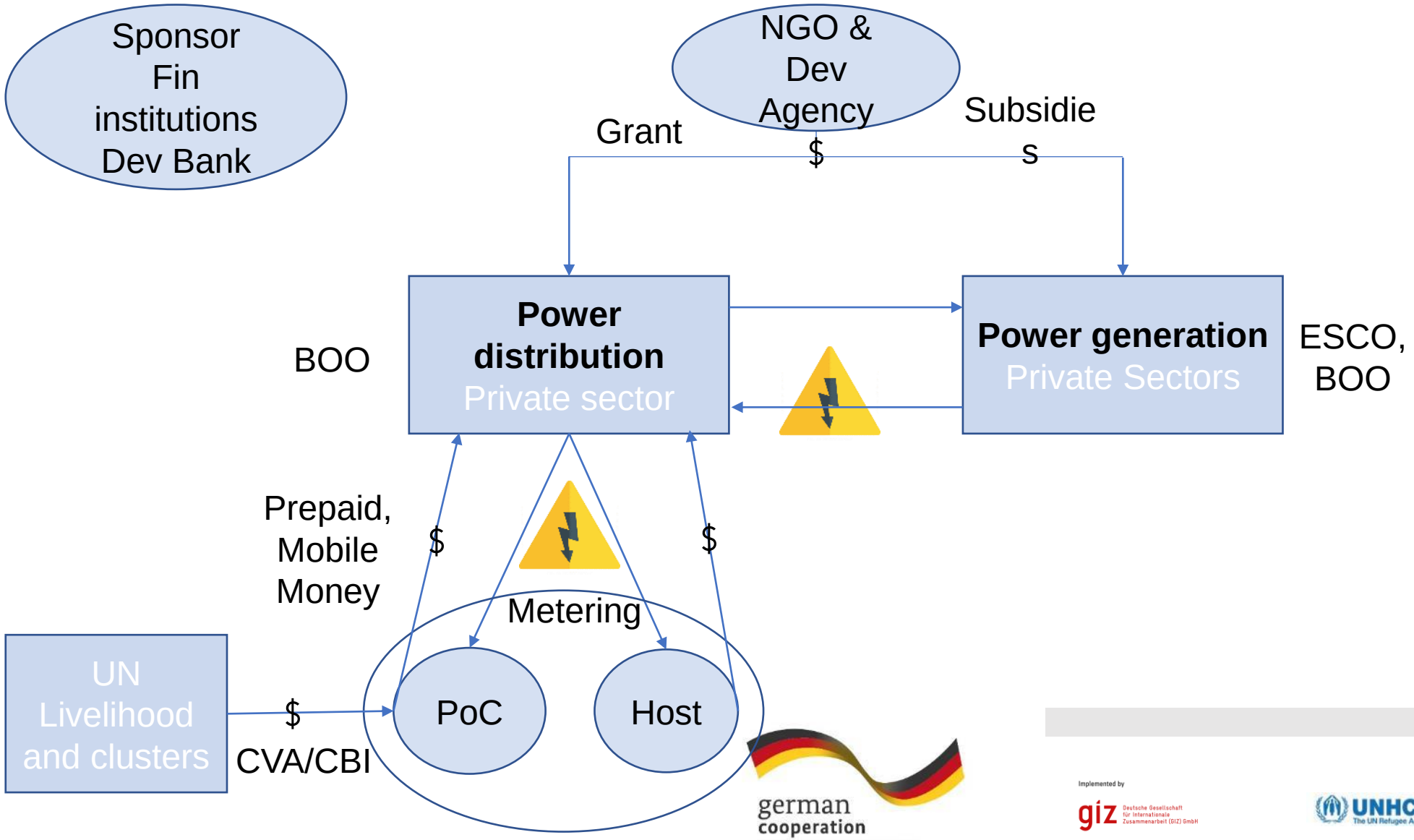


Electricity and Revenue Model

Sponsor and Funder

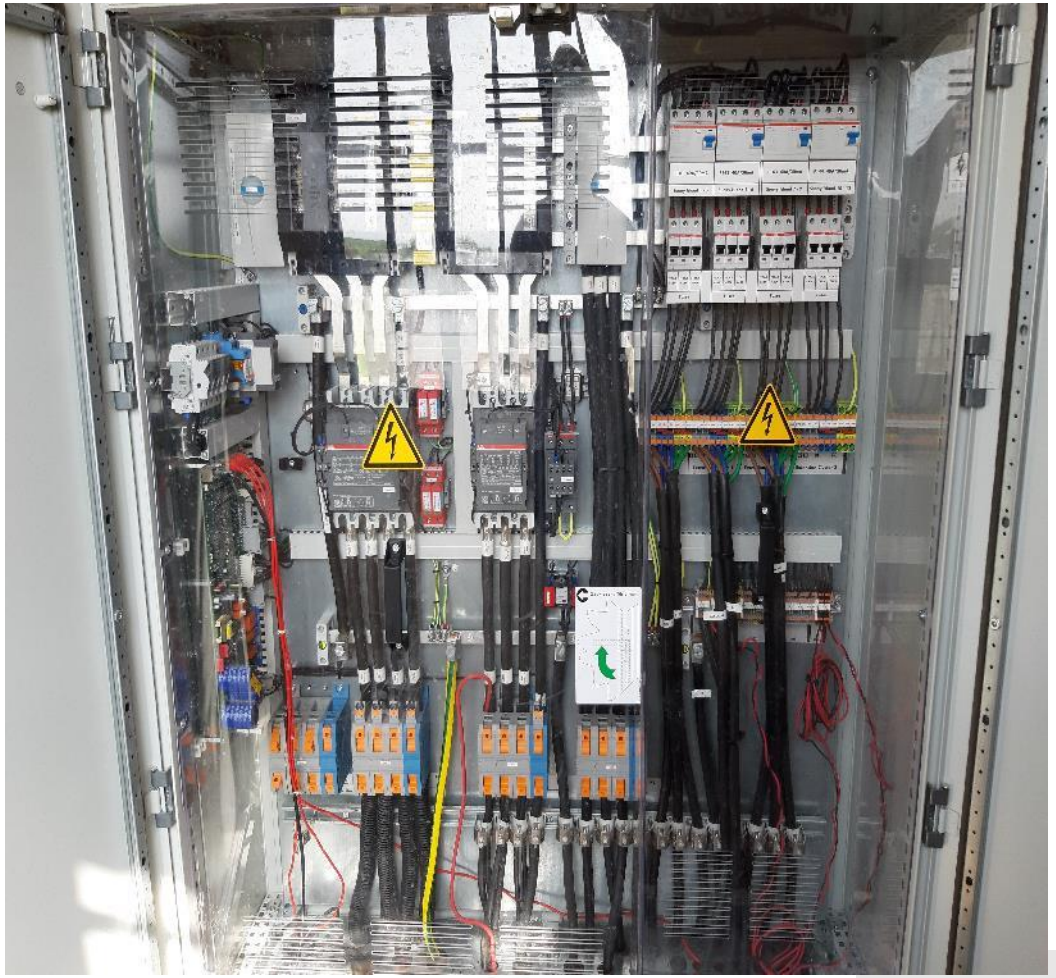
Power Supply

Humanitarian Service Providers



Clean energy transition

Reliable electricity generation & distribution



Safe electricity distribution

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.
- 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.

Contact

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/

Deutsche Gesellschaft für
Internationale Zusammenarbeit (GIZ) GmbH

Registered offices
Bonn and Eschborn

Friedrich-Ebert-Allee 36 + 40
53113 Bonn, Germany
T +49 228 44 60 – 0
F +49 228 44 60 – 17 66

Dag-Hammarskjöld-Weg 1-5
65760 Eschborn, Germany
T +49 61 96 79 – 0
F +49 61 96 79 – 11 15

E info@giz.de
I www.giz.de

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH