

Renewable Energy as a lasting solution to the lack of access to power in rural health facilities

Wednesday, 8th December 2021, 12pm– 1pm
Renewable Energy Thought Leadership Event
by eHealth Africa



Agenda



INTEGRATION environment & energy

- Introduction
- Expertise in RE sector

Energy in health sector

- Types of facilities by energy use
- Energy issues
- RE solutions and effective system selection

Case Study

- INT electrification planning toolkit
- Health center survey for energy status and supply

Key considerations

- Why RE solutions
- How to deploy effective systems
- What is needed to ensure sustainability

/ 1 - INTEGRATION environment & energy

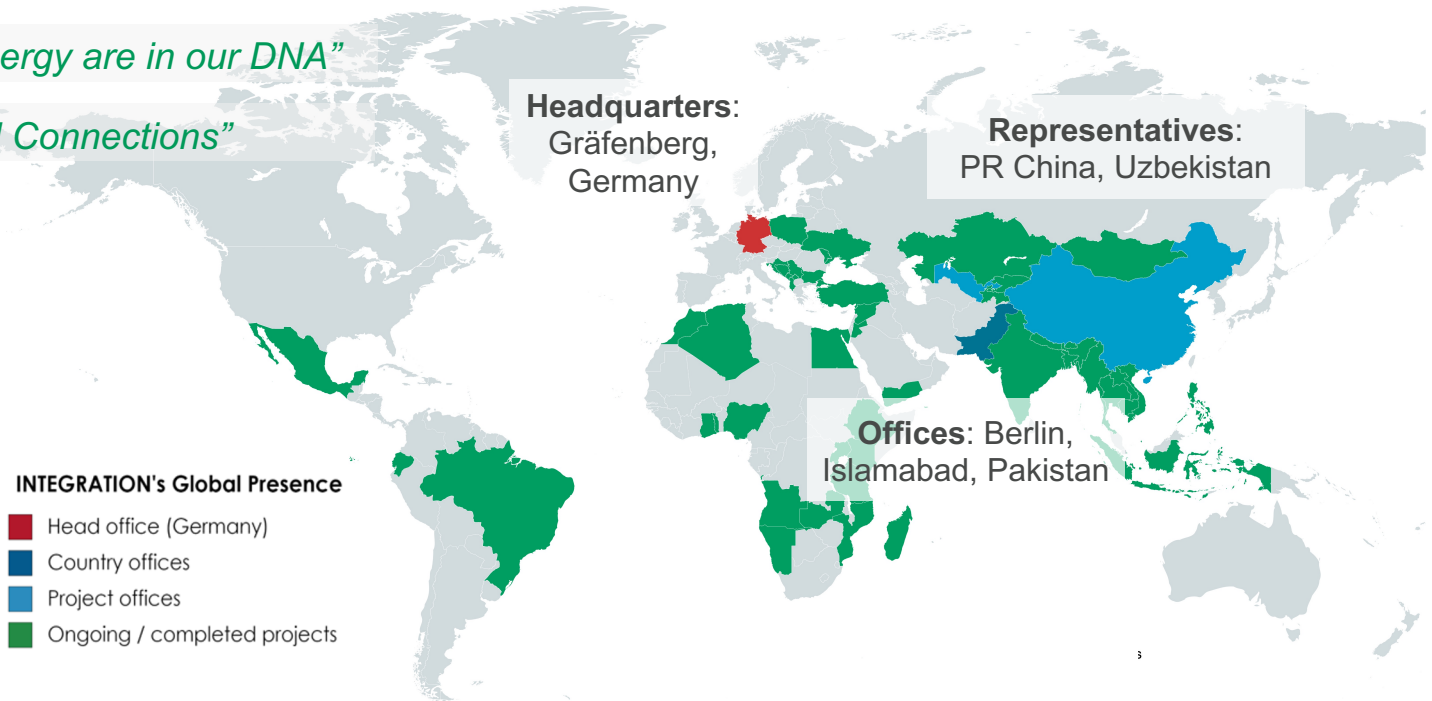


Global Presence

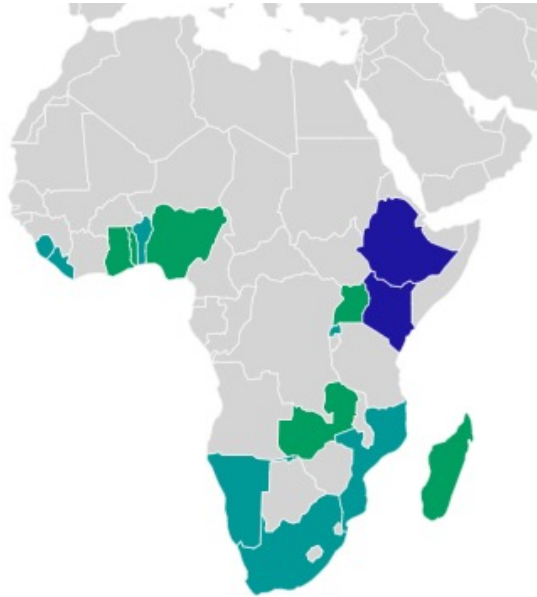
“Facilitating Development”

“Environment and Energy are in our DNA”

“We Build Meaningful Connections”



INTEGRATION in Sub-Saharan Africa

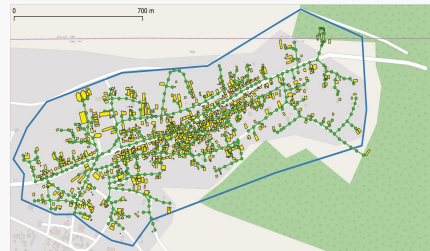


40+ projects in
Sub-Saharan Africa

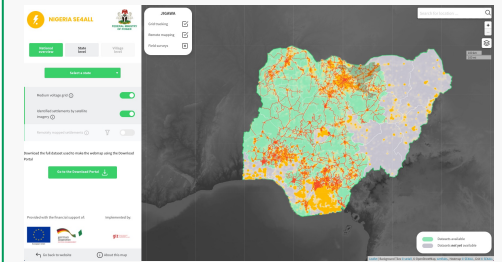
Nigerian Energy Support Programme (NESP II)



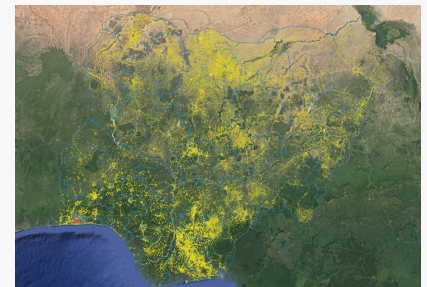
Nigeria Pre-Feasibility Assessment of Co-Located Mini-Grids and Investments in Agro-Processing



Data gathering and management for electrification planning



Geo-spatial Assessment of Mini-Grid Potentials in Nigeria



Main Areas of Expertise



Renewable Energy (RE)

Renewable Energy Systems

Rural Electrification Planning & Advisory Services

RE Grid Integration, Storage & Weak Grids

Humanitarian Energy



Energy Efficiency & Management

Energy Efficiency in Buildings

Energy Efficiency in Industries

Municipal Energy Planning (MEP)



Environment & Climate

Environmental Management & Due Diligence

Eco-industrial Development & Decarbonizing Sectors



Project Management & Cross-cutting Competences

Sustainable Management, Monitoring & Evaluation

Engineering, Operation & Maintenance

Digital Planning Tools & Data Management

Expertise in RE sector

Renewable Energy Systems

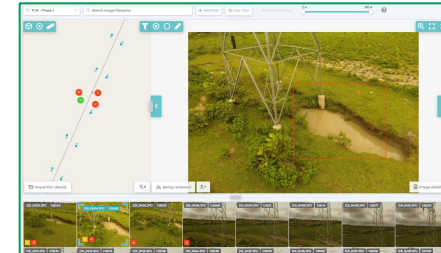
- Small to medium sized solar & hydropower projects, clean fuels, wind, and hybrid solutions
- Resource assessments, feasibility studies, energy system design, transaction and procurement advisory support, as well as capacity building and training

RE Grid Integration, Storage & Weak Grids

- Developing digital asset inventories of T&D systems utilizing imagery processing and smart power supply measurement techniques
- Supporting utilities in sustainable software architecture for RE grid integration and energy storage simulations

Rural Electrification Planning & Advisory

- Fit-for-purpose geospatial and techno-economic assessments, energy models, and advanced data management systems
- Actionable advice for the development of enabling regulatory environments



Humanitarian Energy

- Technical analysis, policy-influencing and policy development to mobilize multi-stakeholder support aimed at affordable and sustainable energy access for both refugees, IDPs and host communities



/ 2 - Energy in Health Sector



Types of health facilities and common energy uses



Pharmacies



**Basic
health post**

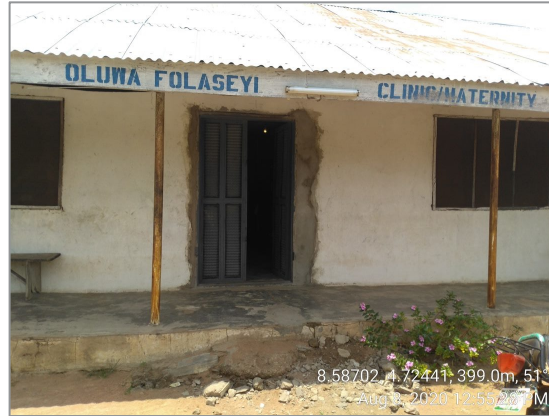


**Primary
Health
Centers**



**Larger facility
/ Hospital**

Example health facilities found in rural and peri-urban communities



Bulbs



Fans



(around 50%) have small **fridges** too

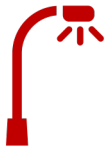
Energy issues faced by rural health facilities



Unreliable electricity supply
Spoiled medications
Critical for vaccines storage



Large bulky equipment
Not portable and
Long repair down times



Lack of night lighting
Services severely limited
Inadequate response to
medical emergencies



Expensive diesel fuel costs
Non-energy efficient
equipment leads to higher
costs



Life saving services
impacted
Shutdown during operations
can cause loss of lives

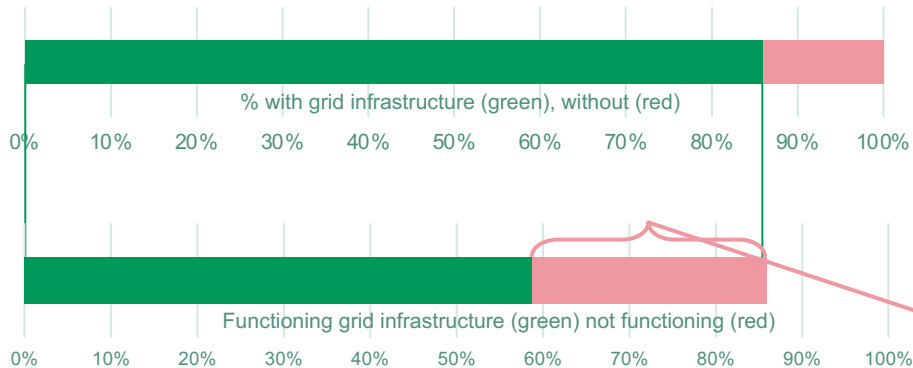


Frequent interruptions
Fluctuations in voltage and
power surges damage sensitive
equipment

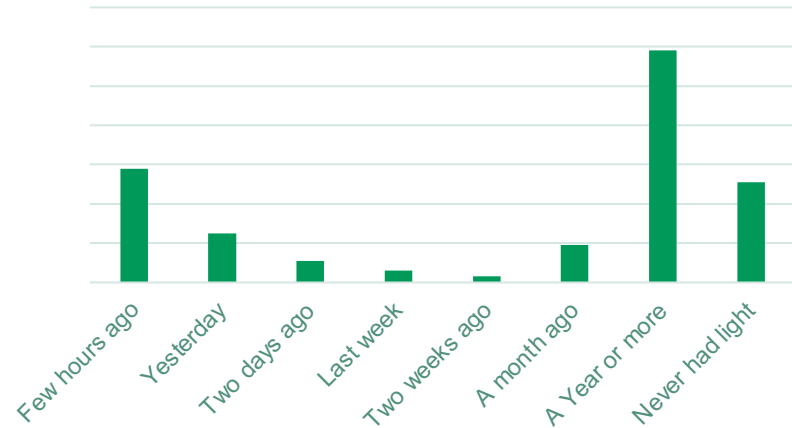
Energy issues faced by rural health facilities



Unreliable electricity supply
 Spoiled medications
 Critical for storage of vaccines and medicines



Date of power last on



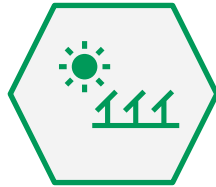
Survey of 291 Health centres across 2 states in Nigeria:

- Many health centres last had power on over a year ago
- Around 27% of total surveyed **had non functional grid infrastructure**

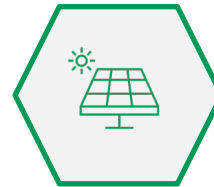
Types of usual RE solutions suitable for health facilities



Small off-grid systems
(1-5 kW)



Standalone larger
systems (5-15 kW)



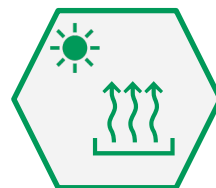
Connected to
mini-grid



Connected to main grid
with solar-battery back up



Solar water
pumping



Solar thermal
for warm water



Solar cold
storage

Supply strategies based on system type



For off-grid & stand alone systems,
DC appliances are better

Lower power and energy consumptions
Cost savings
Portable systems

Mostly static systems with less room for
future expansion



Mitigation strategy: Modular components
(e.g. Separate set of panels for fridge
which can be upgraded when new larger
fridge is required)



For mini-grid and on-grid systems,
AC appliances are better

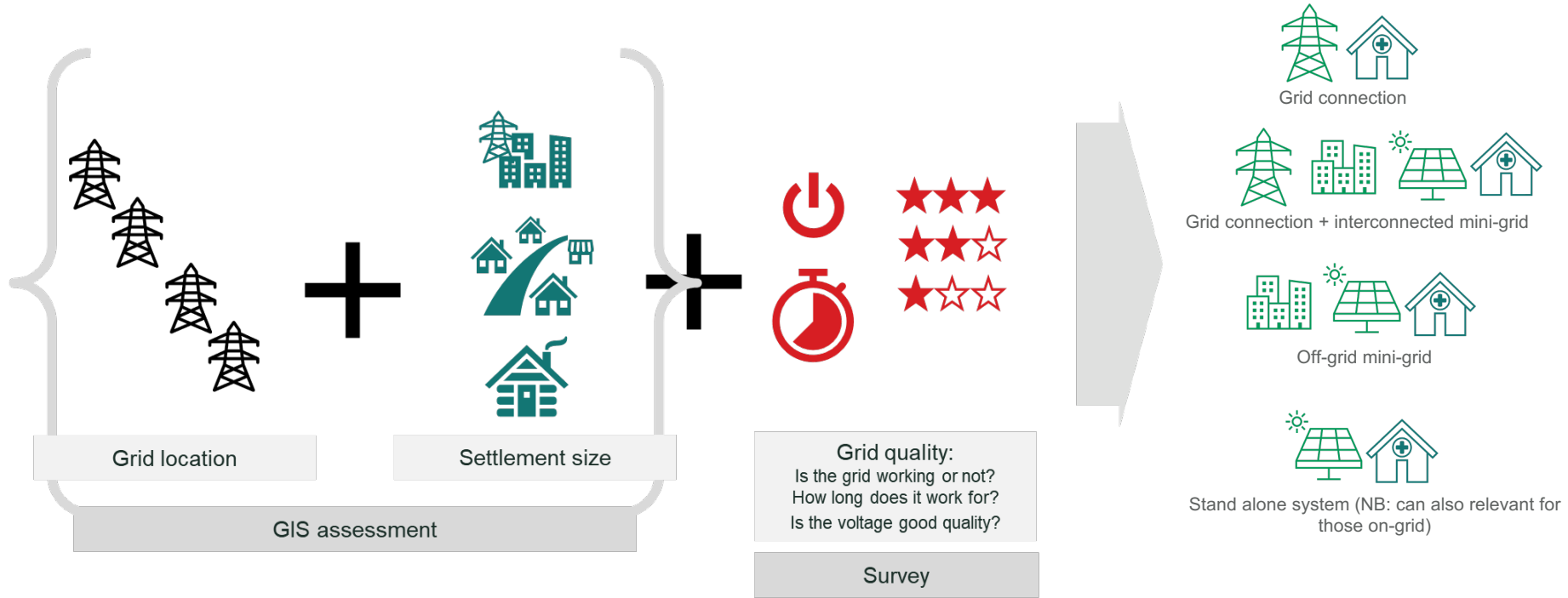
Power larger set of equipment and provide services
Expansion possible by adding new devices

Reduced energy independence



Mitigation strategy: Prioritized and/or
dedicated power supply for critical health
facilities (location close to powerhouse is
advantageous to implement this)

Selection of system type based on data



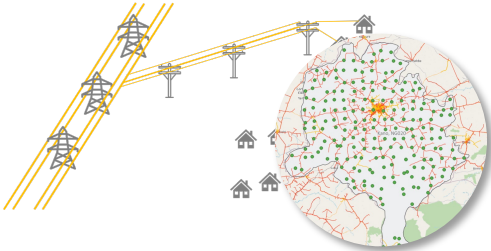
/ 3 - Case study



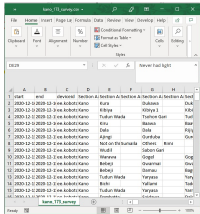
giz | Health center survey for energy status and supply



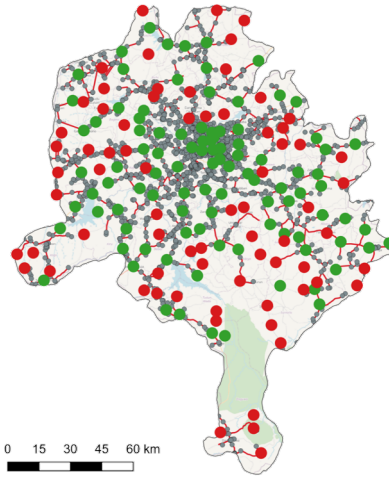
Selection of health centers at key grid points



Mobile (remote) survey



Understand grid quality supply



Analysis of electrification options



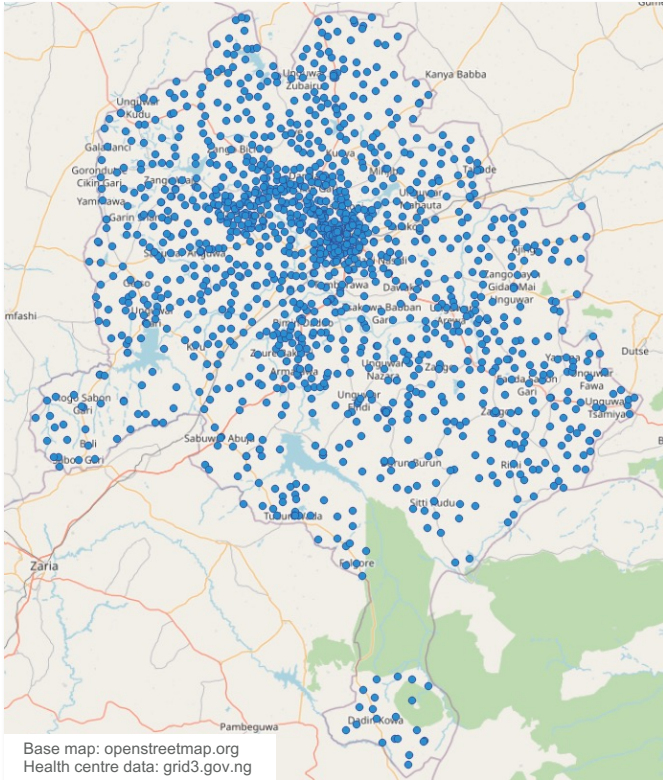
Good supply level:
Grid connection



Supply level can be improved
Consider additional decentralised solar supply

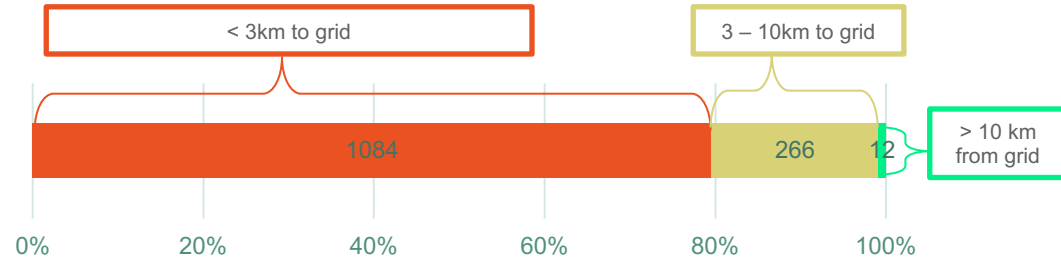
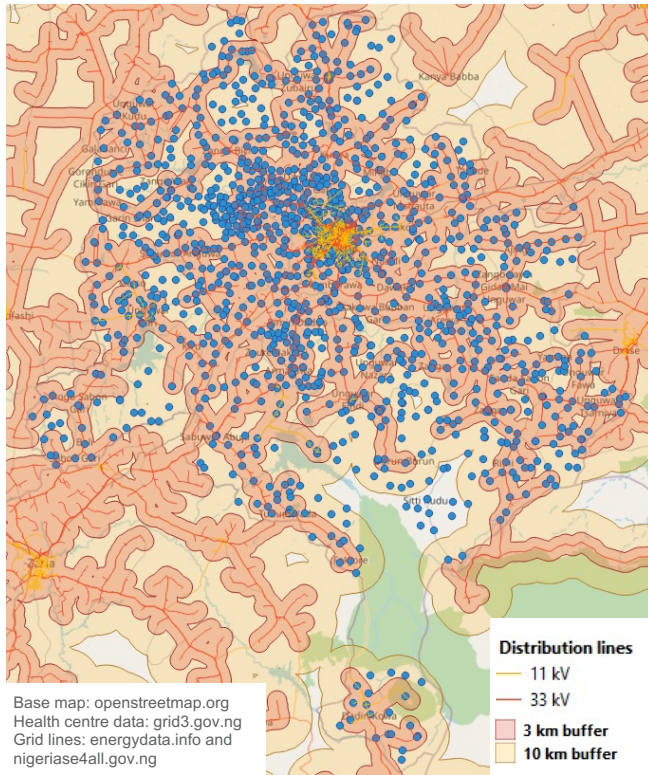


Example: Electrification options in Kano state



- Health locations in Kano state, Nigeria (left)
- **1,395** health points in total:
 - 962 Health Posts
 - 400 Primary Health Centers/clinics
 - 33 Other
- By overlaying with energy supply data, an assessment can be made for current and future optimal energy supply scenarios

Example: Electrification options in Kano state



< 3km to grid: Has a grid connection

3 – 10km to grid: Can soon be electrified

Electrification options (depending on **quality of grid supply**):



Grid connection



Grid connection + interconnected mini-grid

> 10 km from grid: Off-grid

Electrification options (depending on **size of surrounding settlement**):

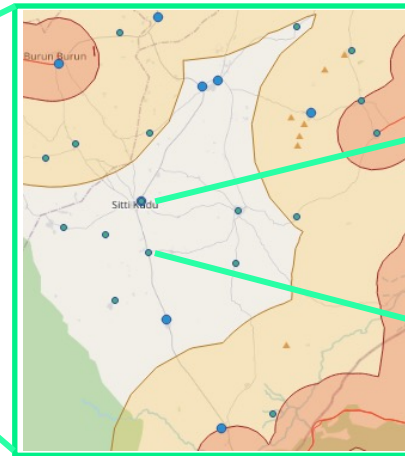
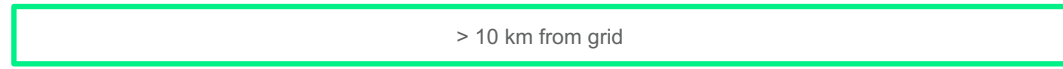
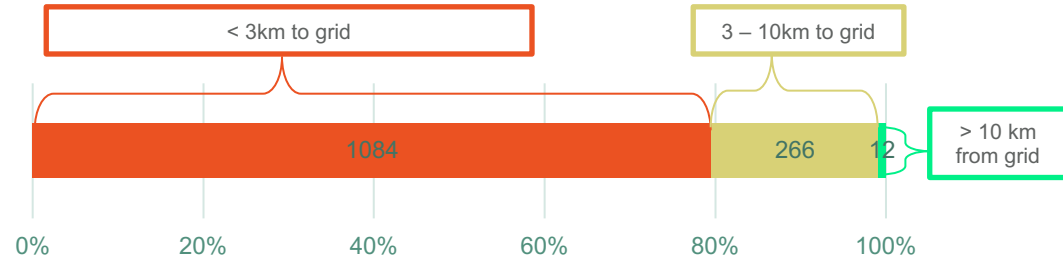
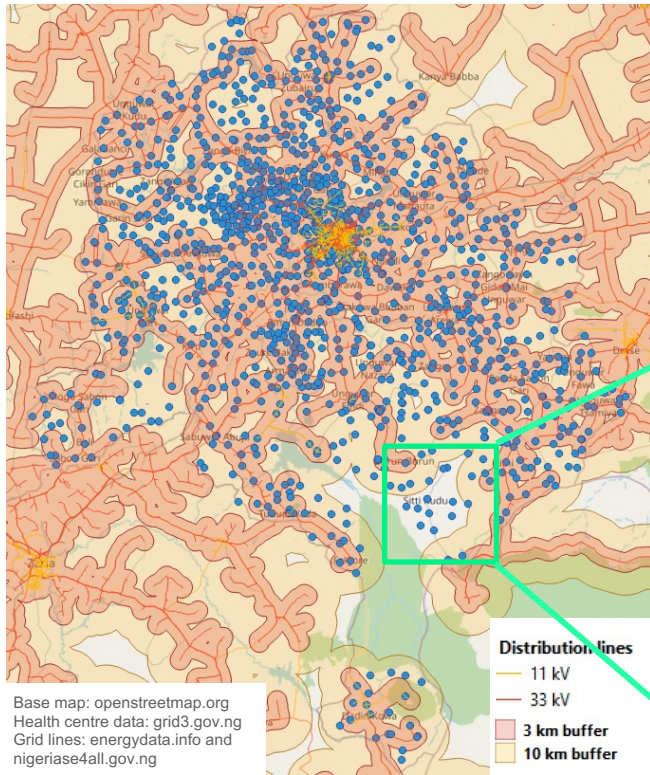


Off-grid mini-grid



Stand alone system (NB: can also be relevant for those on-grid)

Example: Electrification options in Kano state

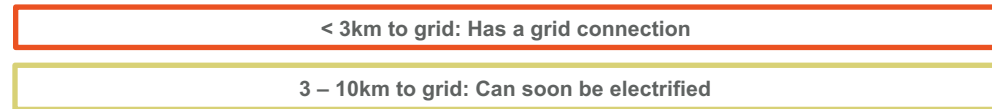
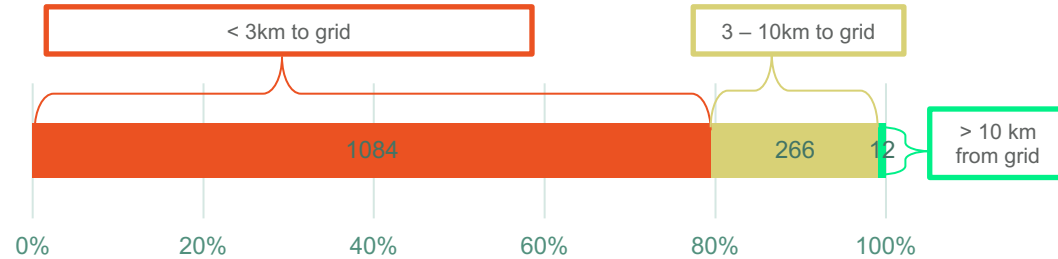
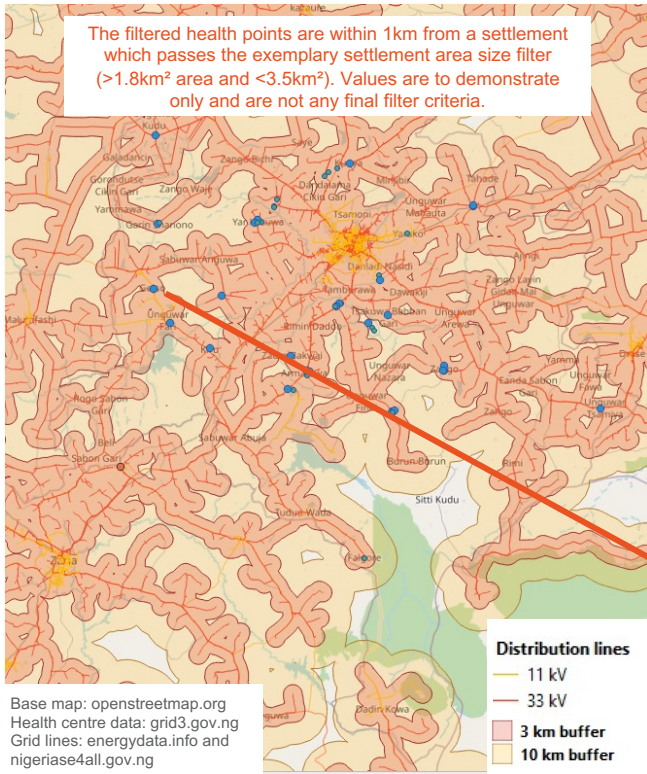


Dense settlement:
Off-grid mini-grid



Sparse settlement:
Stand alone systems

Example: Electrification options in Kano state



Electrification options (depending on quality of grid supply and settlement size):



★★★
 ★★☆☆
 ★☆☆☆

Surveyed settlement reported that it did not have light for several years -> The location *could* be suitable for an interconnected mini-grid (site visit and more detailed survey would be required to confirm)



Grid connection + interconnected mini-grid:
 Surrounding community not too big (area <3.5km²) or small (area >1.8km²) and close (<1km) to a community

/ 4 - Key considerations in promoting RE solutions for rural health facilities



Why are RE solutions needed for health facilities



Energy security can promote provision of life saving facilities

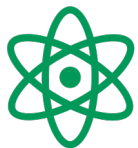


Fast deployment needed in next months to combat COVID-19 – ready to deploy RE systems can come to the rescue



Reduced dependency on diesel fuel and reduced CO2 emissions (especially next to health facilities)

How to speed up deployment of effective RE systems



Synergies between electrification planning and development of health facilities
(co-location initiatives)



Market development for **RE compatible medical equipment**



GIS based grid supply quality assessment can help to identify sites that need RE solutions as priority

What is needed for sustainability of the systems



Community participation and adaptation to local context are key to sustainability



Monitoring of energy consumption of solar based facilities needed to inform future planning



Adequate **infrastructure for O&M** and troubleshooting support should be built up



Better **reliability standards** for RE systems supplying critical health facilities



Future investments in health sector should also keep provision for **RE based energy supply systems**

/ Q&A





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Thank
you!

