



David Lambelet
Co-Founder
david.lambelet@hilyte-power.com
+41 79 356 87 20

Innovative solar kiosks for Energy Access

Neuchâtel, Nov 2021

Image credentials "Mario Cafisone", UniNe

Energy access: a global issue



- ~ **1 billion people worldwide** lack access to the electricity grid
- ~ **600 million** of them live in rural areas of sub-Saharan Africa
- **2 USD/day** is the median household income
- **90%** of them have a mobile phones
- **Energy is 100x more expensive** than in developed countries **in absolute terms**



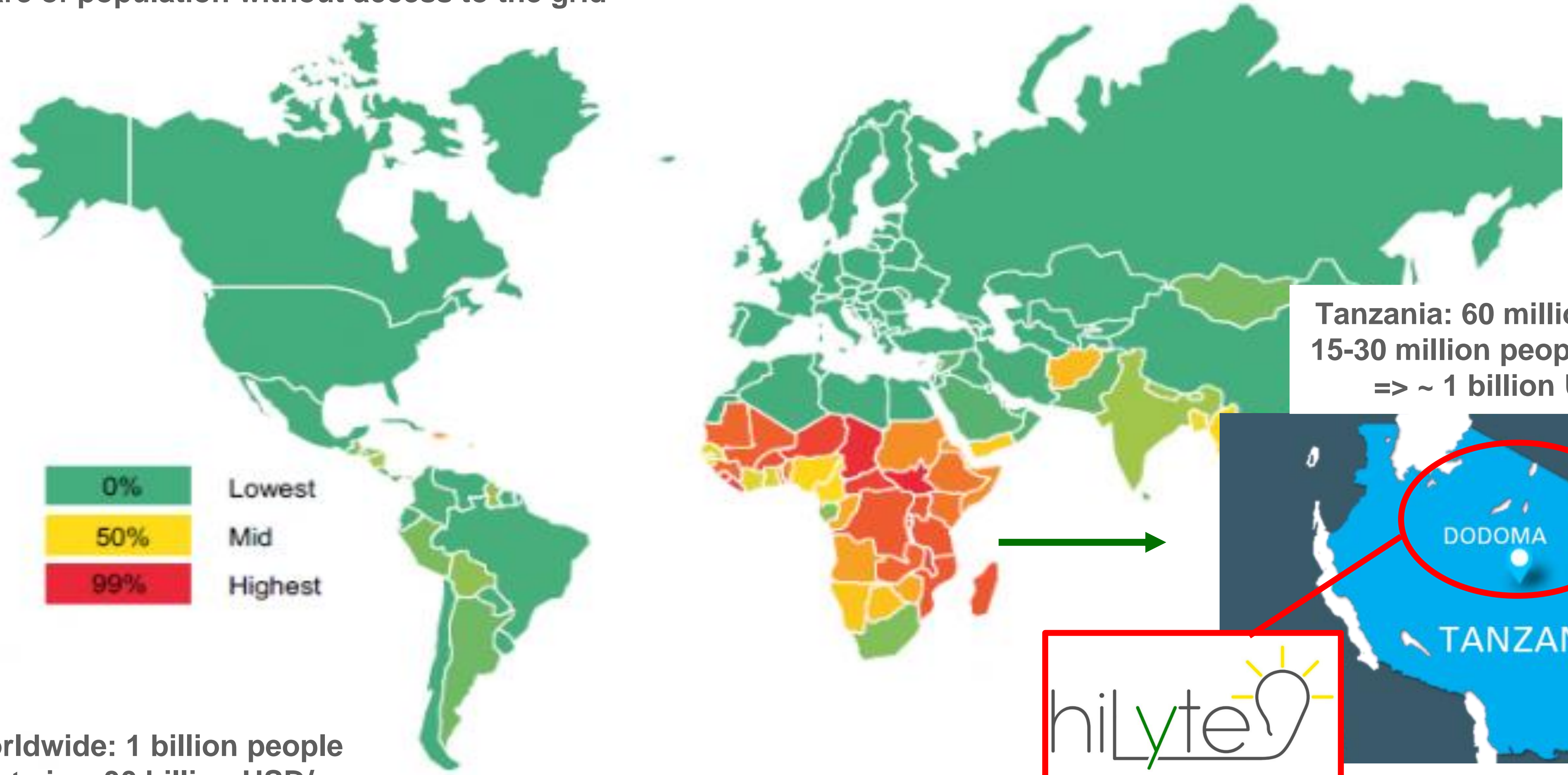
Exemple Masai village



Off-grid energy access market



Share of population without access to the grid



Tanzania: 60 million people
15-30 million people off-grid
=> ~ 1 billion USD !



Worldwide: 1 billion people
Market size: 30 billion USD/year



hiLyte Cube



**Smart power bank with
embedded LED**

- **14h of LED lighting**
- **3 Phone charges**
- **0 USD upfront cost**
- **Not dependent to
weather intermittency**

**Recharged and rented in
local hiLyte solar kiosk**

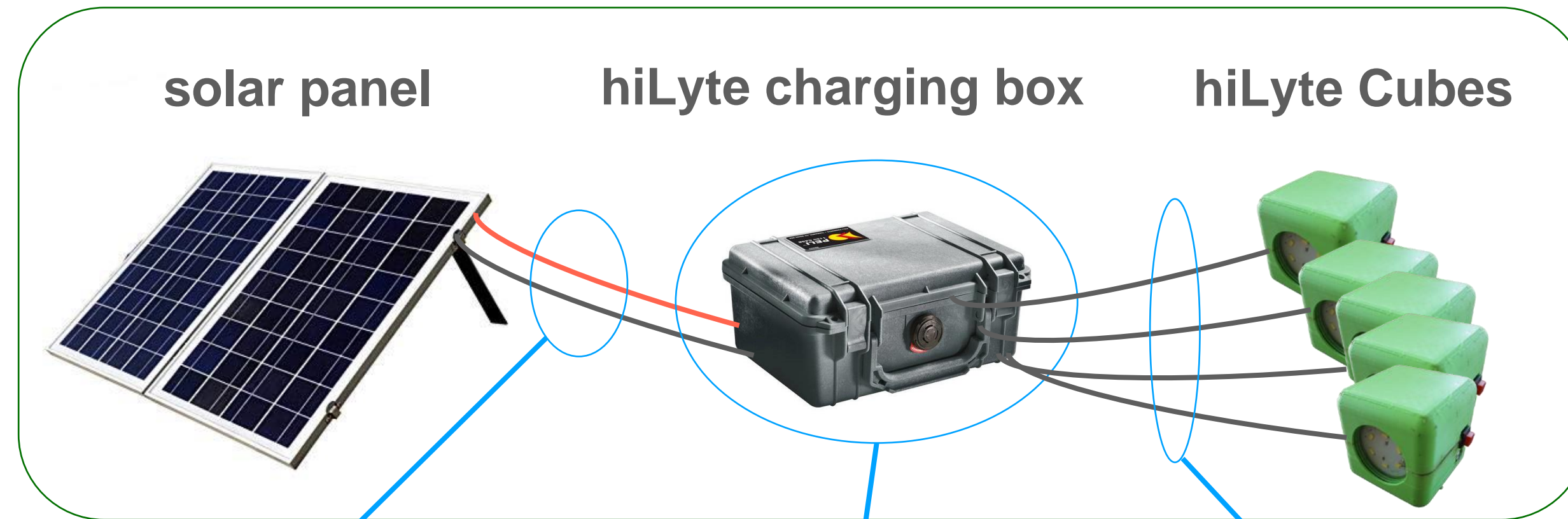


hiLyte PV charging system



hiLyte smart plug&play system

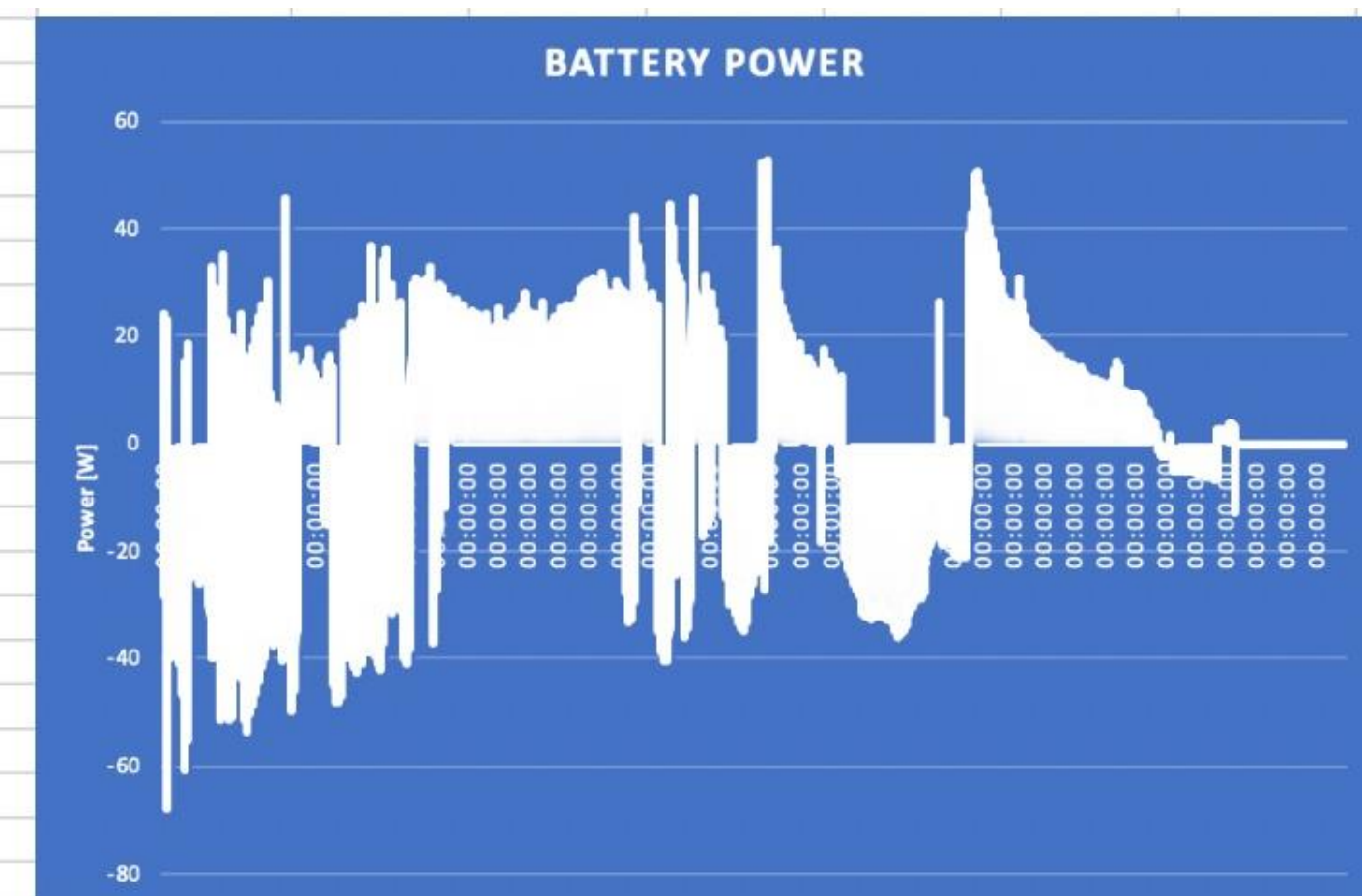
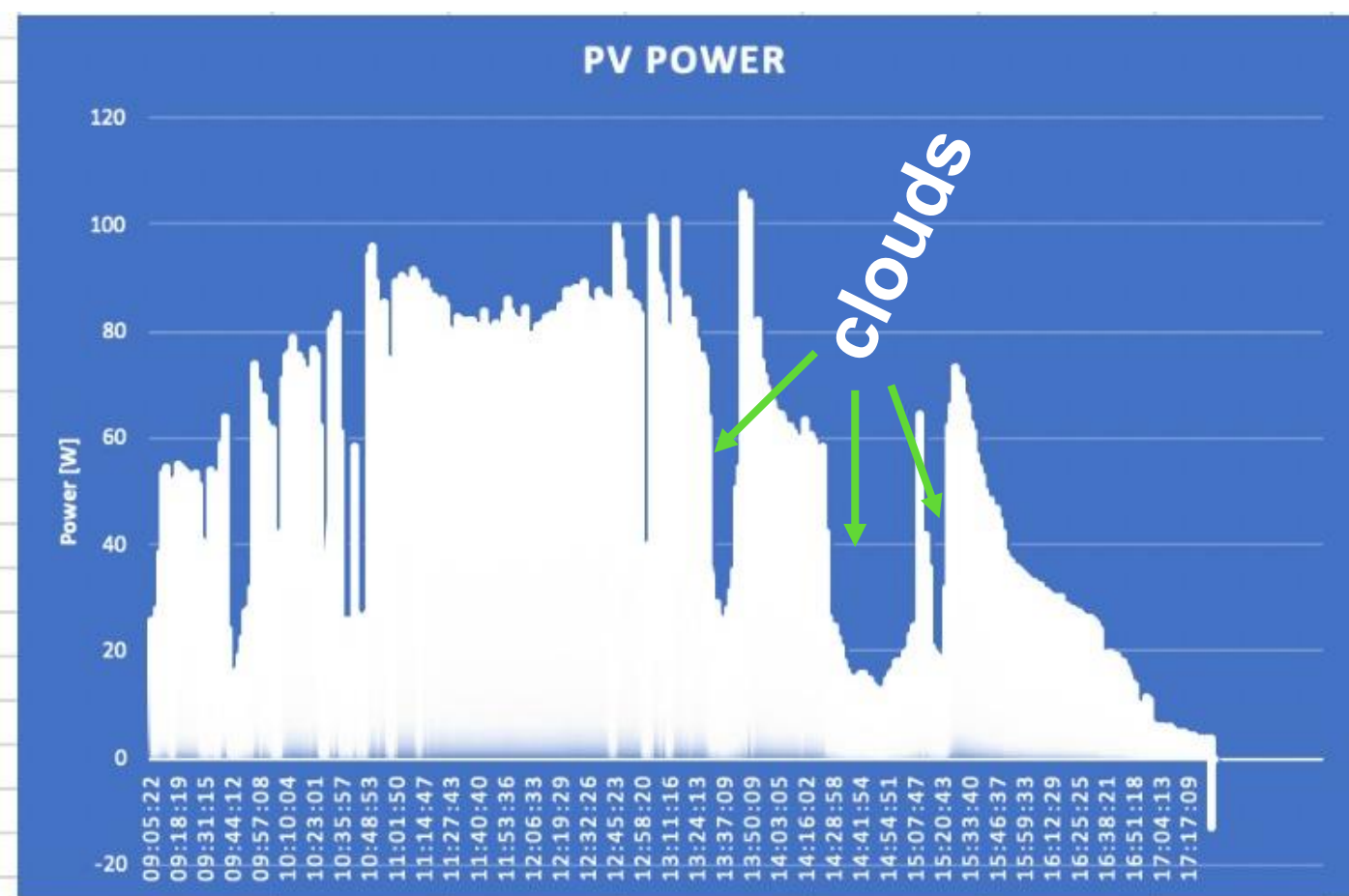
The hiLyte system is optimized to ensure maximal use of solar energy !



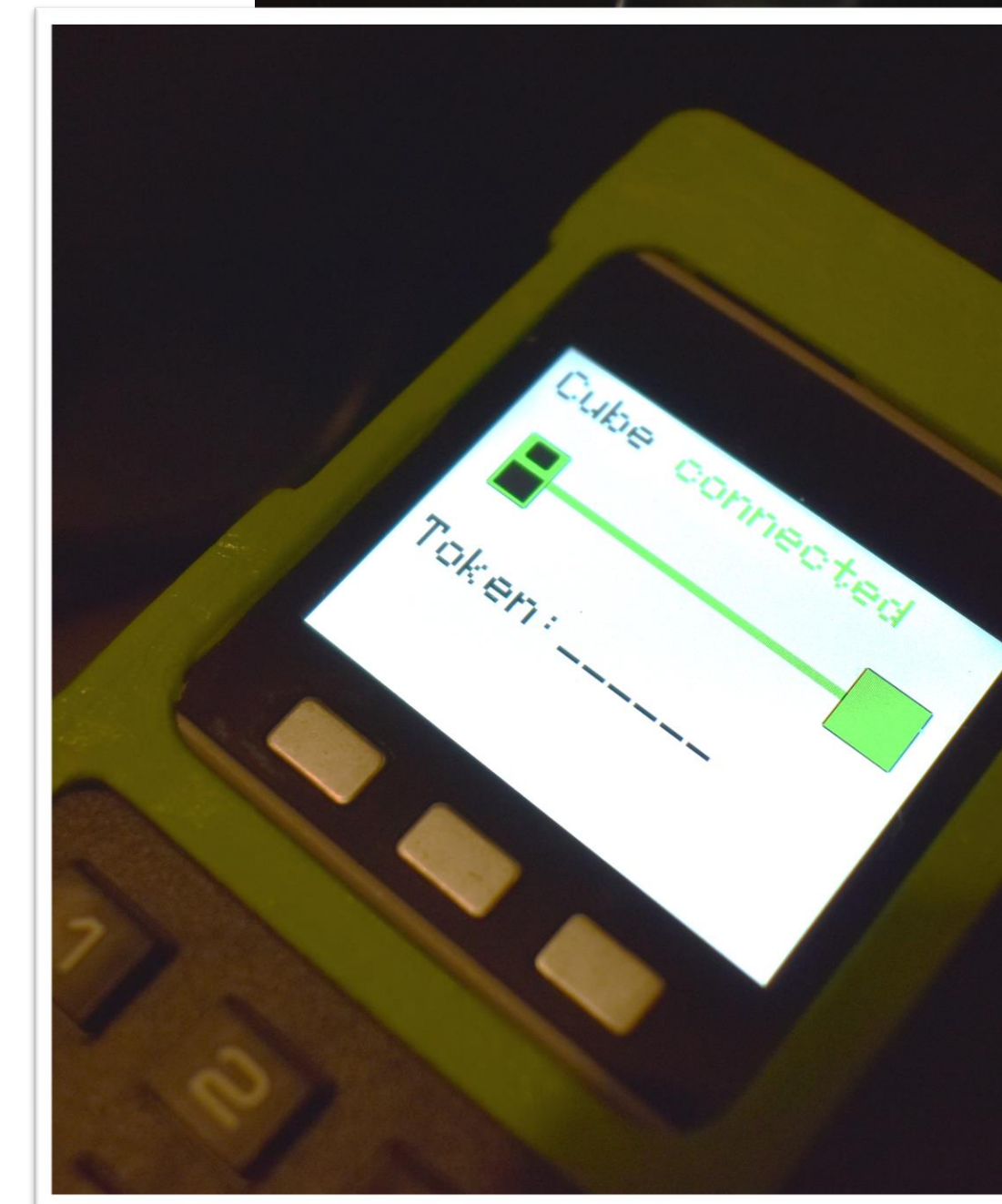
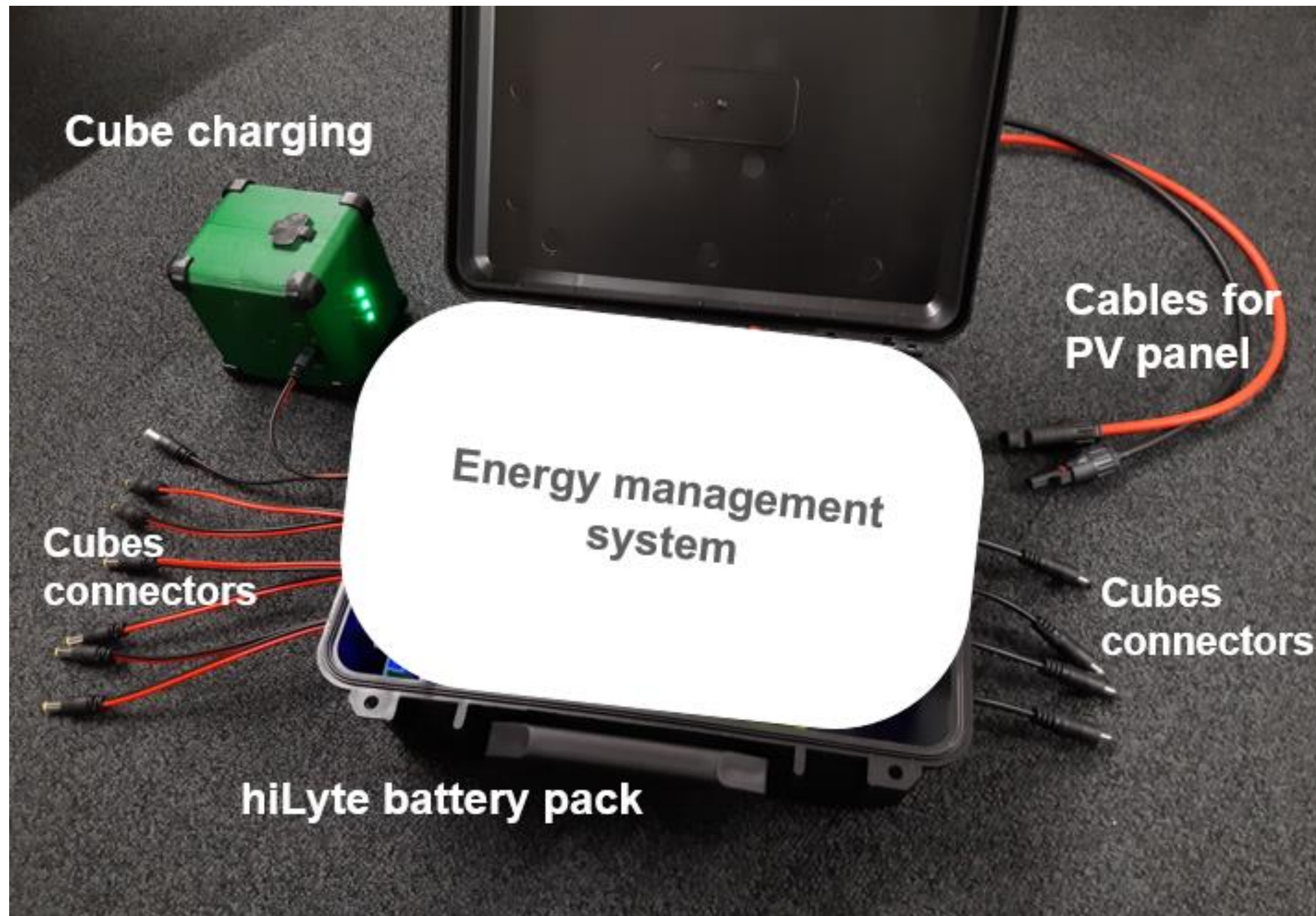
Typical solar panel power in Tanzania for a full day :

Energy management

Constant power delivered to charge all the cubes



hiLyte charging & activation box



Depending on the applications :

- 1) a compact waterproof plastic box
- 2) a wooden box assembled in Tanzania

Targeted users



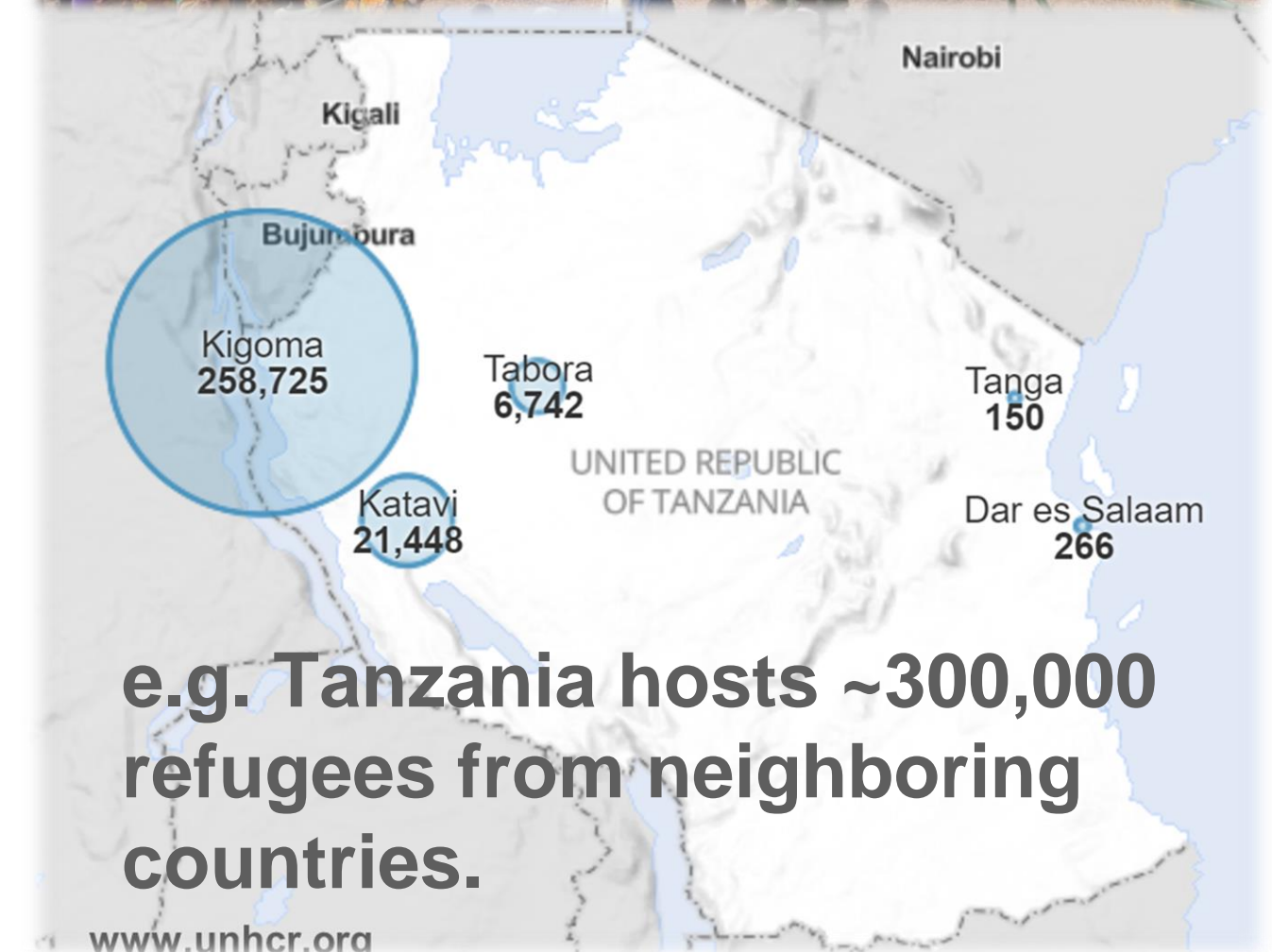
For off-grid households (B2C)



For small businesses & street sellers (B2C)



For refugees camps (B2B)



e.g. Tanzania hosts ~300,000 refugees from neighboring countries.

On-going pilot projects in Tanzania



Market segment not explored/tested yet

Energy-as-a-Service



Our value proposition



Solutions	Light	Phone Charging	Price	Health safety	Environmental safety	Available on-demand
 	✓	✓	\$ (Light + Phone)	✓	✓	✓
PAYG - Solar	✓	✓	\$\$ 0.5 USD/day + 20 - 40 USD initial	✓	⚡*	✓
Charging kiosks	✗	✓	\$\$ 0.2 USD /charge	✓	✓	🕒
Solar lamps	✓	✗	\$ 10-30 USD initial	✓	⚡*	🕒
Kerosene lamps	✓	✗	\$\$ 0.2 USD/day	☠️	☠️	✓
AAA Batteries	✓	✗	\$\$\$ 0.3 USD/day	✓	☠️	✓

*Battery end-of-life poorly managed

Impact



Purchase-power increase



Over the lifespan of the device, the maximum price per day is of 0.11 \$/day to get powerful light and charge phones

Better health condition



Kerosene lamps emit black carbon (as toxic as smoking 2 packs of cigarettes per day). There is no emission with hiLyte.

Better Education



Students can keep studying even if it's dark: During one of our field tests, a young girl started studying every evening !

Co2 emission reduction



1 kerosene lamp

Co2equ per year and per lamp

185 kg



2 kg

Co2 saving: 183 kg



- Long-lasting, High capacity, Cobalt-free battery
- Cube batteries can be recycled



Particular impact for refugees:

- Charging phones enables them to stay in touch with their families

Good jobs and economic growth



Maximizing local production and know-how transfer to Tanzanian employees.

Providing agents extra-revenues to agents

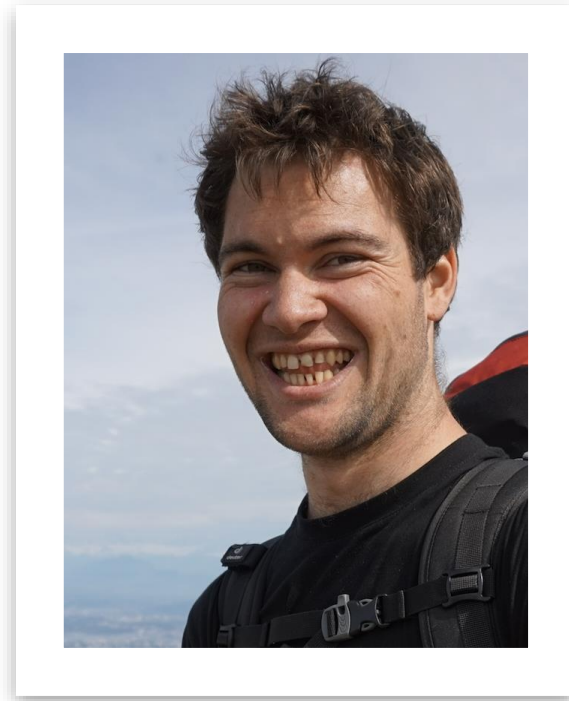


The hiLyte team



Switzerland, hiLyte LLC/Sàrl

Briac Barthes
CEO & co-founder



EPFL engineer
Fluent in Swahili

David Lambelet
CTO & co-founder



EPFL engineer
5 years R&D experience

Jonathan Fiorentini
CFO & co-founder



Uni. Of St-Gallen / Finance

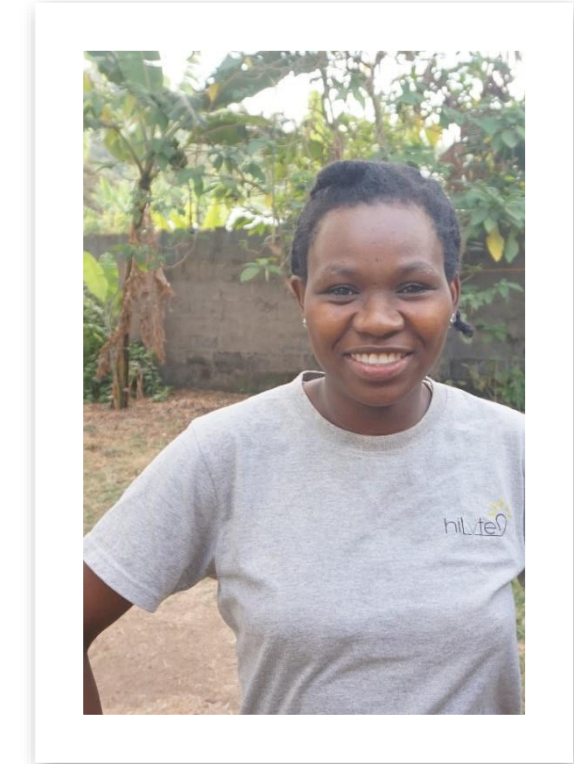
Tanzania, hiLyte Tanzania Limited

Evarest Maleko
Field Technicien



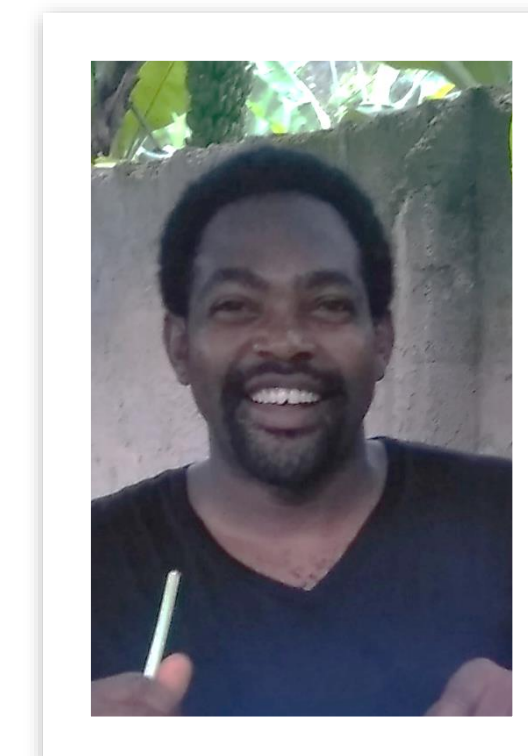
Oriented-solution mindset

Rehema Saidi
Sales & agent support



Customer high care

Julius Kiwesa
Admin



R&D and Product Dev. is
mainly made in Switzerland

Production and Distribution
are handled from the
Tanzanian office

Roadmap & milestones



Field tests Arusha, Tanzania
July-August 2018

Incorporation in
Arusha, Tanzania



LLC incorporation
January 2018



PIVOT to NEW
TECHNOLOGY &
BUSINESS MODEL
September 2019

Cube development

Solar kiosk
optimization

Product
improvement



Innosuisse
Business Concept
February- June 2017

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra
Swiss Confederation
Innosuisse – Swiss Innovation Agency



Solar impulse
1000 efficient solutions
October 2018



Forbes 30under30
Europe/Industry
February 2019

Pilot with 20 cubes

Pilot with 200 cubes

400 cubes

1500 cubes

Scale-up
Tanzania &
East-Africa

REPIC Pilot in Tanzania
50 kiosks, 1200 cubes

Research funds

Seed: 150K USD

Pilot : 300k (95% secured)

1 Mio (2023)



Pilot projects 2020 - 2022



hiLyte agent shop in a village near Arusha



A user going back home with his cube rented in a local shop



Visiting the Solar Training Center of Arusha Technical College, Dec. 2020



Local production, Arusha, Tanzania

hiLyte in picture in 2020



PV module for the new charging kiosk



Electronic board programming by Evarest



Rehema bringing new cubes to an agent

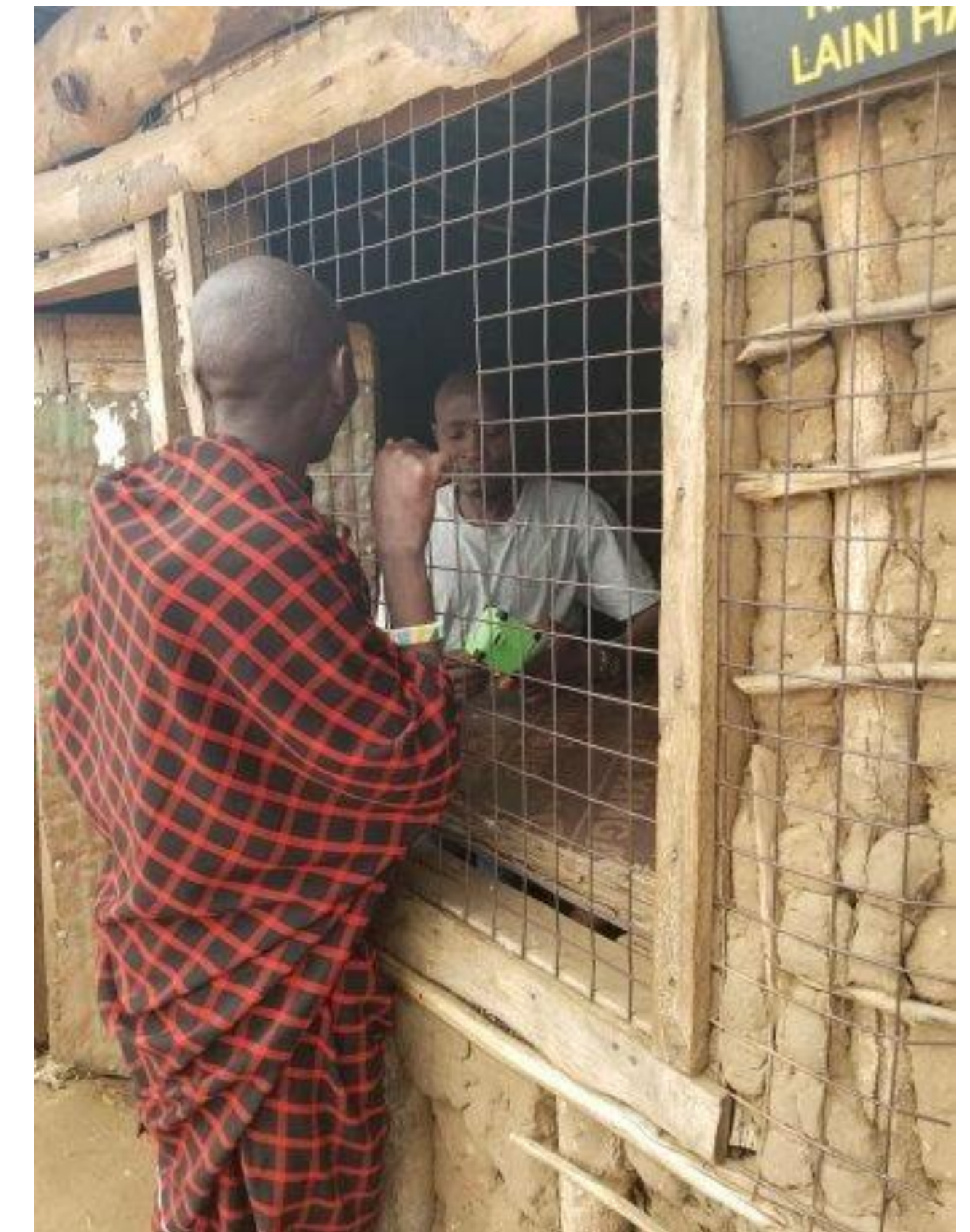
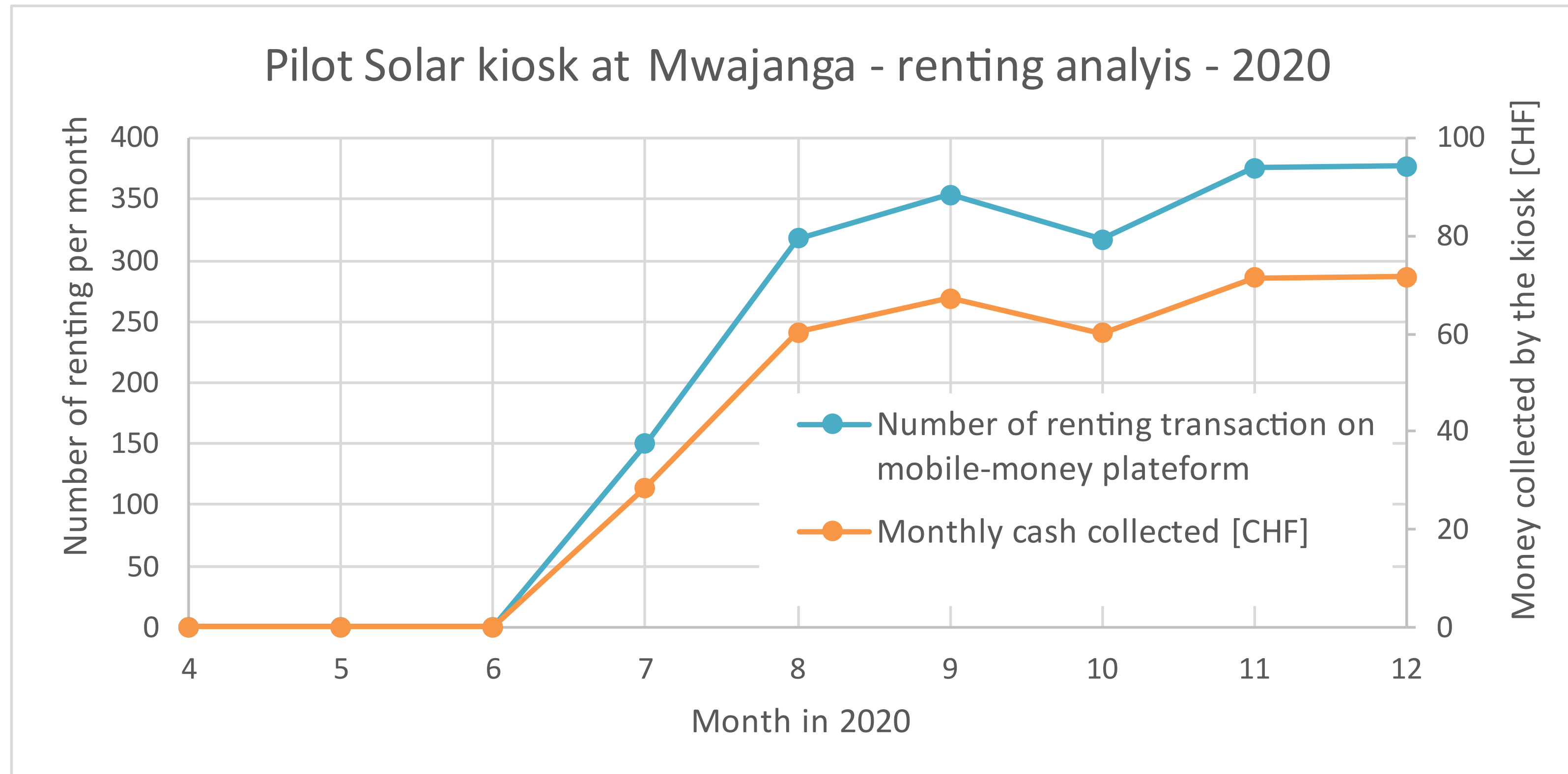


A user getting his cube at local shop



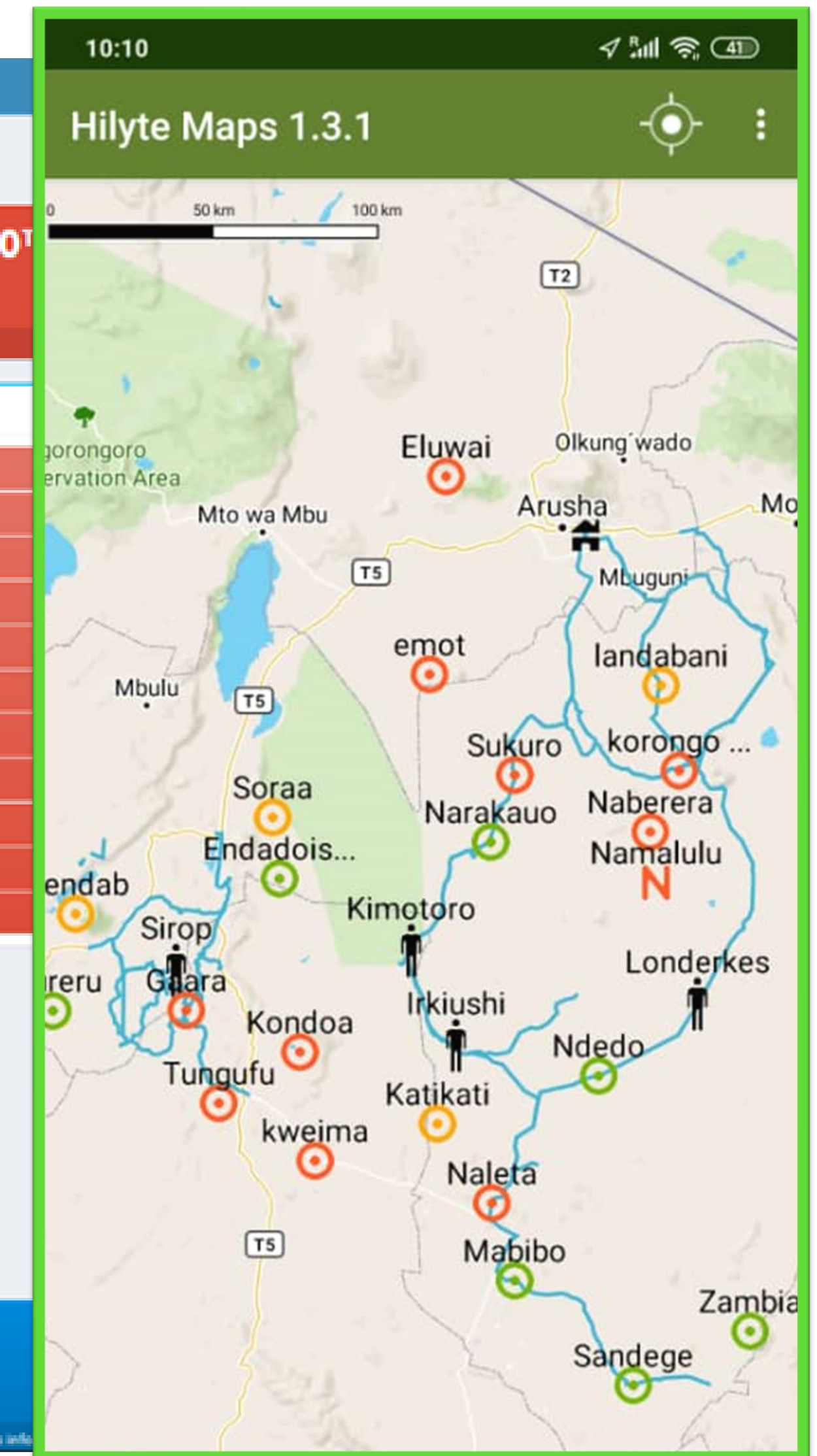
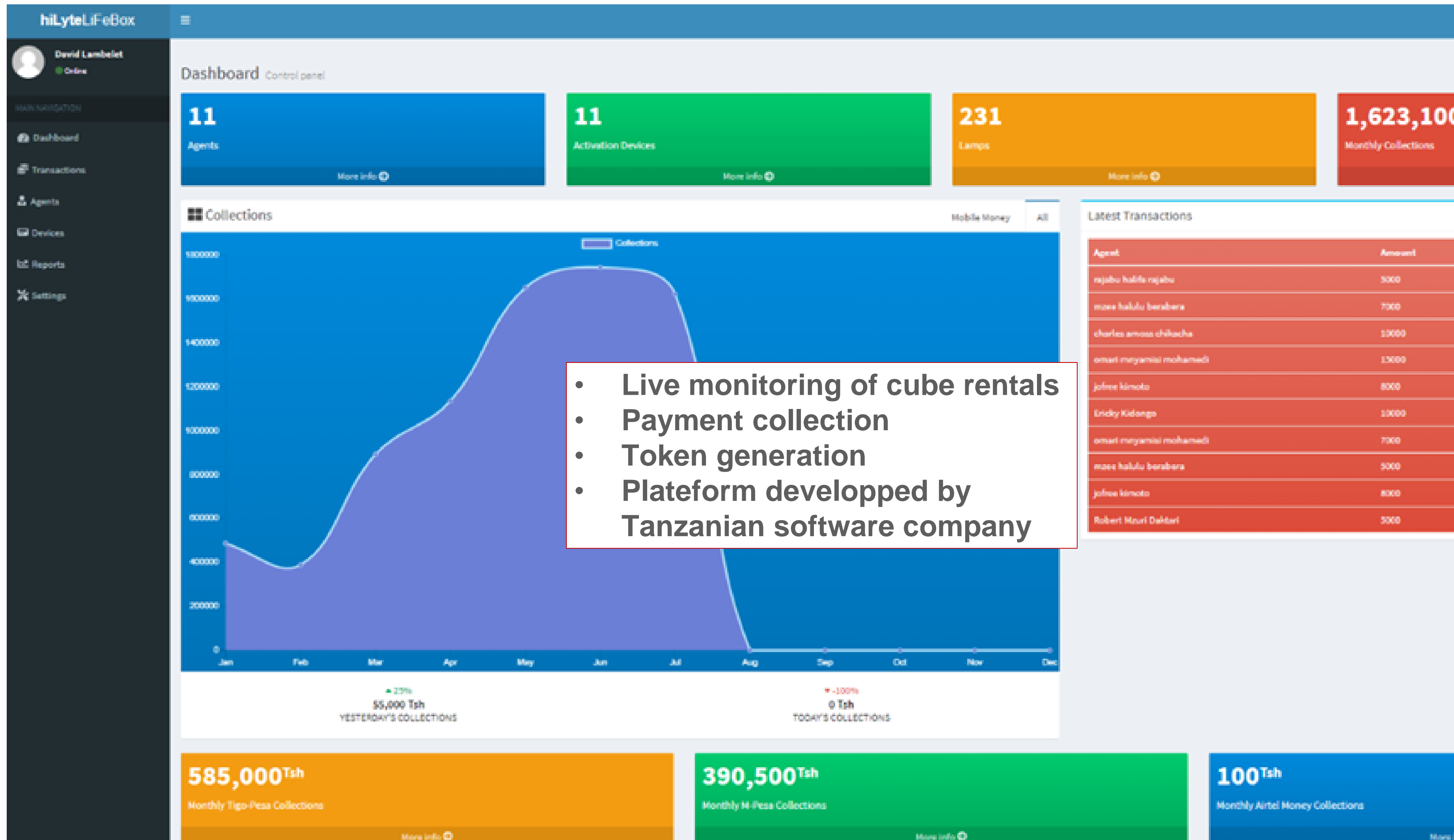
Solar module visual quality control

Pilot – 1st kiosk example - 2020

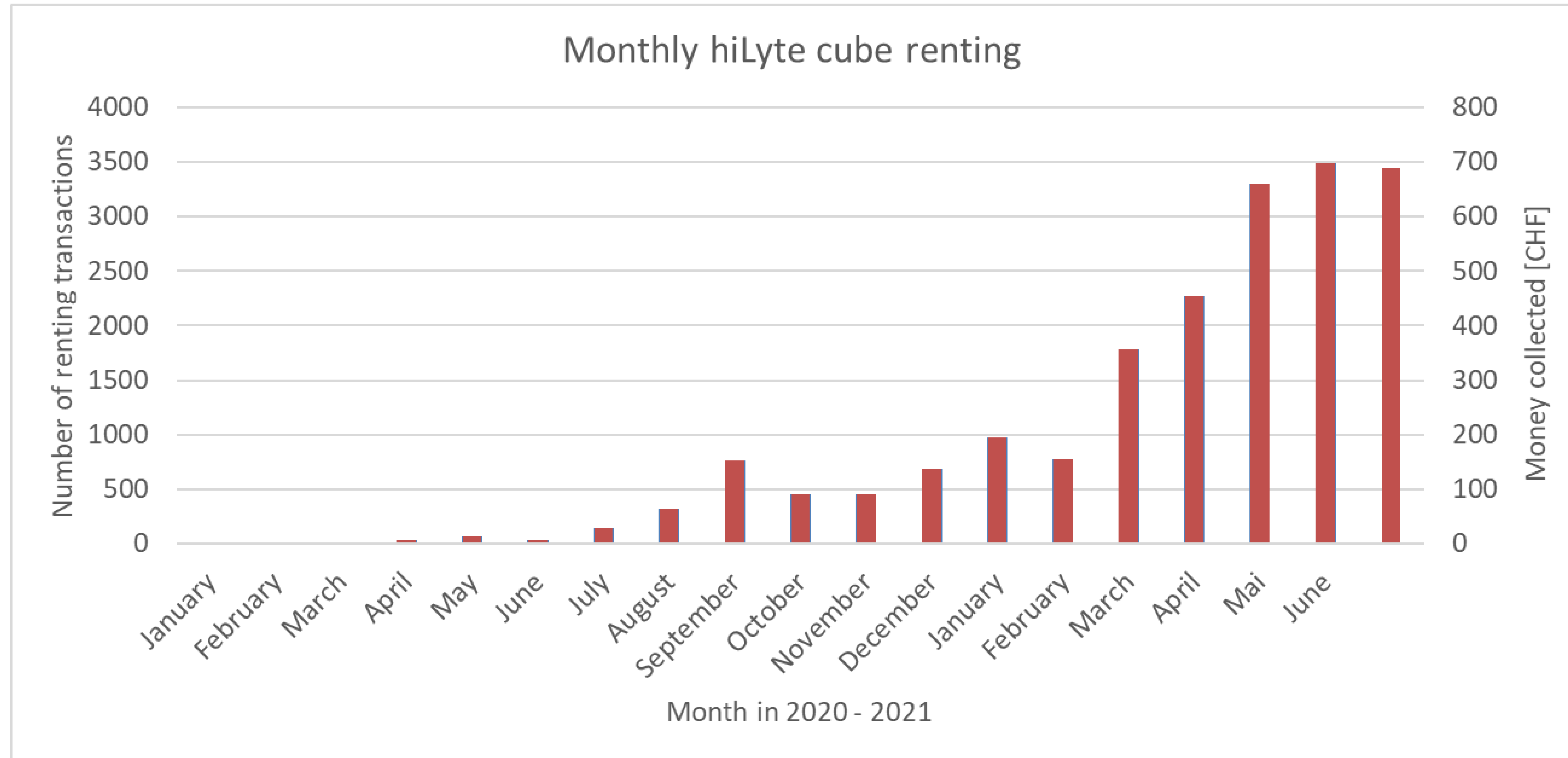


Pay-back time around 2 - 4 year and ROI (5 years) around 30-50%

Current pilot – 11 kiosks



Pilot project revenue



Revenue stable around 600 - 700 CHF from Mai 2021.
Will increase again with the deployment of new kiosks

Long-term vision



Becoming « the energy hubs » of African villages, for lighting, phone-charging, access to computer & internet, access to clean cooking...

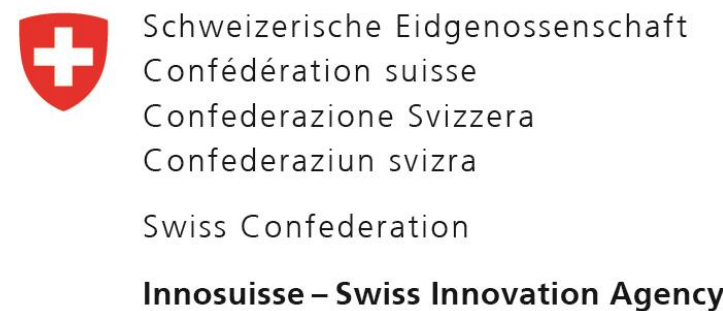


Thank you



Call for action – Looking for :

- 30 kCHF for 2022 Q1/Q2 to finance a pilot project of « multi-functional solar kiosk »
- Build up relationships with NGOs, fondations, labs, sponsors, etc...



Forbes 30under30 Europe/Industry 2019



Tanzania 2020, part of the hiLyte team in Arusha

Contact: David Lambelet, CTO
phone: + 41 79 356 87 20
email: david.lambelet@hilyte-power.com

Contact: Briac Barthes, CEO
Phone: + 255 686 310 237 (from the 3rd of February 2021)
Email: briac.barthes@hilyte-power.com



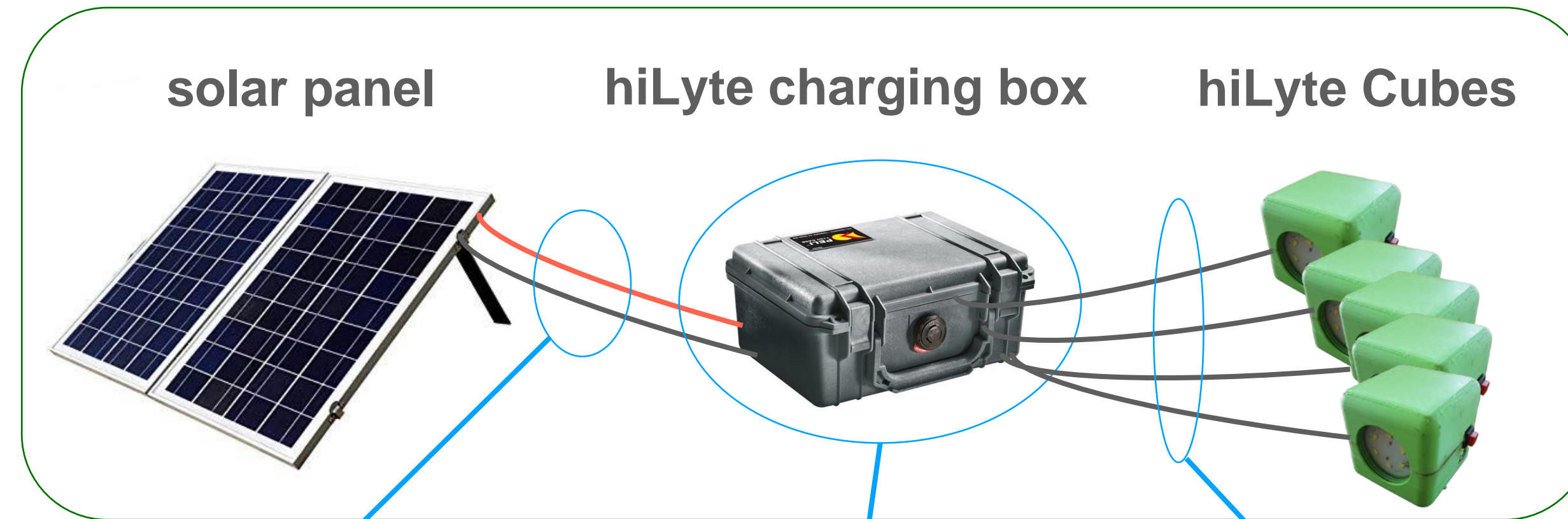
Annexe : hiLyte Technology developped for applications in Tanzania

hiLyte PV charging system



hiLyte smart plug&play system

The hiLyte system is optimized to ensure maximal use of solar energy !

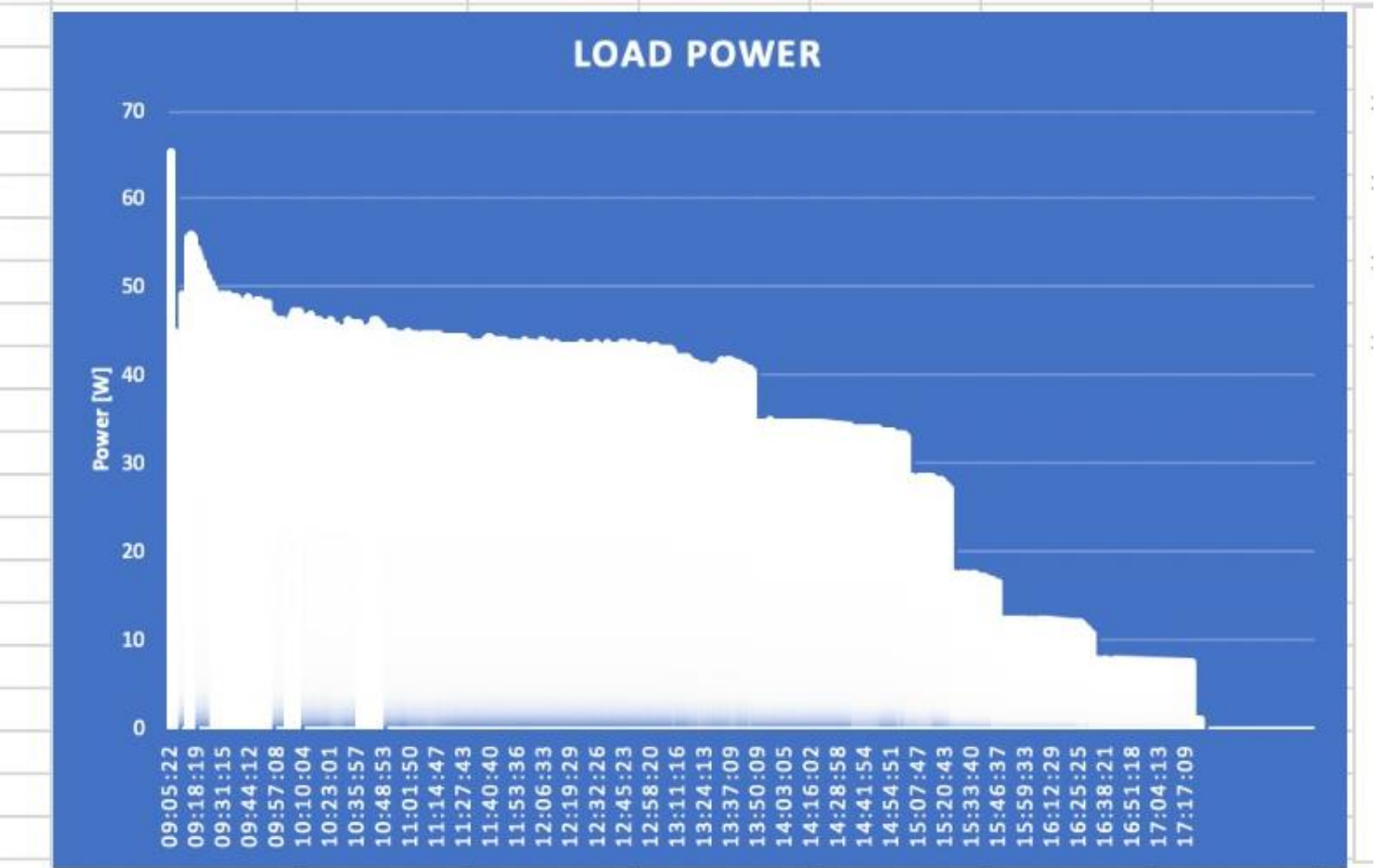
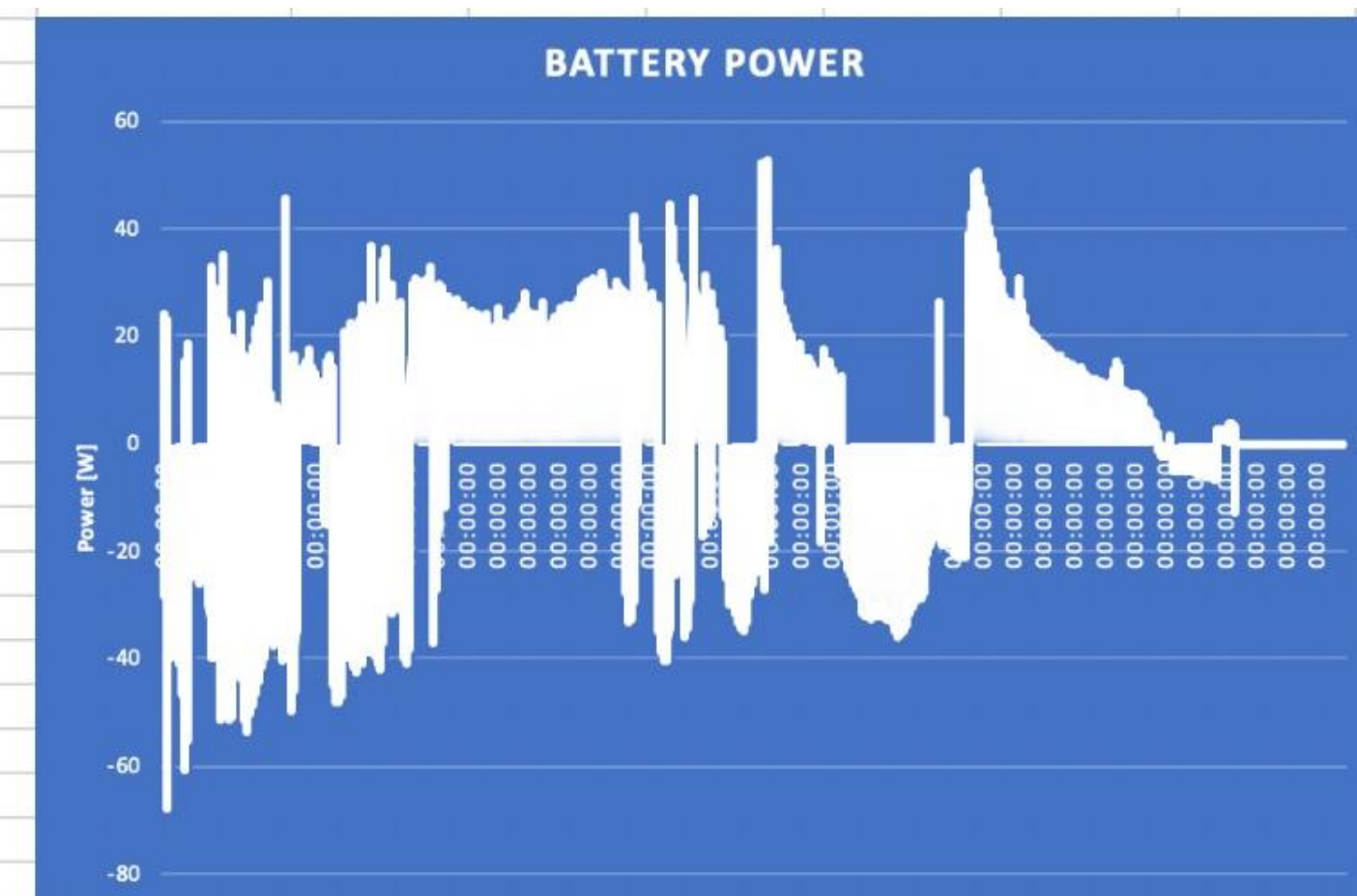
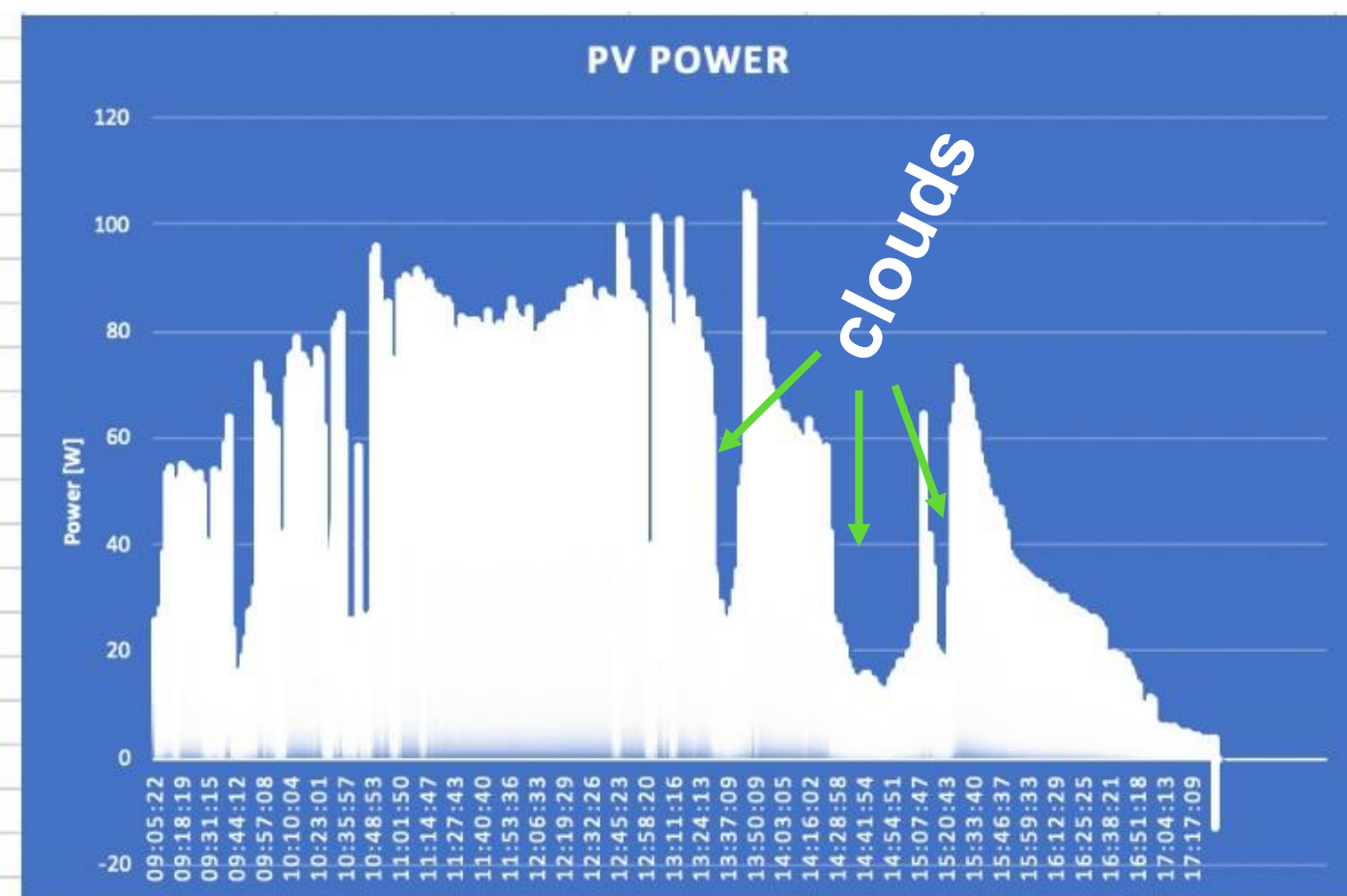


PV system optimized in collaboration with EPFL PV Lab

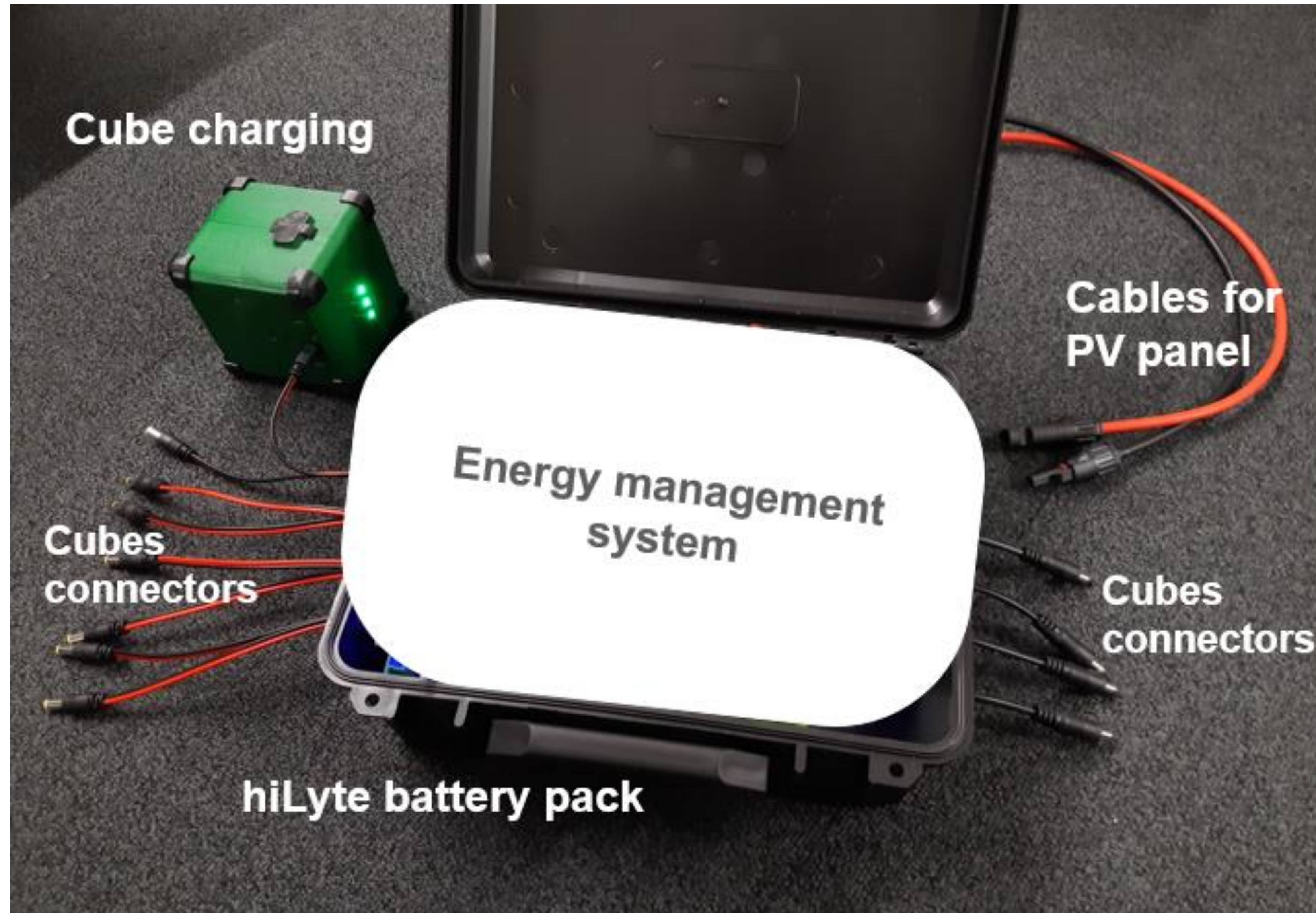
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hiLyte charging box



Depending on the applications, the hiLyte charging box is either :

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The hiLyte cube



First hiLyte cubes made in Tanzania



**Robust
Compact
Easy to use**

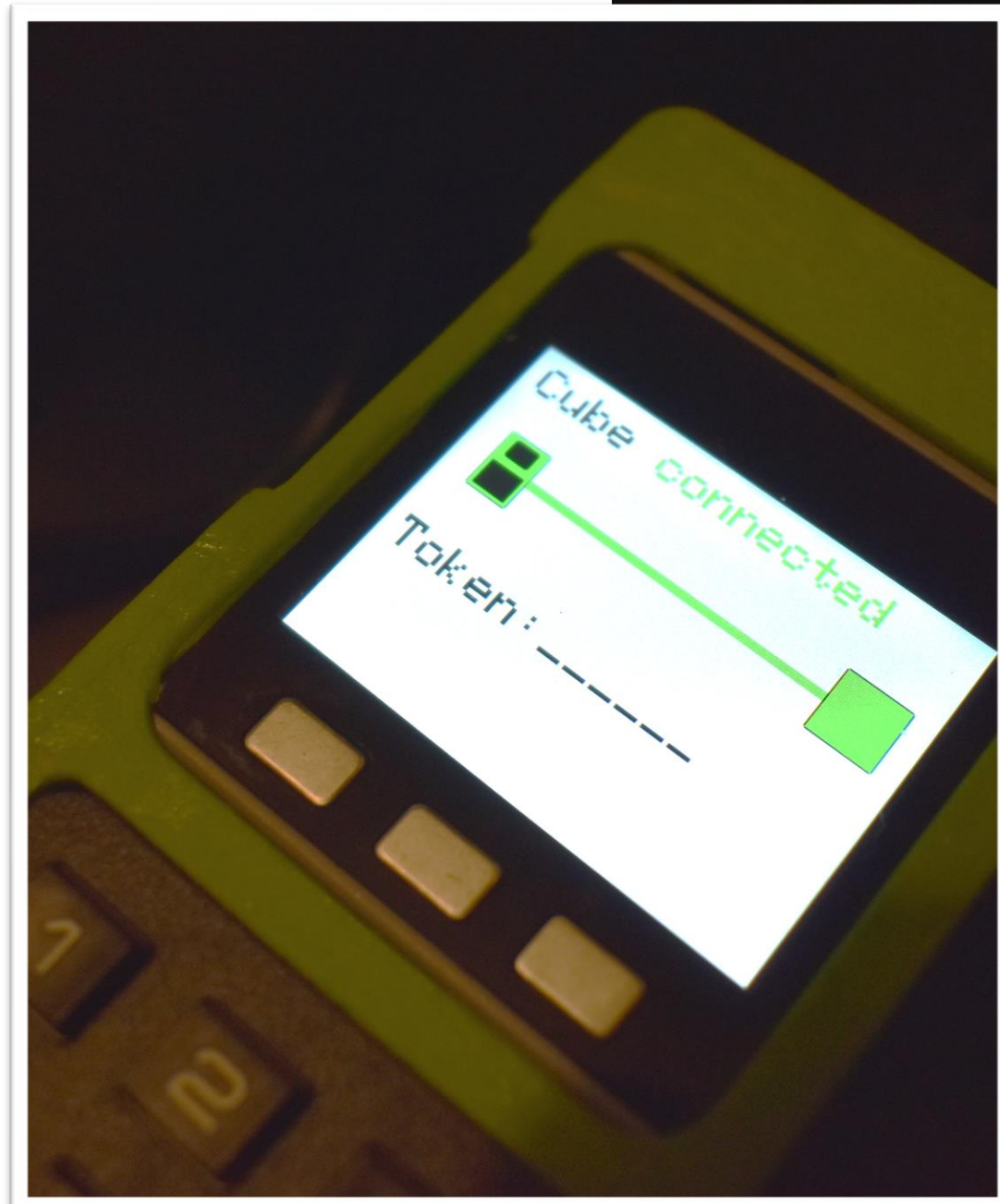
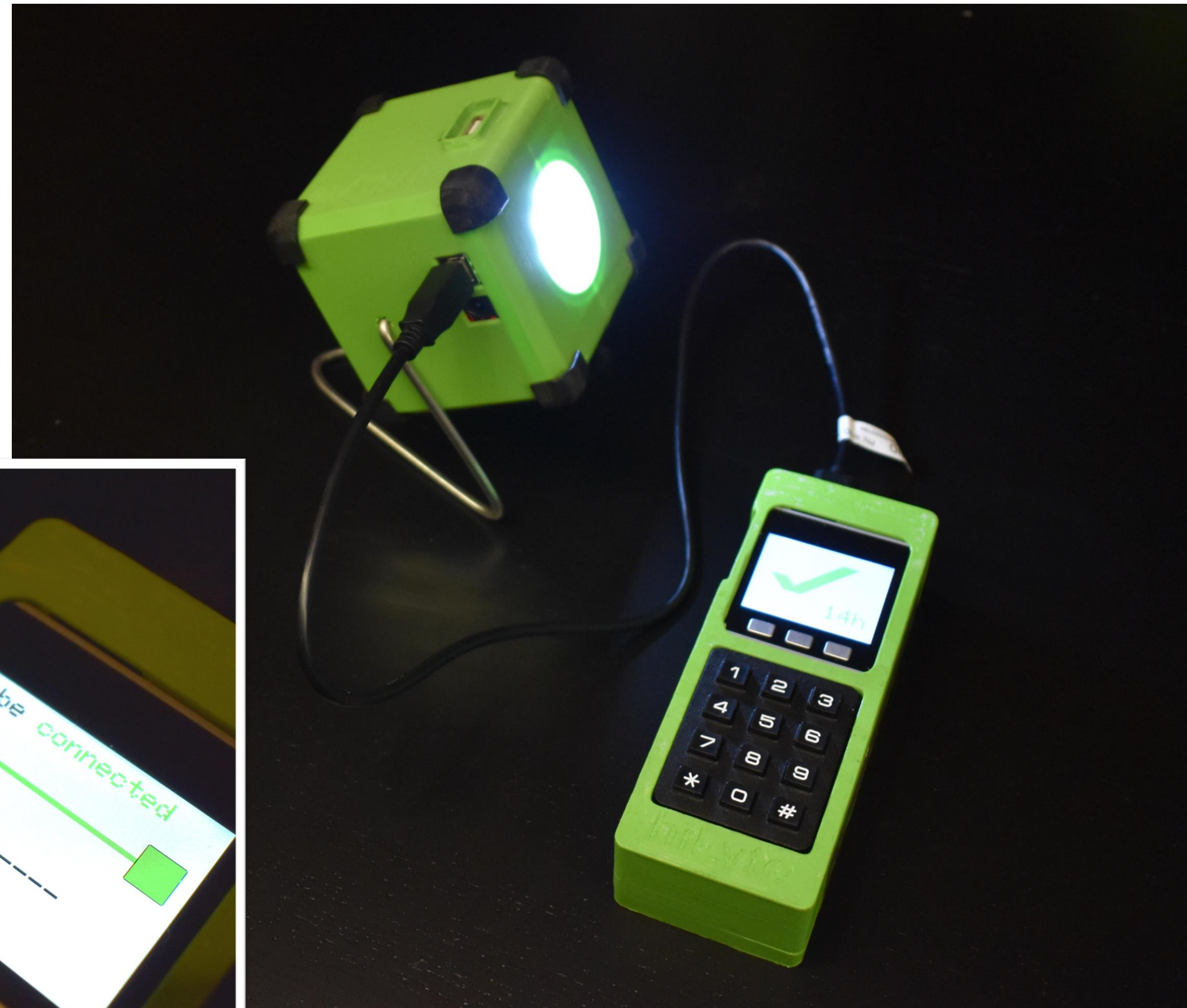
Cube specifications :

- Smart energy management for 10-15h lighting / 3 phone charges
- Powerful LED light
- USB outputs for phone-charging
- Auxiliary LED lamp can also be connected on the USB output to light up a second room
- Safe, long-lasting, heat resistant, high-capacity, lithium-iron battery cell.
- Battery technology without cobalt or other rare metals

Key notes :

- Product under industrialisation
- Design with 2x or 4x battery capacity possible

hiLyte activation system



Activation system specifications :

- Low-cost activation terminal allowing the agent to activate the cube with the token received by text message on his phone
- Easy to use
- Encrypted token and communications to prevent any abusive use.
- Get informations about the cube battery State-of-Charge and block activation&rent if the cube is not charge enough, to avoid disappointed users.
- Our activation system can also be used/adapted for other micro-payment applications : PAYGo LPG Gas for clean cooking, Clean water distribution, cooling systems, etc...

- **Open for partnerships**

hiLyte payment & token generation platform



The dashboard displays the following metrics:

- 10 Agents
- 9 Activation Devices
- 189 Lamps
- Monthly Collections (partially obscured)

Collections Chart: A line chart showing monthly collections from Jan to Dec. The y-axis ranges from 0 to 900,000. A callout box highlights the following data points:

- 46,000 Tsh YESTERDAY'S COLLECTIONS (▲ 59%)
- 40,500 Tsh TODAY'S COLLECTIONS (▼ -12%)

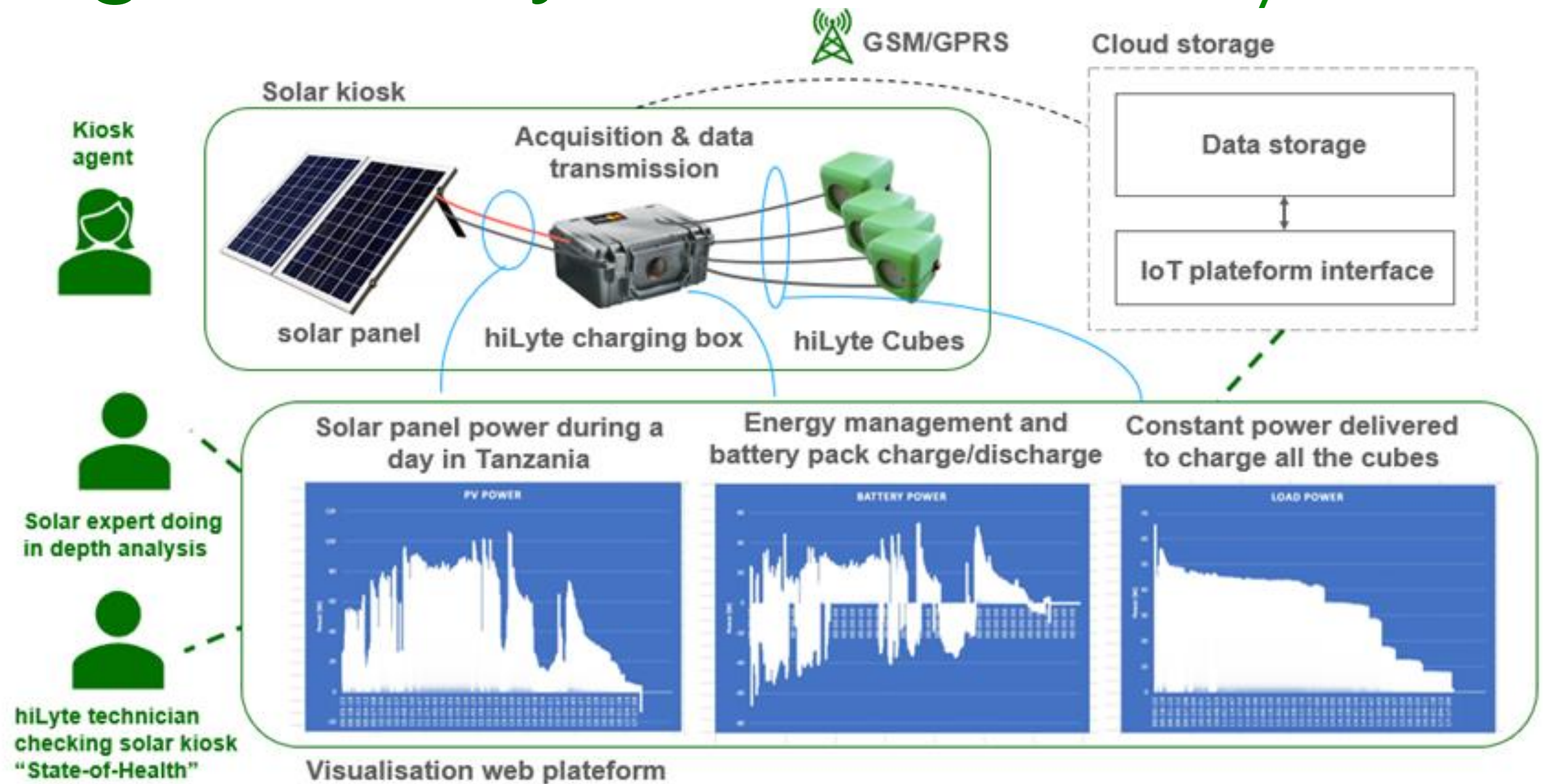
Latest Transactions Table:

Agent	Amount	Date
j	1000	31-03-2021 20:32:33
j	1000	31-03-2021 20:03:07
r	500	31-03-2021 19:51:22
r	500	31-03-2021 19:27:13
r	2000	31-03-2021 18:55:38
E	5000	31-03-2021 17:51:04
r	5000	31-03-2021 17:50:11
h	5000	31-03-2021 17:43:59
j	10000	31-03-2021 17:30:35
r	2000	31-03-2021 12:35:08

hiLyte IoT Monitoring for off-grid PV system



- Measure power flow on PV, Battery and Load side
- Measure solar irradiance
- Data transmitted by GSM/GPRS to an IoT web platform and stored locally on SD card
- Configurable with the ability to add other sensors (Temperature, water flow, etc..)
- Alarm can be set for predictive maintenance
- Low-cost, precision +/- 3%
- Under development



Irradiance

History - from 2021-02-26 06:00:00 to 2021-02-26 20:00:00

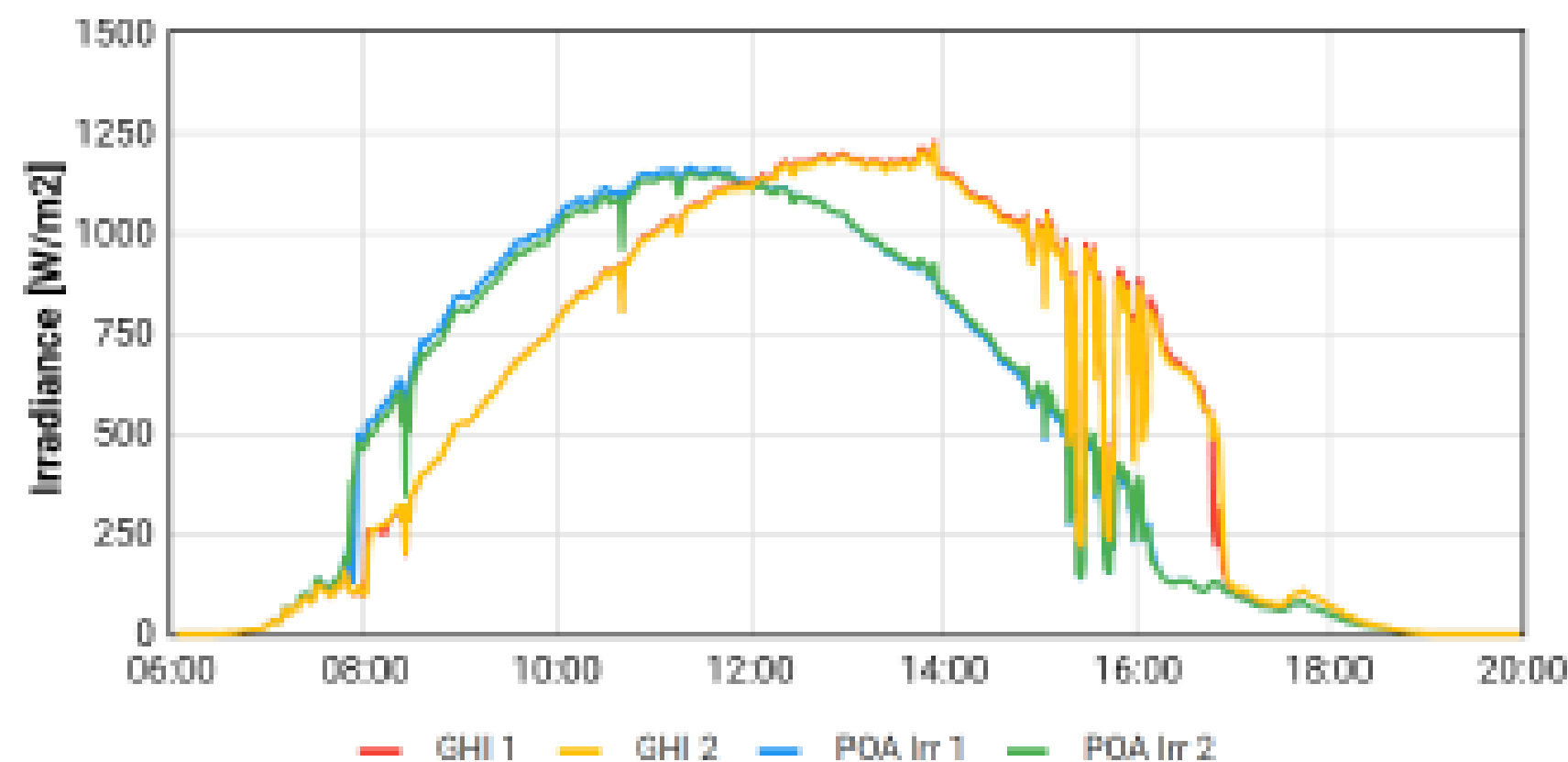


Figure 5.8: GHI and POA irradiance over one sunny day

Data from monitoring system in Tanzania

Measured power

History - from 2021-03-02 09:00:00 to 2021-03-02 19:30:00



Figure 5.4: Charging process of several cubes over one day, data averaged over a 5 minutes interval