UNITED NATIONS UNIVERSITY

UNU-EHS

Institute for Environment and Human Security

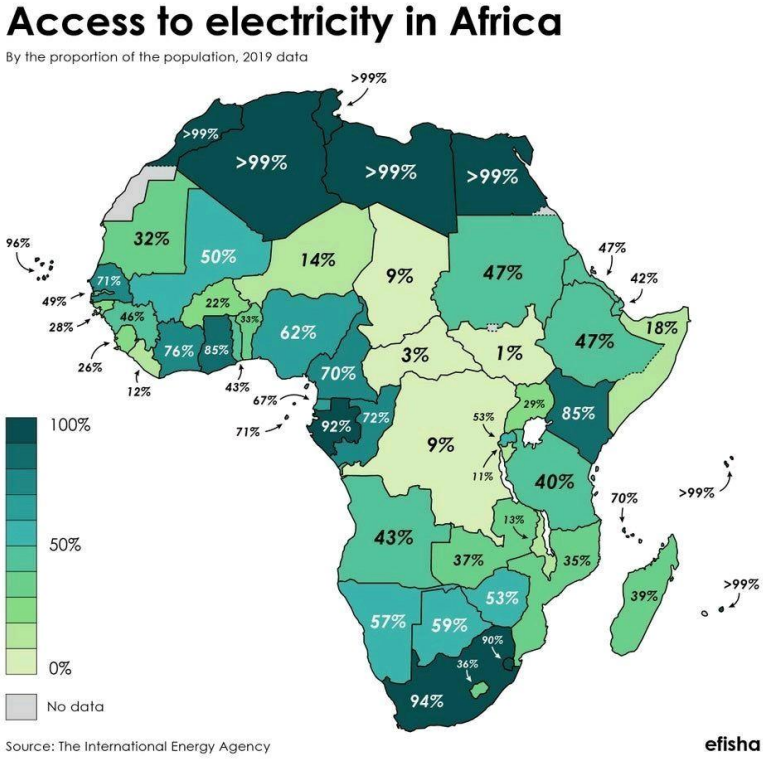
Introduction Session – Digitalization & Rural Electricity Access

Summer Climate Academy | 12th September 2022

Dr Erick Tambo
UNU – EHS

African (rural) electricity access

UNITED NATIONS UNIVERSITY
UNU-EHS
Institute for Environment and Human Security

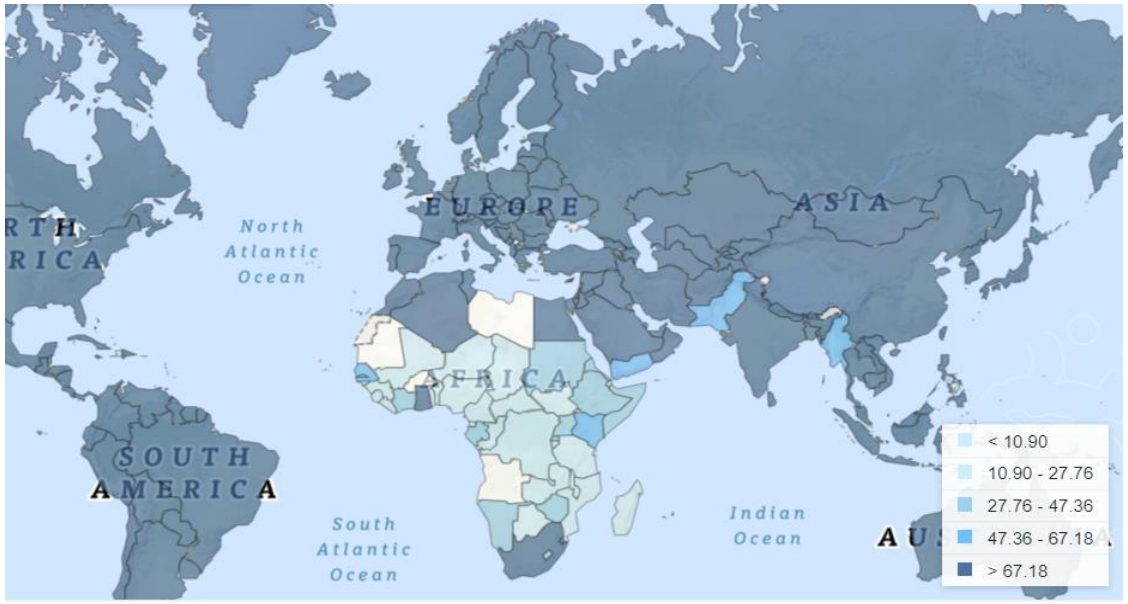


- Energy (electricity) access have been a challenge over the last decades in SSA. With **over 597 million** people lacking access to electricity in **2021**, from **592 million** in **2020.**
- In 2021, SSA represents **>77%** of the world population without access to electricity.

Source: IEA (2022)

•As of 2021, about **59%** of Sub-Saharan African population lives in **rural areas** (*steady decrease from **85%** in 1960s*) **(World Bank data)**

Rural African energy access Vs rest of the world



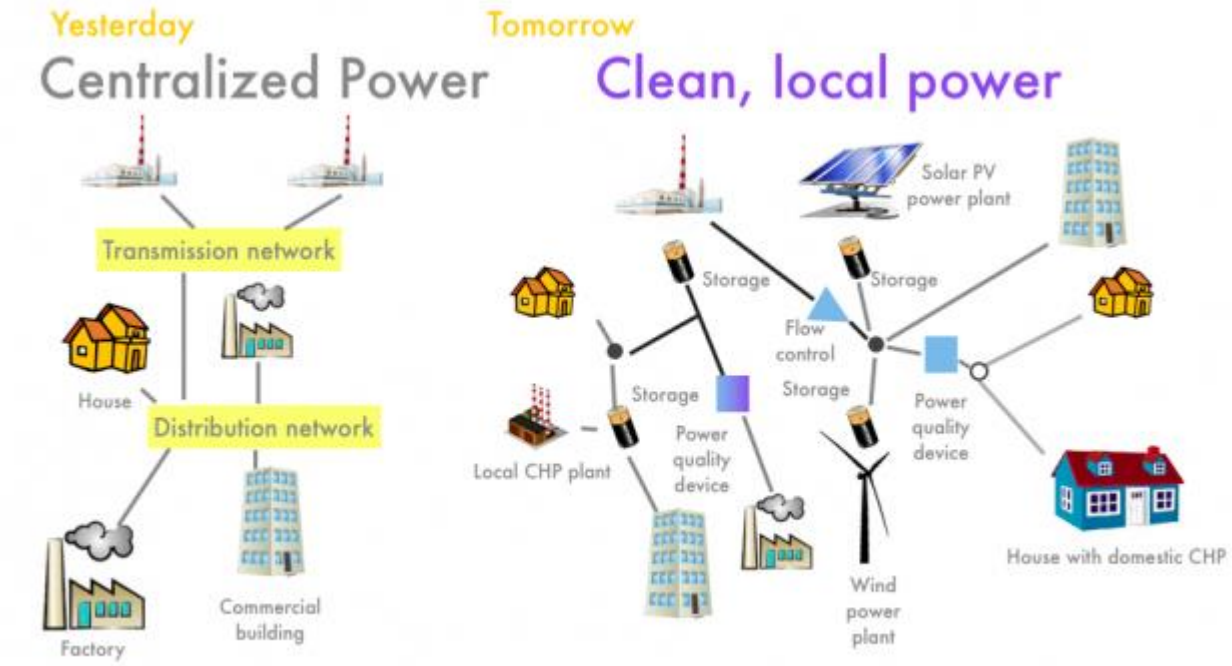
On average **only 28.7%** of rural population in SSA has access to electricity V**s 93.6% rural access** in *Latin America and the Caribbean* and **grater** in the other regions of the world

Source: World Bank Data (2022)

Centralized VS Decentralized Mini-grids for rural electricity access

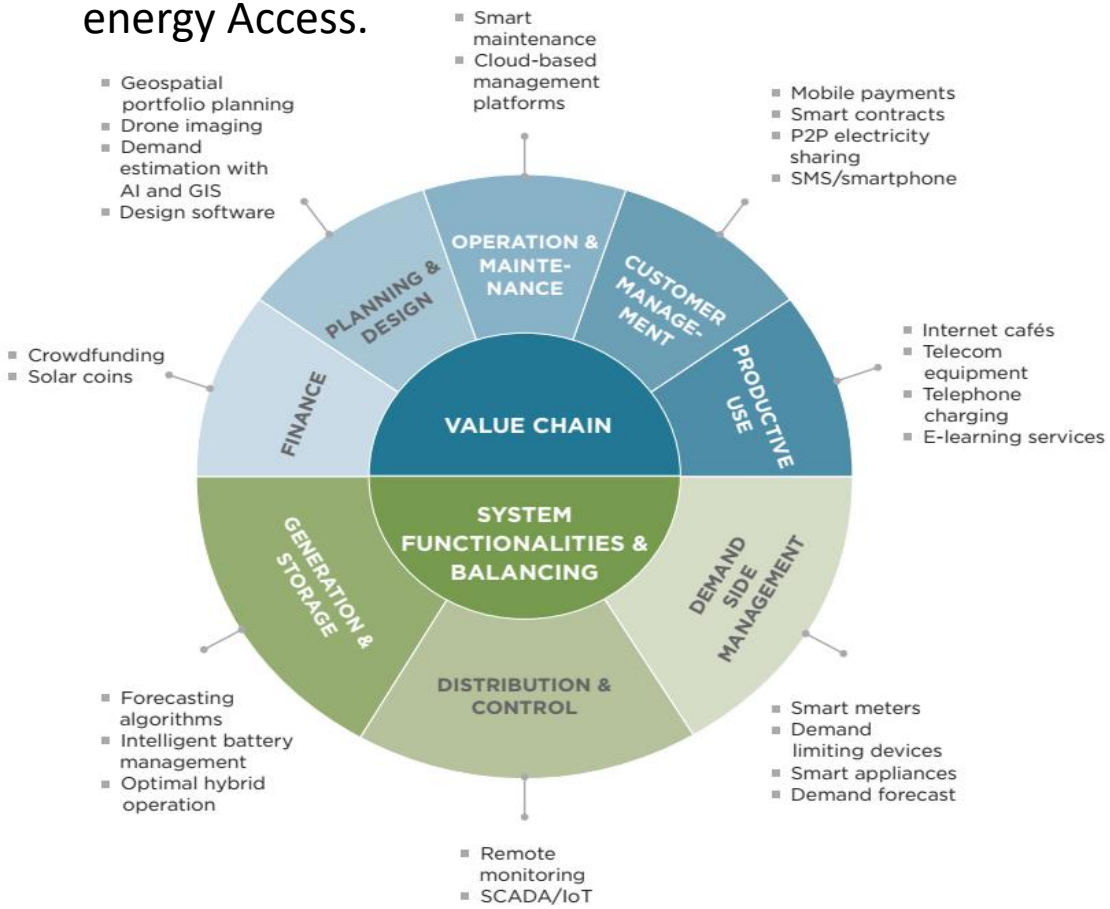
UNITED NATIONS UNIVERSITY
UNU-EHS
Institute for Environment and Human Security

- With the ongoing challenges of electricity grid extension to rural areas in African countries, **mini-grids** as decentralised energy systems are a viable alternative.



- Innovative Smart Grid approaches should/may enable sub-Saharan African countries to **leapfrog** elements of traditional power systems in terms of both technology and regulation.

- The **emergence and applications of new/frontier Digital Technologies (DT)** offers many opportunities to improve energy Access.



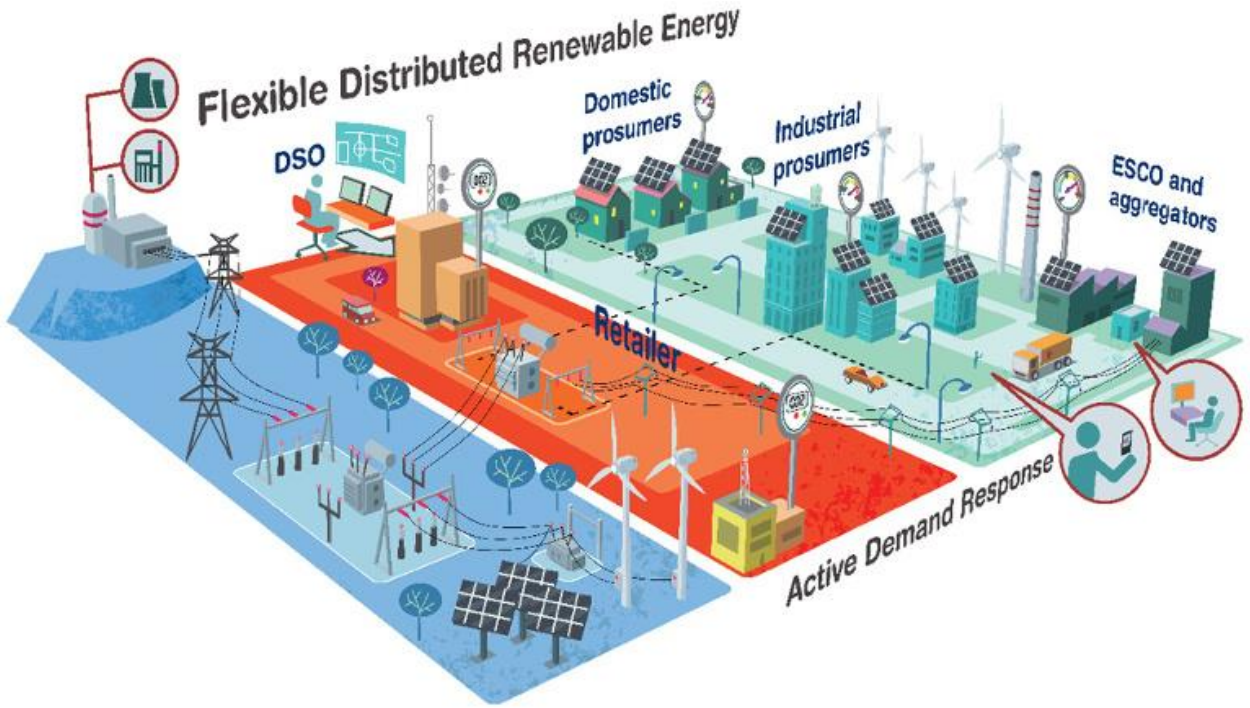
Application areas of digital technologies in mini-grids – Source IASS(2019)

Contextualization of Smart Grid in Africa

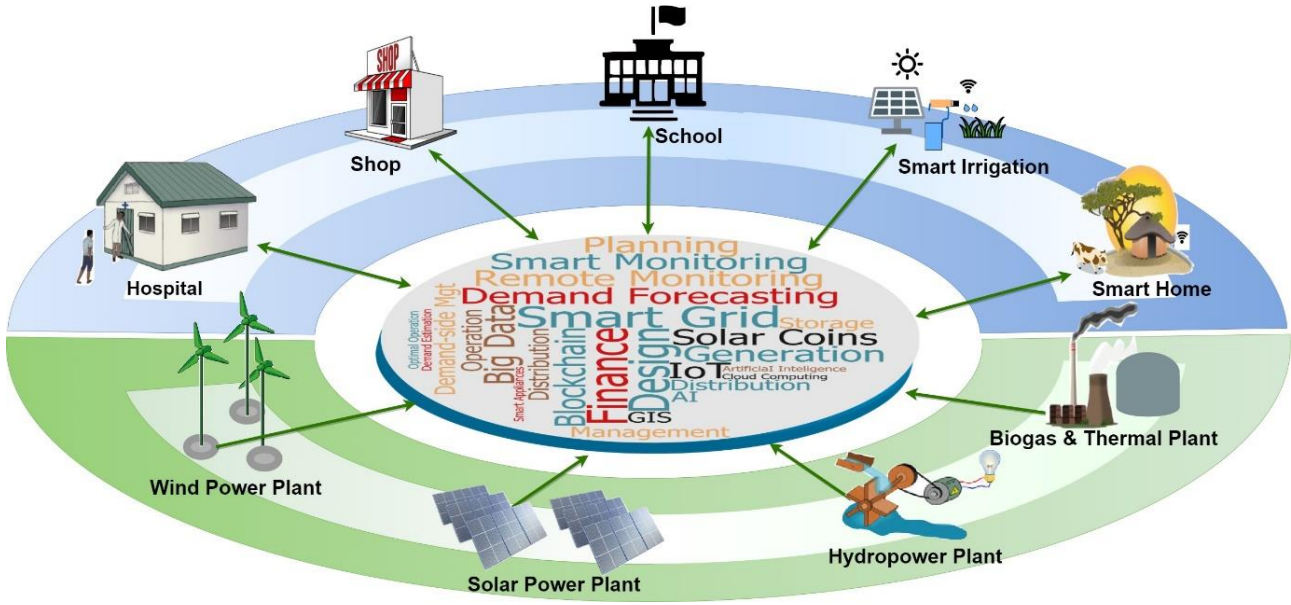
UNITED NATIONS UNIVERSITY
UNU-EHS
Institute for Environment and Human Security

- Specific needs, challenges and opportunities for Smart Grid approach can be different for Africa and the Global North.
- Need for contextualization of Digital Solutions respectively Innovations according to specific needs

Smart Grid in Global North



Smart Grid in Rural Context in Africa



DT innovation use cases in the MG sector

UNITED NATIONS UNIVERSITY
UNU-EHS
Institute for Environment and Human Security

SPARKMETER

real time monitoring service using cloud-based services

Remote monitoring (Africa)

PAYG Digital payment (Kenya, Moz.)

Innovative payment systems

RVE.SOL

FLEXGRID

Development of a radically different approach to mini-grid architecture using artificial (swarm) intelligence which results in a substantial lower upfront investment per connected users in the mini-grid

AI-based Digital planning (Mali))

Blockchain (Kenya)

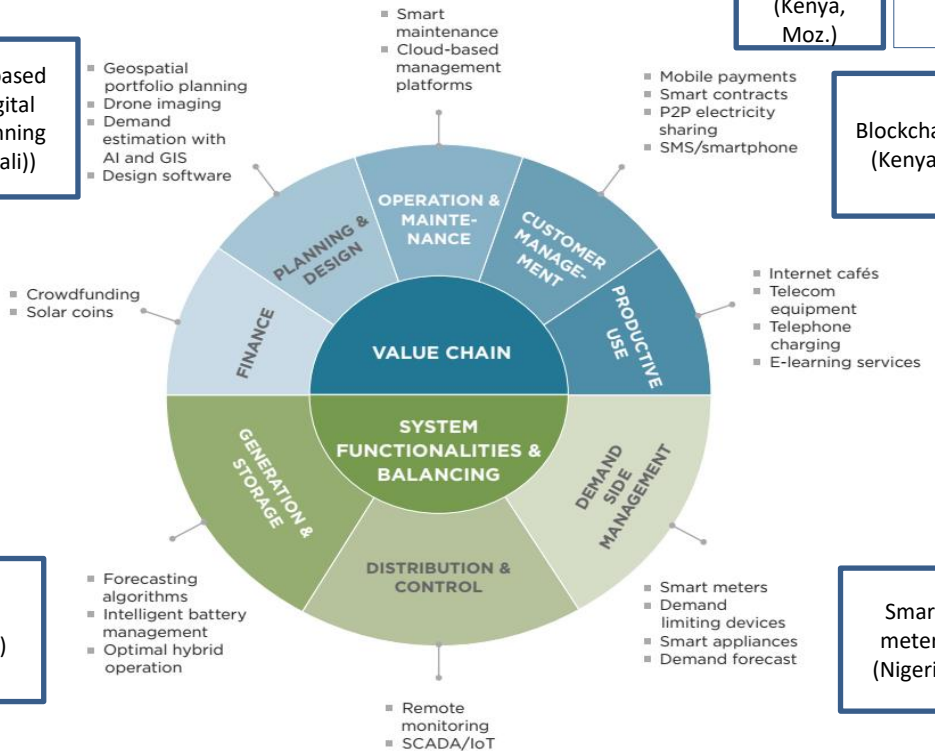
blockchain-based marketplace to facilitate the transactions between producers and consumers around the mini-grid systems

RED+ Renewable Energy Decentralised

sunexchange

Using the Ethereum crypto currency to develop an innovative and universal peer-to-peer solar cell leasing marketplace

Blockchain (South Africa)



RED+ Renewable Energy Decentralised

Innovative **Artificial Intelligence** based systems to optimize energy generation

AI (Kenya)

Smart meters (Nigeria)

smart metering solutions that allow the monitoring of the generation and consumption while offering secured payment processing in the Nigerian market

ICE COMMERCIAL POWER

wattnow

Web/platform that analyses and provides real-time monitoring of energy consumption to inform energy efficient decision making

AI-based remote monitoring

IoT (Uganda)

Provide supports companies in the energy sector in Uganda with advanced prototyping and energy system monitoring

INNOVEX