Empowering Rural Ghana: An Electrification Journey Worth Sharing

- **Presentation By**
- **Ing. Seth Agbeve Mahu**
- **Director, Renewable Energy and Green Transition**
- **Ministry of Energy and Green Transition (Ghana)**

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PRESENTATION OUTLINE

Country Brief

Electrification Schemes

Status of Renewable Energy in Ghana

Ghana’s Mini-grid Policy

Mini-grid Experience in Ghana

Lessons Learned

Critical Factors for Successful Mini-grid Electrification

Conclusion

COUNTRY BRIEF

Demo:
- Total population: 34,676,378
- Urban population: 56.1% of total population (2024)
- Population growth rate: 2.17%
- Urban population growth rate: 3.5%

Politics:
- Democratic governance

Economics:
- GDP for 2025 is estimated at around $88.3 billion.

agriculture: 22% (2024 est.), industry: 26% (2024 est.), services: 52% (2024 est.)

COUNTRY BRIEF- Power Statistics

Power Generation:

- Installed Generation Capacity – 5,712MW (GRIDCo 2024)

Hydro	Renewable	Thermal
1,584	256	3,873
27.7%	4.5%	67.8%
Generation by IPP		**41%**
Generation by Public Utilities		**59%**

Power Transmission:

- Open Access Transmission Utility

Power Distribution:

- 3 Distribution Utilities (ECG, NEDCo and Enclave for Freezone Enclave)

COUNTRY BRIEF- Policy/Regulation

NATIONAL ENERGY POLICY

RENEWABLE ENERGY ACT 832 OF 2011 (AMENDED 1045

GHANA NATIONAL ENERGY TRANSITION FRAMEWORK

RENEWABLE ENERGY MASTER PLAN

Funded by the European Union

RePower: Improving Renewables Penetration Through Plug and Play Microgrids
Project: 101096250 — HORIZON-CL5-2022-D3-01

ELECTRIFICATION SCHEMES

Background

- Instituted in 1989 as Government's principal instrument to achieve its policy of extending the reach of electricity to all parts of the country over a 30-year period from 1990-2020
- 64 out of 110 District Capitals were without grid electricity supply at the time
- By 1996 additional 41 District Capitals had been connected to the grid
- Last batch of 23 District Capitals were connected between 1996-1998

ELECTRIFICATION SCHEMES

IMPLEMENTATION STRATEGY

- Grant from Canadian Govt. for the National Electrification Plan Study (NEPS)
- Study was carried out by Acres International of Canada …… establishment of the National Electrification Master Plan
- Study considered alternative sources of providing power to communities i.e. solar, wind, biomass, small hydro etc.
- Phases of implementation (6 5-yr phases spanning the 30 yrs). Basis for phasing:

- District Capital -1st Phase
- Subsequent phases – based on economic ranking

ELECTRIFICATION SCHEMES

IMPLEMENTATION STRATEGY

- The 1st phase covered the connection of all District Capitals and towns/villages en-route to the District Capitals
- The subsequent phases entailed the electrification of communities based on most economically viable projects

ELECTRIFICATION SCHEMES

SELF-HELP ELECTRIFICATION PROGRAMME (SHEP)

THE SELF-HELP ELECTRIFICATION PROGRAMME IS A COMPLEMENTARY ACTIVITY TO THE NATIONAL ELECTRIFICATION PROGRAMME

Rationale:

- Reduce overall cost on Government
- Introduce community ownership
- Accelerate grid connection for communities who felt their proposed projects were too far away

ELECTRIFICATION SCHEMES

CRITERIA FOR JOINING THE SHEP

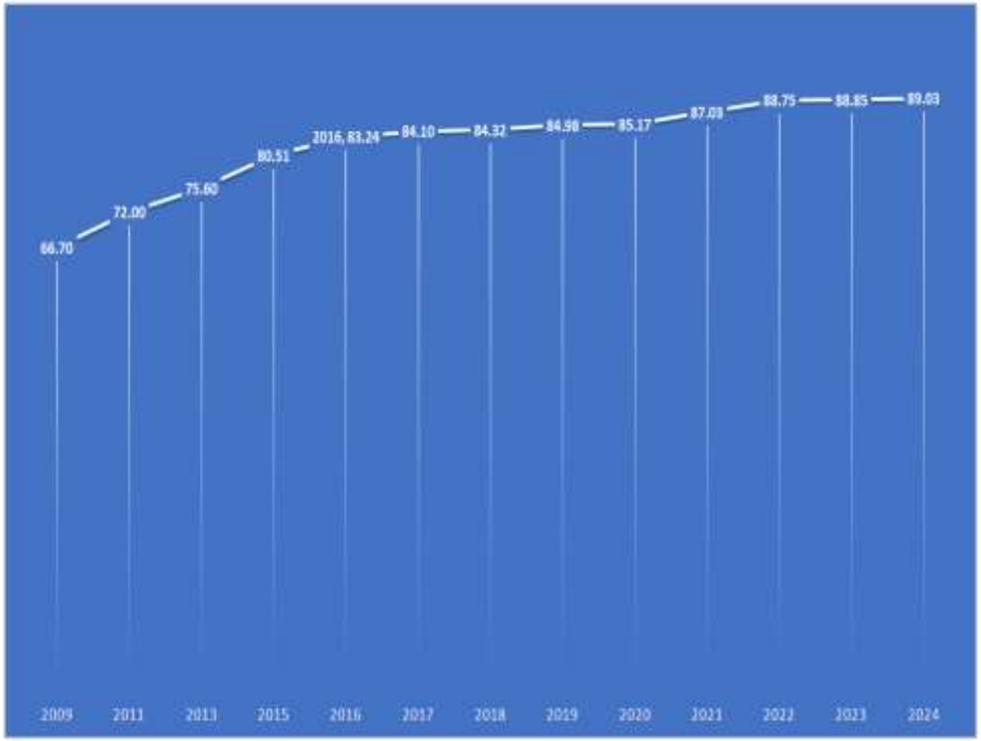
- Community must be within 20km of an existing 11kV/33kV network
- Community must be willing to procure and erect all the Low Voltage poles required for the works
- A minimum of one-third of houses in the community should be wired

ELECTRIFICATION SCHEMES

SUMMARY OF COMMUNITIES CONNECTED UNDER NES		
ITEM	PHASE	COMMUNITIES COMPLETED
1	Phases 1 & 2	1,909
2	Phase 3	1,080
3	Phase 4	1,824
4	Phase 5	4,105
5	Phase 6	3,125
Total		12,043

COUNTRY BRIEF- Power Statistics

National Electricity Access Rate (%)



Region	POP 2020	POP Electrified	Access Rate %
Ashanti	5,998,426	5,562,203	92.73
Ahafo	530,387	427,107	80.53
Bono	1,337,483	1,270,820	95.02
Bono East	1,105,649	840,402	76.01
Central	2,411,881	2,325,024	96.4
Eastern	3,439,905	3,119,451	90.68
Greater Accra	5,484,566	5,407,133	98.59
Northern	1,930,963	1,411,054	73.08
North East	534,461	354,537	66.34
Savannah	533,002	367,285	68.91
Upper East	1,280,510	957,191	74.75
Upper West	876,178	657,316	75.02
Oti	816,875	596,154	72.98
Volta	2,283,271	2,106,416	92.25
Western	1,974,334	1,857,889	94.1
Western North	955,634	779,427	81.56
National	**31,493,526**	**28,039,409**	**89.03**

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Status of Renewable Energy in Ghana

Technology/Intervention	Unit	Reference as at (2025)	Targets Cycle III (2026-2030)
Solar PV Utility Scale	MWp	183.10	902
Distributed Solar PV	MWp	64.90	120
Solar PV Home Systems	MWp	7.60	5
Solar Street/Community lighting	Units	30,000	125,000
Solar Lanterns	Units	345,296	1,100,000

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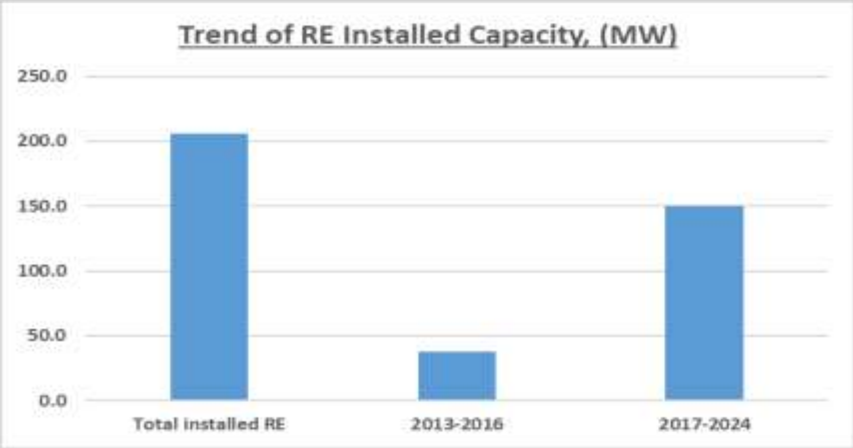
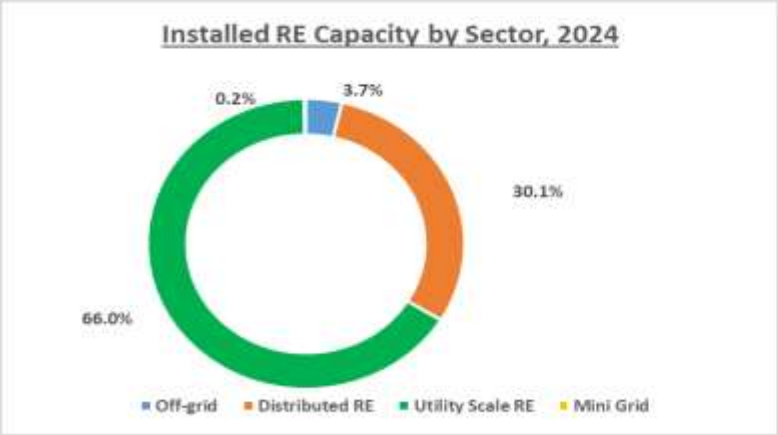
Status of Renewable Energy in Ghana





The total renewable energy installed capacity is 205MW (Approx. 4% of national electricity installed capacity).

LAST MILE: MINI-GRID EXPERIENCE IN GHANA

- WB funded 5 pilot mini grids under the Ghana Energy Development and Access Project (GEDAP) to provide electricity access to remote communities.

- The EPC&M included a management component to allow for the development of a sustainable management model and test it for a two-year period post technical commissioning of the mini-grids.

- Lessons from the management component formed the basis for policy consideration for scaling-up mini-grid electrification in Ghana

MINI-GRID EXPERIENCE IN GHANA

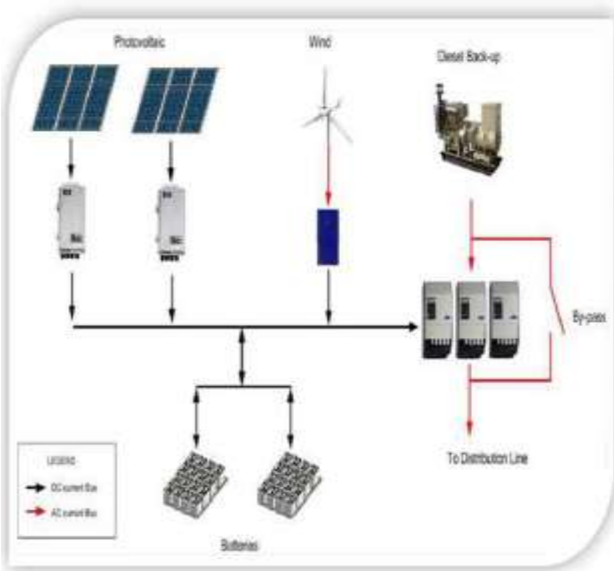
KEY FEATURES OF PILOT MINI-GRIDS:

- Delivering 99.9% systems reliability (reliable 24/7 electricity service and street lighting)
- Three phase 415V AC-distribution backbone
- Grid-ready Inverters
- Smart energy dispensers with Energy Daily Allowance (EDA), Prepaid metering system, and Time-of-use features
- An environmentally friendly power house

MINI-GRID POLICY

- MGs mainstreamed into National Electrification Scheme and aligned with policy on rural electrification
- Public sector-led Business Model: ownership
- Management of mini-grid installations:
  - VRA responsible for O&M of MG assets on islands
  - ECG and NEDCo responsible for O&M of MG assets inland within their respective jurisdictions.
- ZERO connection fee charge for RE-based mini-grid customers.
- Tariff: the existing Uniform Tariff Policy (UTP) applies to RE-based mini-grid customers. e.g. lifeline consumption which is equivalent to 50kWh/month
  - PURC includes MGs in the National Electricity Tariff Rate Setting Methodology (cross subsidization)

Solar PV array
39KWp
Wind Generator
2x5.5KWp
Battery
2Vx3,500/4,200Ah
Diesel back-up generator
30KVA
Invertor
6x8KVA



MINI GRID ELECTRIFICATION SCALE UP

1. In line with our universal access target, mini grids have been mainstreamed into the national electrification scheme.
2. The five pilot mini grids in operation since successful rehabilitated in 2024, providing 24/7 uninterrupted electricity to over 15,000 people.

1. **Three (3) new MGs funded by SECO in Aflivie, Azizakpe and Alorkpem in the Ada East Municipality technically commissioned in Nov. 2024.**
2. **Procurement of 35 additional mini grids to serve some 70,000 people in 49 island communities funded by AfDB, GoG and CIF under Scaling-up Renewable Energy Program (SREP) ongoing.**
3. **Feasibility studies completed for additional 140 islands and lakeside communities funded by USTDA and UNOPS.**

MINI GRID ELECTRIFICATION SCALE UP




LESSONS LEARNED

- The adoption of the most appropriate Business Model depends on the country's electrification context. In the case of Ghana, the Public sector Business Model is driven by UTP (with cross subsidization) and the NES.

- The policy decision to mainstream the mini-grids into the NES led to about 94.5% Service Connections Rate on the MGs, harmonized the operational processes and eliminated tariff disparities between mini-grid customers and those on the national grid.

- The use of technology significantly improved operational efficiency and reduced operations and management cost and limited human interface (e.g. RFID Card, Intelligent Dispenser, ABC).

LESSONS LEARNED

- Over 90% revenue collection achieved for MG customers because of the technology, which is far above the national average of 70% by the country's two main utilities (ECG and NEDCo).
- However, total revenue collected is not sufficient to cover the O&M costs. Therefore, MG Tariff Methodology was developed to fund the viability gap.
- As PUE activities increase on the MG Network, revenues are projected to improve to reduce the viability gap.
- The tariff structure and time use of energy deployed allowed customers to manage their Daily Energy Allowance and also easily upgrade their consumption levels.

FACTORS FOR GHANA’S SUCCESSFUL MG PROGRAM

- Market size – the ability to serve a significantly sizeable number of the population at the least capital and recurring cost of the project.

- Policy choice –based on understanding of the local context within which the project must be delivered. There is no one-size-fits-all solution to delivering mini-grid electrification. It important that the interest of beneficiaries override those of external forces. In other words, donors and development partners must be flexible and willing to provide tailored support.

- Integration of concepts – gender, productive uses etc. must be developed, integrated and promoted consciously in order to improve the commercial viability of mini-grid electrification.

FACTORS FOR GHANA’S SUCCESSFUL MG PROGRAM

- Choice of Technology – the remote nature of mini-grids require well-engineered solutions and technologies that limit human interface whiles balancing cost and service.

- Human and institutional capacity – building human and institutional capacities is crucial for the efficient and sustainable management and operation of mini-grids.

- Financing arrangement – the very nature of mini-grids require concessional facilities to make them financially and socioeconomically viable. State involvement in financing and delivery of mini-grid electrification service is therefore necessary to reach the poor in remote communities.

Thank you

For questions or comments contact:
seth.mahu@energymin.gov.gh

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