

TAKING MINI GRIDS TO SCALE SUSTAINABLY/ INSTITUTIONAL FRAMEWORK

Ghana Case Study

24 – 28 June 2019 | Movenpick Accra, Ghana



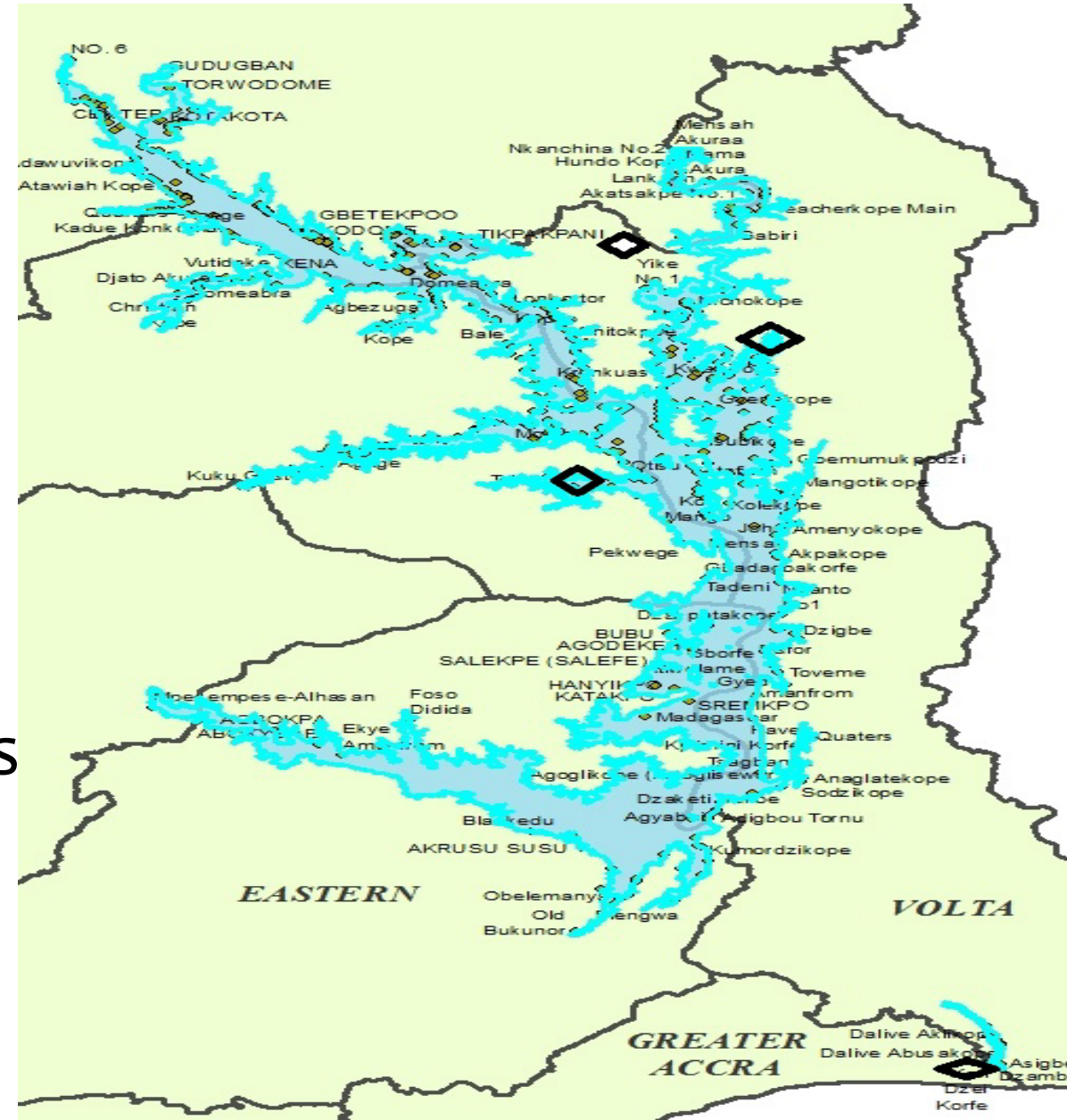
Ing. Seth A. Mahu
Ministry of Energy, Ghana

Presentation Outline

1. Rationale for Mini-grid In Ghana
2. Pilot Mini – Grid Electrification Project
3. MG Scale-up Preparatory Activities
4. Social Acceptability
5. Checklist for Effective Rollout of Mini Grid
6. Summary of Ghana Mini-grid Policy
7. Institutional Arrangement
8. Financing Arrangement
9. Ongoing Mini Grid Projects
10. Conclusion and Way Forward

Rationale for Mini-grid In Ghana

- Significant number of **island and lakeside communities** with population between 500 and 2000 exist in Ghana.
- Grid extension (using submarine cables) economically not feasible.
- Mini grid electrification identified as technically and economically feasible option compared to Off-Grid system (solar home systems).



Pilot Mini – Grid Electrification Project

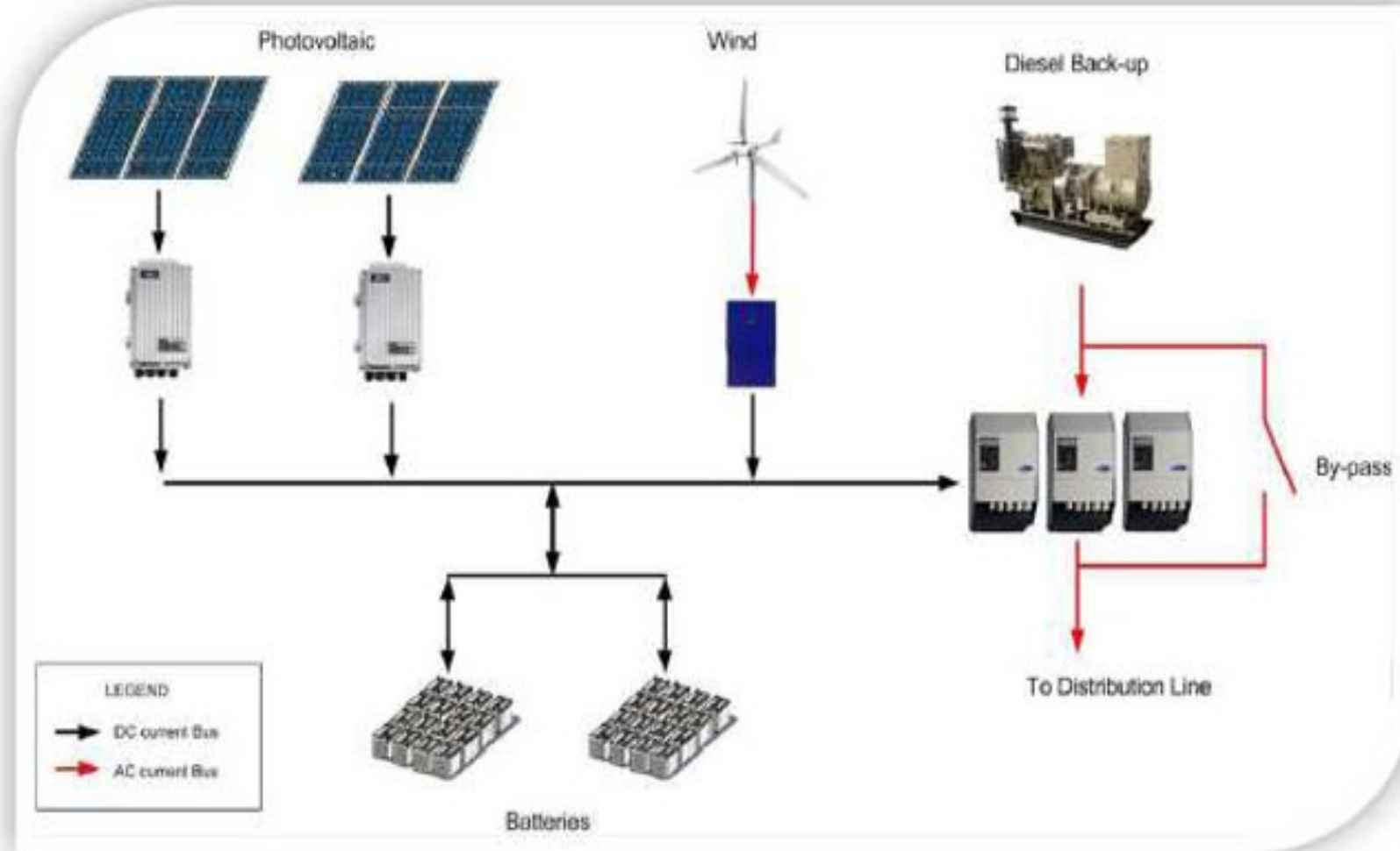
Component Specifications

- Solar PV array - 25-54KWp
- Wind Generator - 2x5.5KWp
- Battery - 2Vx3,500/4,200Ah
- Diesel/biofuel back-up generator - 30KVA
- Invertor - 6x48KVA

Highlights of the 5 Pilot Schemes

- 563 residential and non-residential connections
- Smart Metering system with 5 main load categories with tariffs similar to that of the national grid for residential and non-residential.
- LED street/path lighting facility (30 per Community)
- Excess Energy Incentive Scheme.

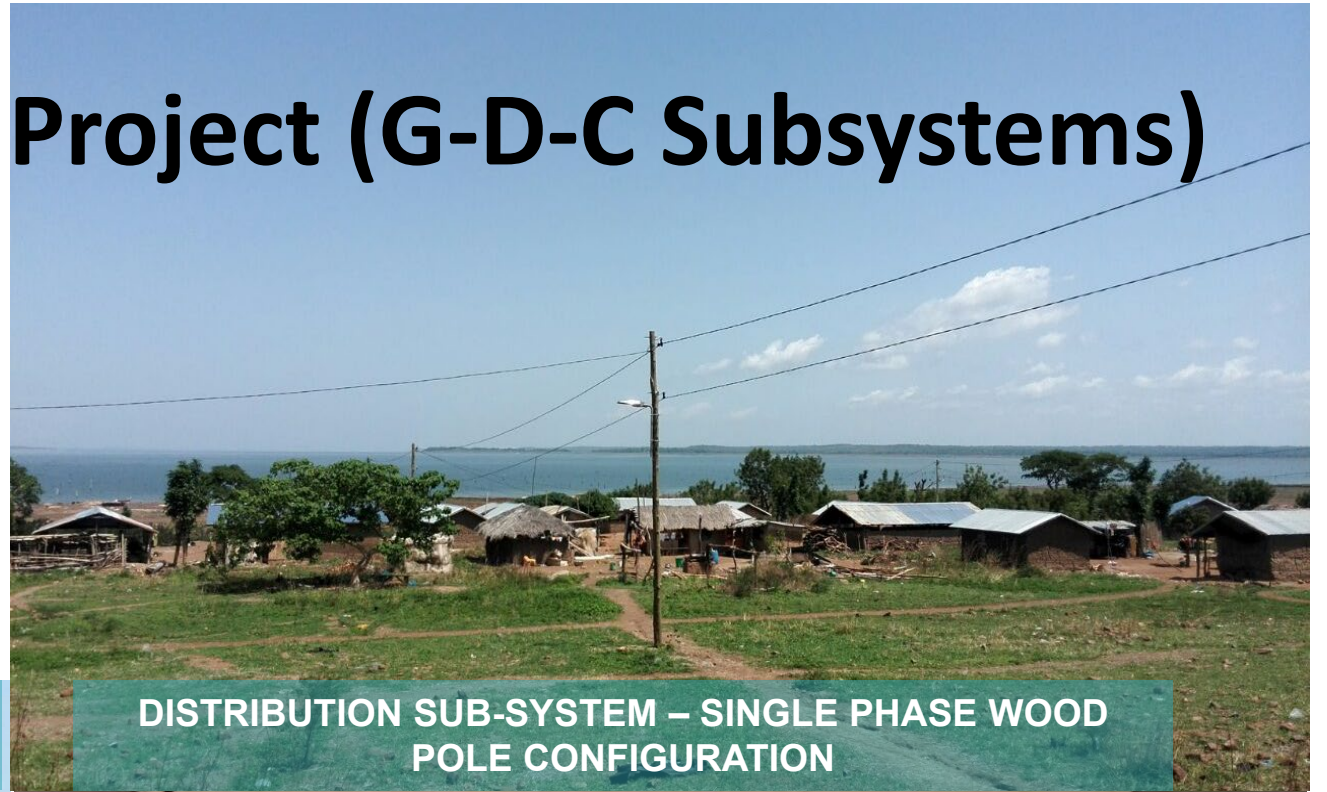
Schematic Diagram



Pilot MG Electrification Project (G-D-C Subsystems)



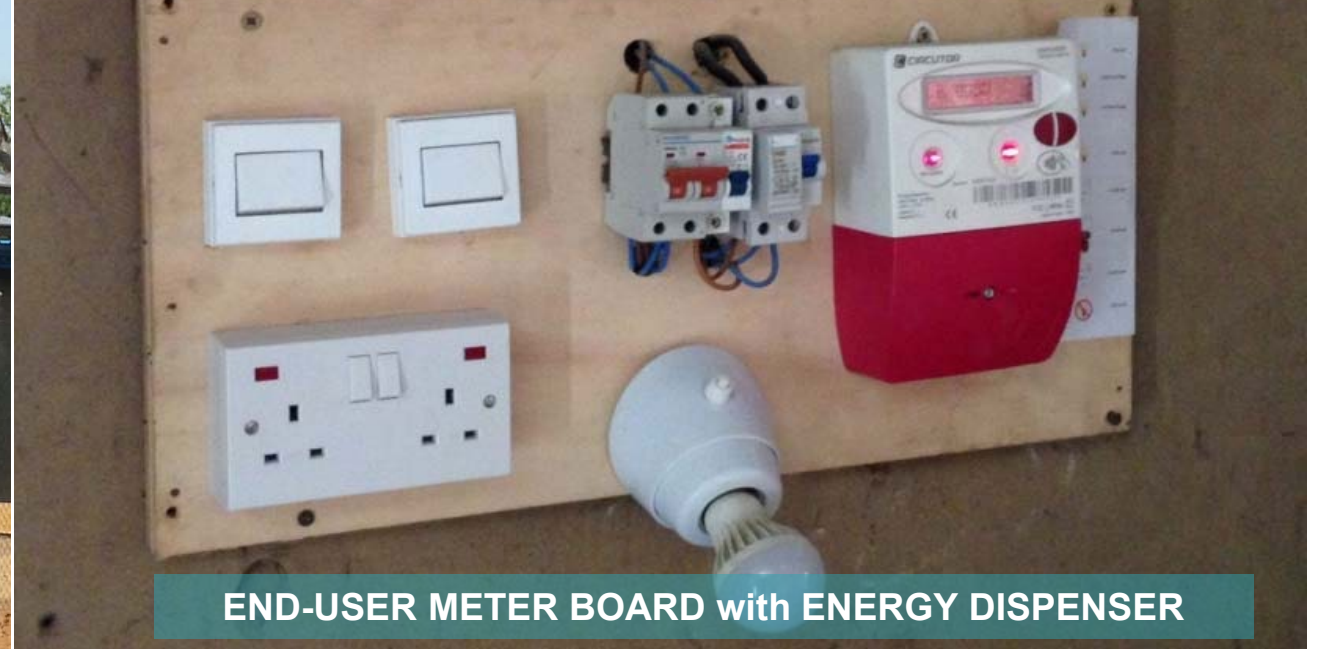
**GENERATION SUB-SYSTEM – SOLARPV/ WIND & DIESEL
GENSET BACKUP HYBRID SYSTEM @ Perdiatorkope**



**DISTRIBUTION SUB-SYSTEM – SINGLE PHASE WOOD
POLE CONFIGURATION**



**SOLAR PV PLANT with DIESEL GENSET BACKUP @
Kudorkope**



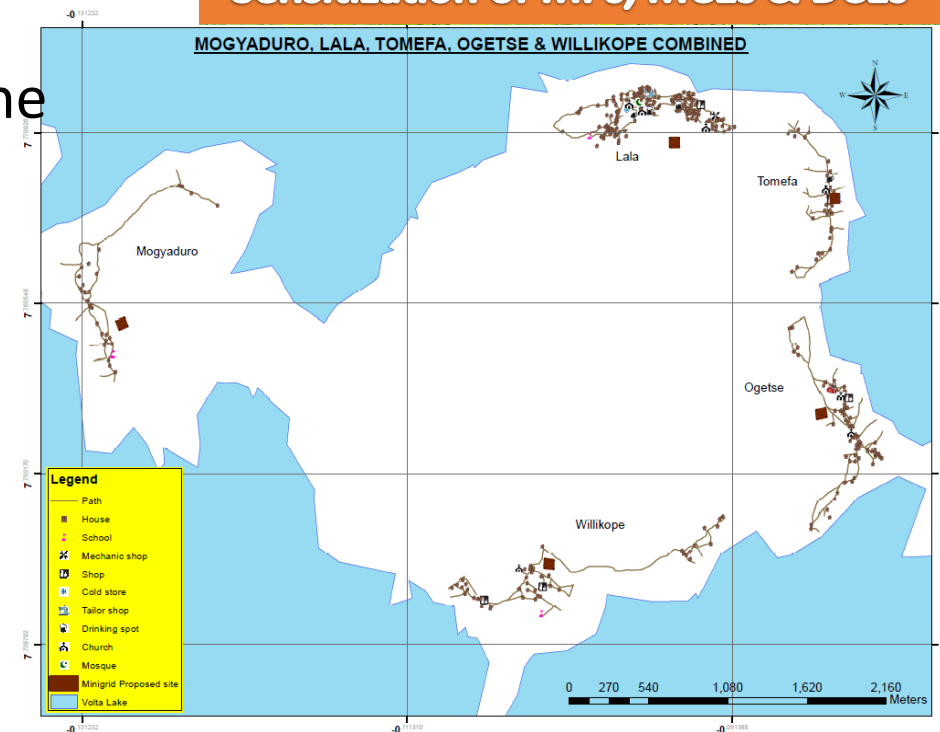
END-USER METER BOARD with ENERGY DISPENSER

MG Scale-up Preparatory Activities

- Stakeholder mapping and Sensitization (MPs, Communities, DCEs/MCEs, etc.)
- GIS Survey of Communities for customer classification and distribution network planning.
- Siting of appropriate locations for the proposed power plants;
- Land release agreement for the demarcated sites for the power plants.
- project packaging and procurement arrangement
- community selection using GIS tools and physical visits
- Socio-Economic and Energy Forecast study
- Environmental Impact Assessment



Sensitization of MPs, MCEs & DCEs



Social Acceptability

- Formed Community Energy Management Committee (EMC) in all communities
- Providing continuous capacity building to EMC members and community in general
- Mainstreaming gender in decision-making



Checklist for Effective Rollout of Mini Grid

Intervention	Status
MG Policies	Done
Regulations frameworks	Drafted
Delivery models	Done
Institutional arrangement	Done
Boundary issues for grid, mini-grid and standalone	Ongoing
Procurement Models	Done
Social Acceptability	Ongoing
Human capacities	Ongoing
Cost and Tariff frameworks	Ongoing

Summary of Ghana Mini-grid Policy

Intervention	Decision
Investment Policy	<ul style="list-style-type: none">• Mini-grids mainstream into the National Electrification Programme.• Public sector led investment similar to Rural Electrification through Grid extension• Ministry of Energy facilitates the implementation of the Mini-grid scheme
Business Model	<ul style="list-style-type: none">• Public Model option selected so that the existing Public Utilities take Over.<ul style="list-style-type: none">• VRA takes responsibility for the operation and maintenance of generating systems (until the establishment of the Renewable Energy Authority/Agency)• ECG/NEDCo takes responsibility for the distribution network and collection of revenue.
Connection Policy	Zero connection fee for mini grid customers
Tariff Policy	<ul style="list-style-type: none">• Uniform pricing tariff for residential and non residential consumers.• Cost of installation, operation and maintenance of entire system is to be embedded in the national electricity tariff process and approval by PURC

Institutional Arrangements

- Mini-grid electrification (in the meantime) will be managed and implemented by the Ministry of Power until such a time that the Renewable Energy Authority is Established.
- Designed and Supervised by Local Consultants in close collaboration with the Electricity Utility Agencies.
- Constructed by Local and Foreign Contractors
- Co-supervised by Engineers of the beneficiary agencies

Financing Arrangement

- Public Sector – Budgets & Concessional Loan Facilities
- National Electrification Levy (electricity consumers)
- Multilateral & Bilateral Sources
- Renewable Energy Fund

Ongoing Mini Grid Projects

Project	Target	Expected Completion Date	Status	Funding
SREP	55	2023	Preparatory activities completed	CIF, AfDB, GoG
SECO	3	2020	EPC Awarded	Swiss Govt.
AUDA	5	2020	Preparatory activities completed	AU. Others
SH	30	2022	Preparatory activities ongoing	China
USTDA	45	-	FS ongoing	USTDA

Conclusions and Way Forward

- Field preparatory activities for the 60 islands/lakeside successfully completed.
- MG electrification will be managed and implemented by the Ministry of Energy until such a time that the REA is established.
- EPC by Local and Foreign Contractors
- Preparation of projects (socioeconomic, energy forecast, GIS data, etc.).
- Continue to develop suitable project packages and sourcing investments