# 5th Mini Grid Action Learning Event and Summit - Reaching Universal Energy Access in Ghana

## Geospatial Planning – Focusing on remaining 15% non-electrified communities

Venue: Movenpick Ambassador Hotel - Accra
27th June 2019
Presented by: Mr George Owusu
(Senior GIS Specialist, CERSGIS)

Government of Ghana / World Bank ESMAP/ DFID / SREP

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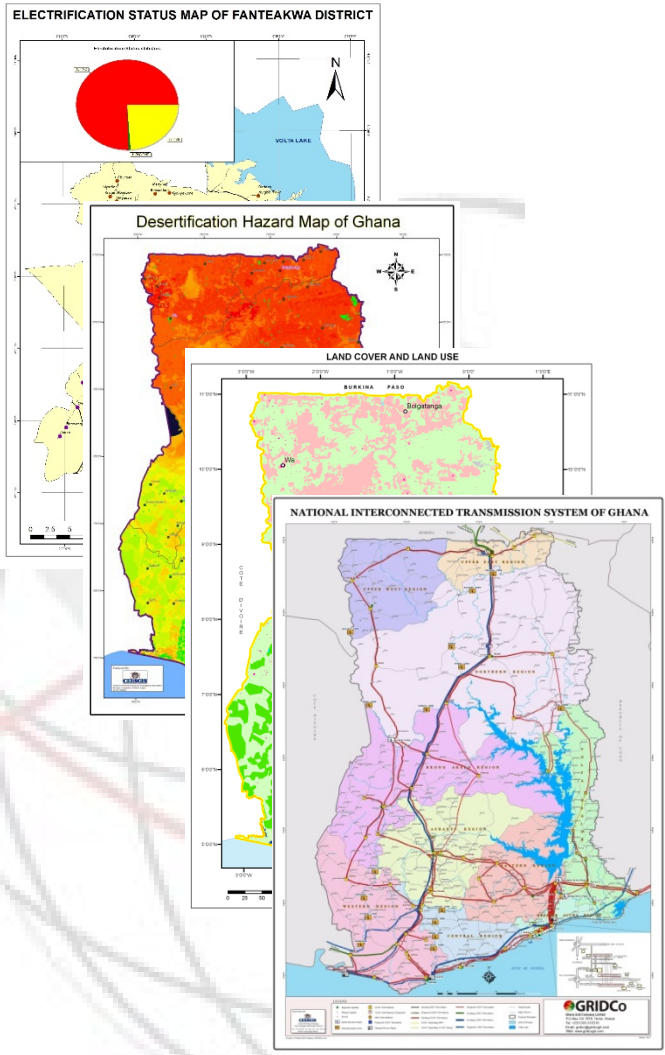
# Centre for Remote Sensing and Geographic Information Services (CERSGIS)

- Established by EPA (Ghana) and University of Ghana in 2000 as a self-financing GIS service and research support centre
- Provides geographic information services and the application of GIS and remote sensing to sector specific projects
- Clients include government and non-governmental organizations, development partners and the private sector

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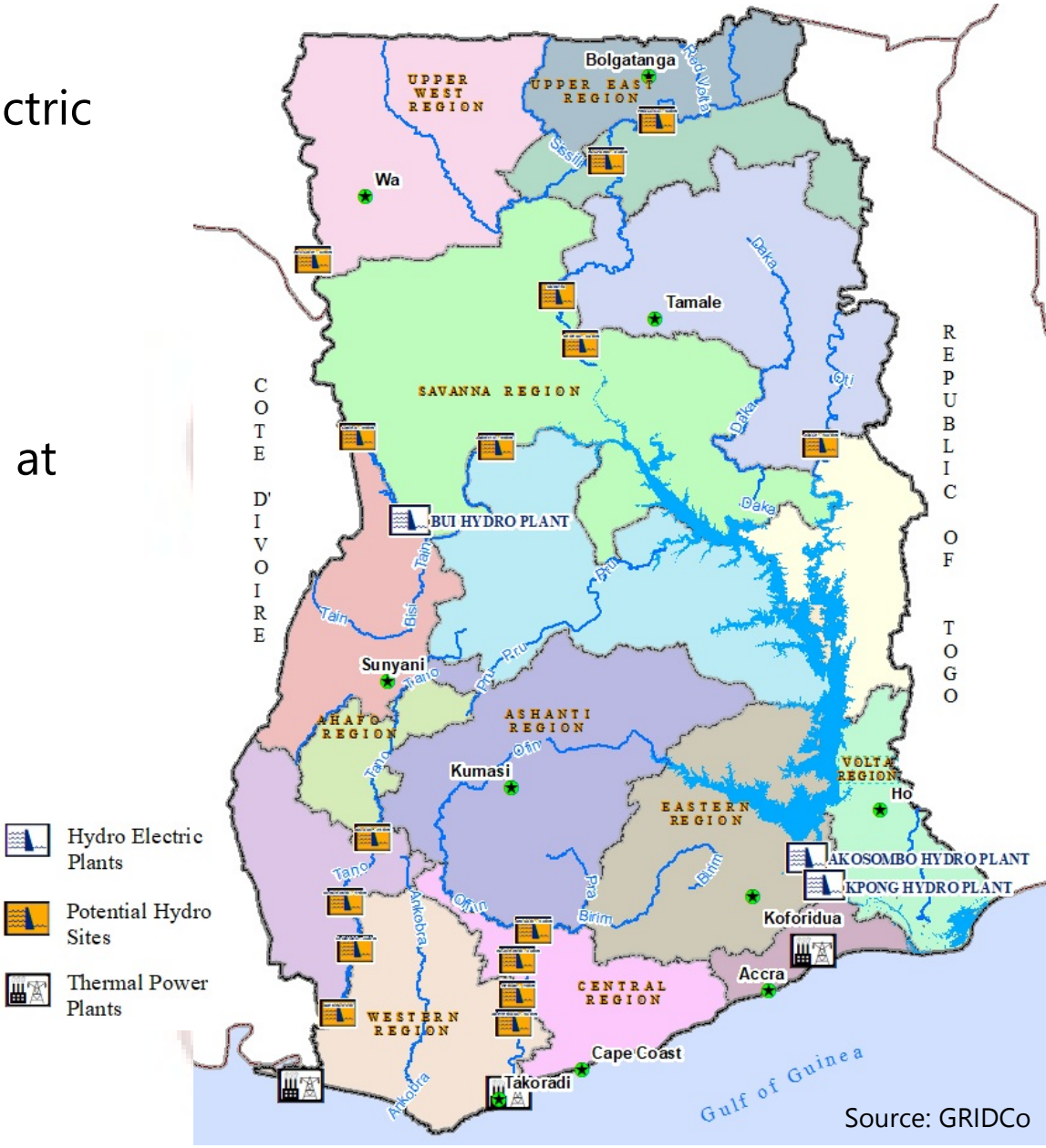
# Major sources of power in Ghana

- Three major hydro-electric dams located at
  1) Akosombo
  2) Kpong
  3) Bui

- Thermal Power located at
  1) Aboadze
  2) Atuabo
  3) Tema




Source: GRIDCo

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# Background

- At 84% access to electricity, Ghana is second only to South Africa in sub-Saharan Africa. Nonetheless, about 15% of communities are not electrified.
- Majority of these rural areas are islands and lakeside communities along the Volta Lake, where it is not economically feasible to extend the national grid mainly due to lack of infrastructure (bridges, roads, etc.) and the high cost of laying underwater cables from the nearest grid facilities.
- A more feasible and less demanding option for providing dependable electricity to remote regions lies with mini-grids.

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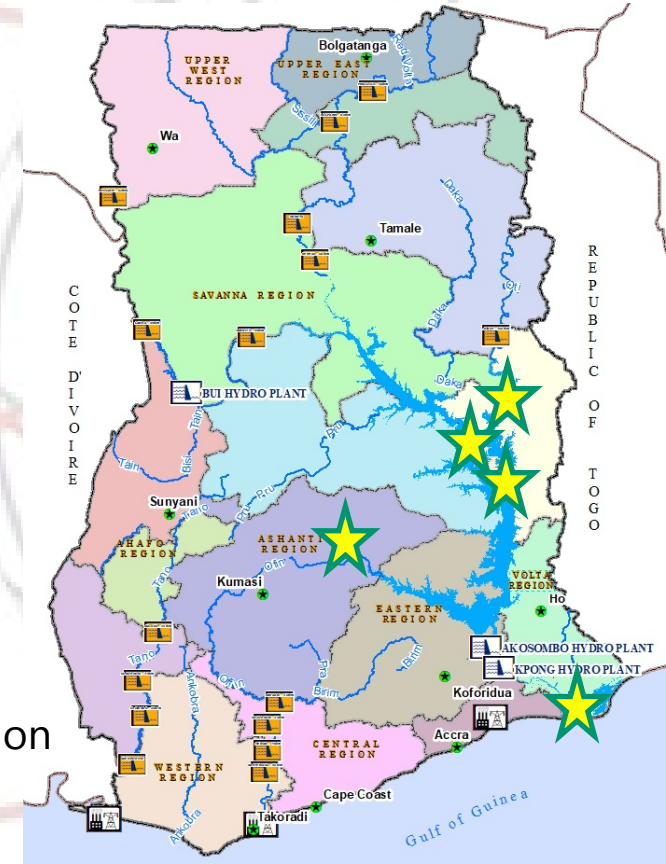
Source: CEESD, 2018

# Introduction

The greatest boost to mini-grids came from The World Bank under the Ghana Energy Development and Access Project (GEDAP) in 2013 where the Ministry of Energy piloted mini-grids in five island settlements. The beneficiary communities are;

- Aglakope (Krachi West)
- Mempekasa, (Drobonso)
- Kurdokope (Krachi East)
- Atigagome (Sene East)
- Pediatorkope (Ada East)

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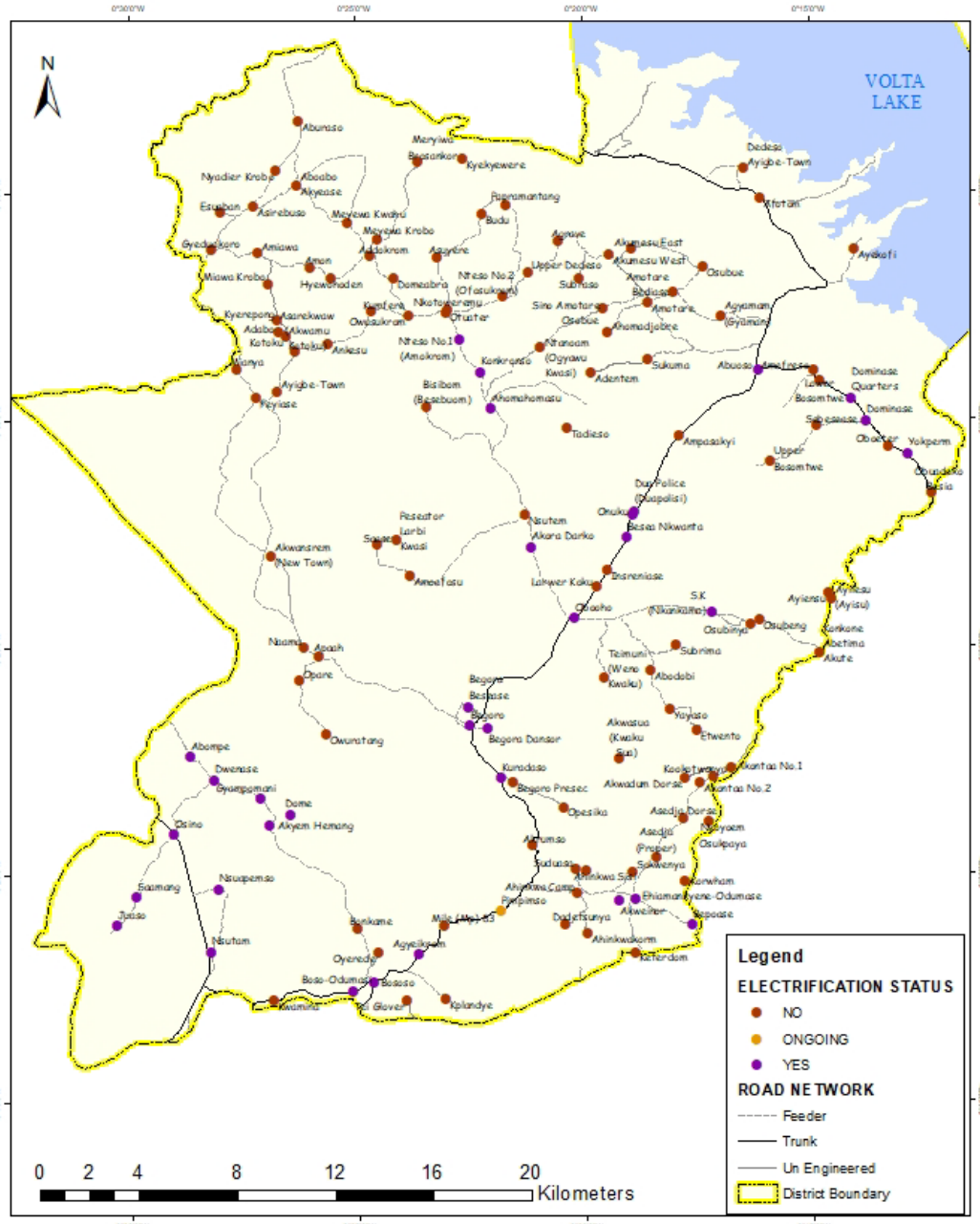
# ELECTRIFICATION STATUS MAP OF FANTEAKWA DISTRICT
# EASTERN REGION - GHANA




Source: GEDAP Project

# Intervention for off-grid communities

- All 15% of the off-grid communities certainly will not require to be on a minigrid.
- Some of these communities can be reached on the mainstream due to proximity to a nearby grid.

**Main Goal**

- Identify all the off-grid communities
- Rank these communities according to those requiring grid intervention and minigrid intervention

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# Multi-criteria analysis – Solar grid siting

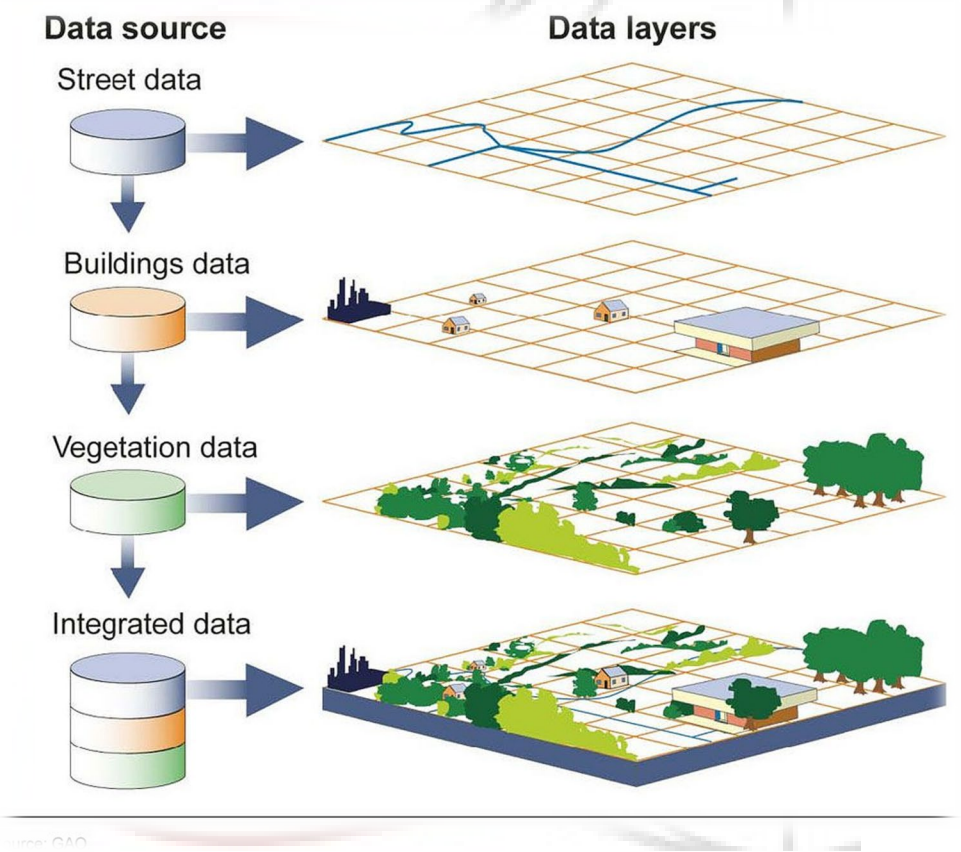
- Considering the siting of solar energy sites, the multi-criteria analysis can be used making use of the weights assigned to the various parameters influencing locating of the solar (Photo Voltaic) plants.

## Parameters

- Solar Irradiance
- Proximity to Electricity grid
- Distance to roads (Accessibility)
- Population density
- Distance from settlements

## Excluded areas

- Protected land (Forest reserve)
- Water areas (Lakes, wetland)

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# Multi-criteria analysis – Solar grid siting

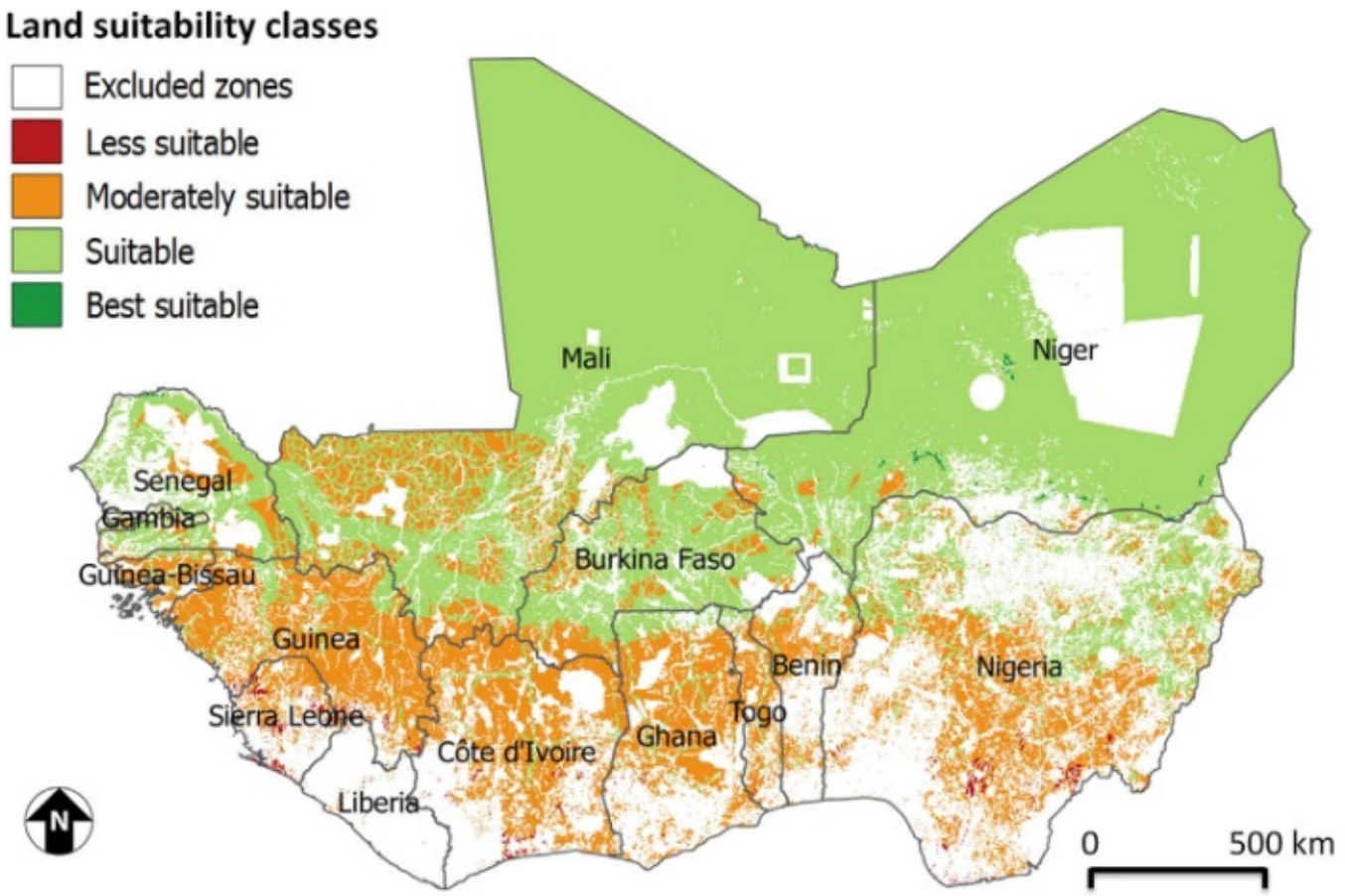


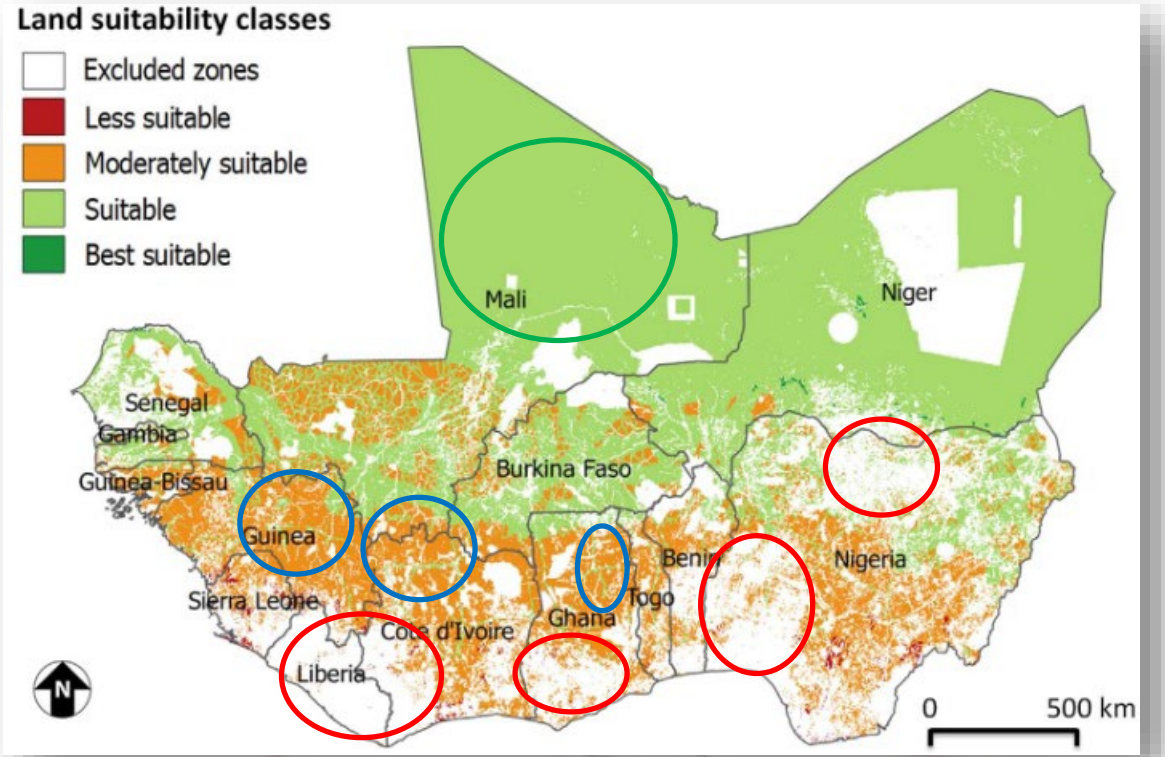

**Fig. 1.** Map of land suitability classes for large-scale grid-connected CSP systems according to Scenario 1.

Source: GIS-based assessment of photovoltaic (PV) and concentrated solar power (CSP) generation potential in West Africa, 2017

# Proposed minigrid types for communities

After the analysis, zoning the various areas and land classes will determine which of the minigrid type the community will require

- Solar Energy (PV)
- Wind energy
- Hydro-electric
- Fossil fuel Generators

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# Conclusion and Way Forward

- Considering the magnitude of work ahead, it will be prudent the geospatial processes is adopted and applied in order to facilitate the speedy connection of the off-grid communities onto the grid

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