

Universal Access to Modern Energy Services in Ghana: Issues, Progress and next Steps for Electrification

By

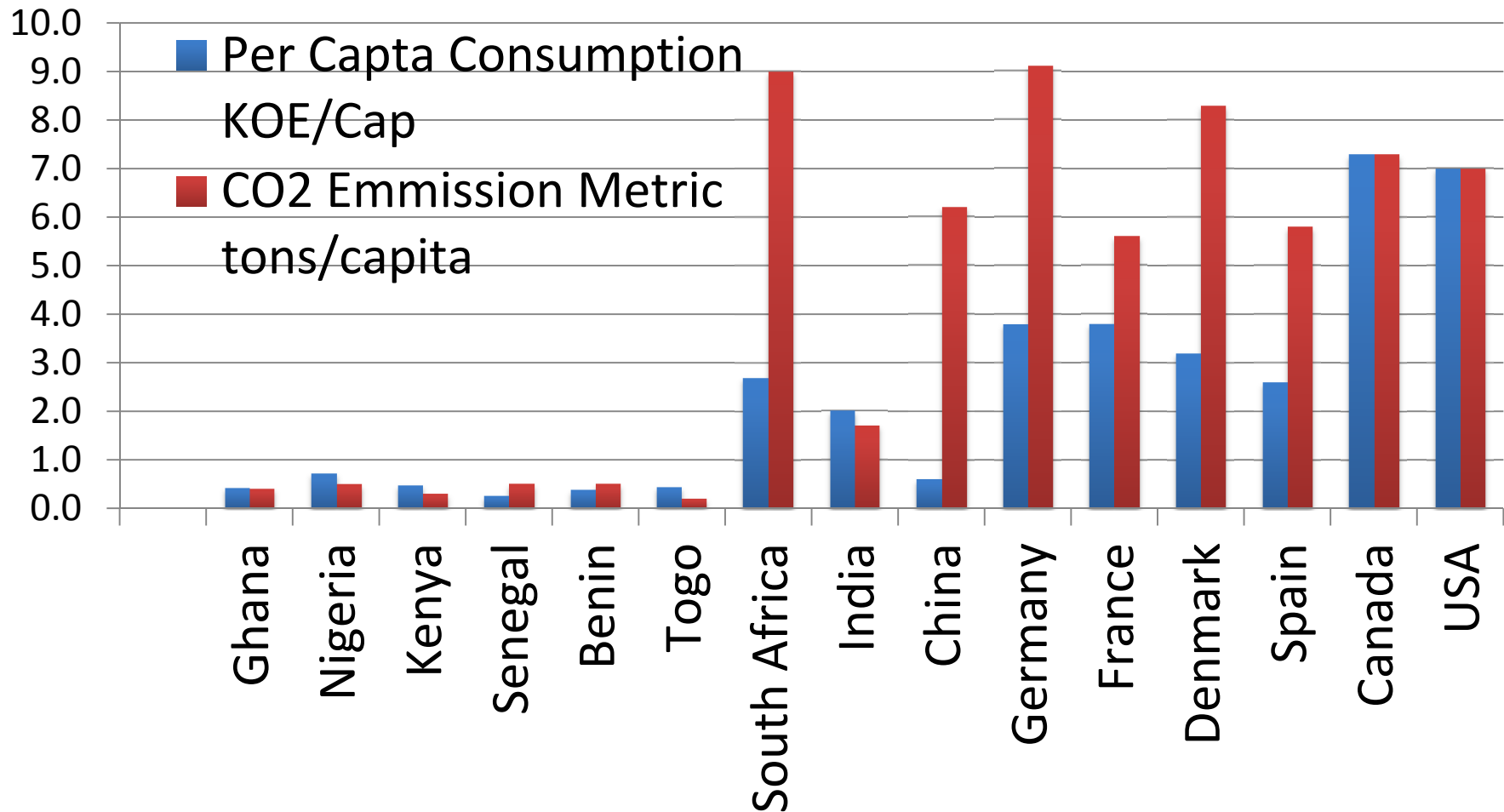
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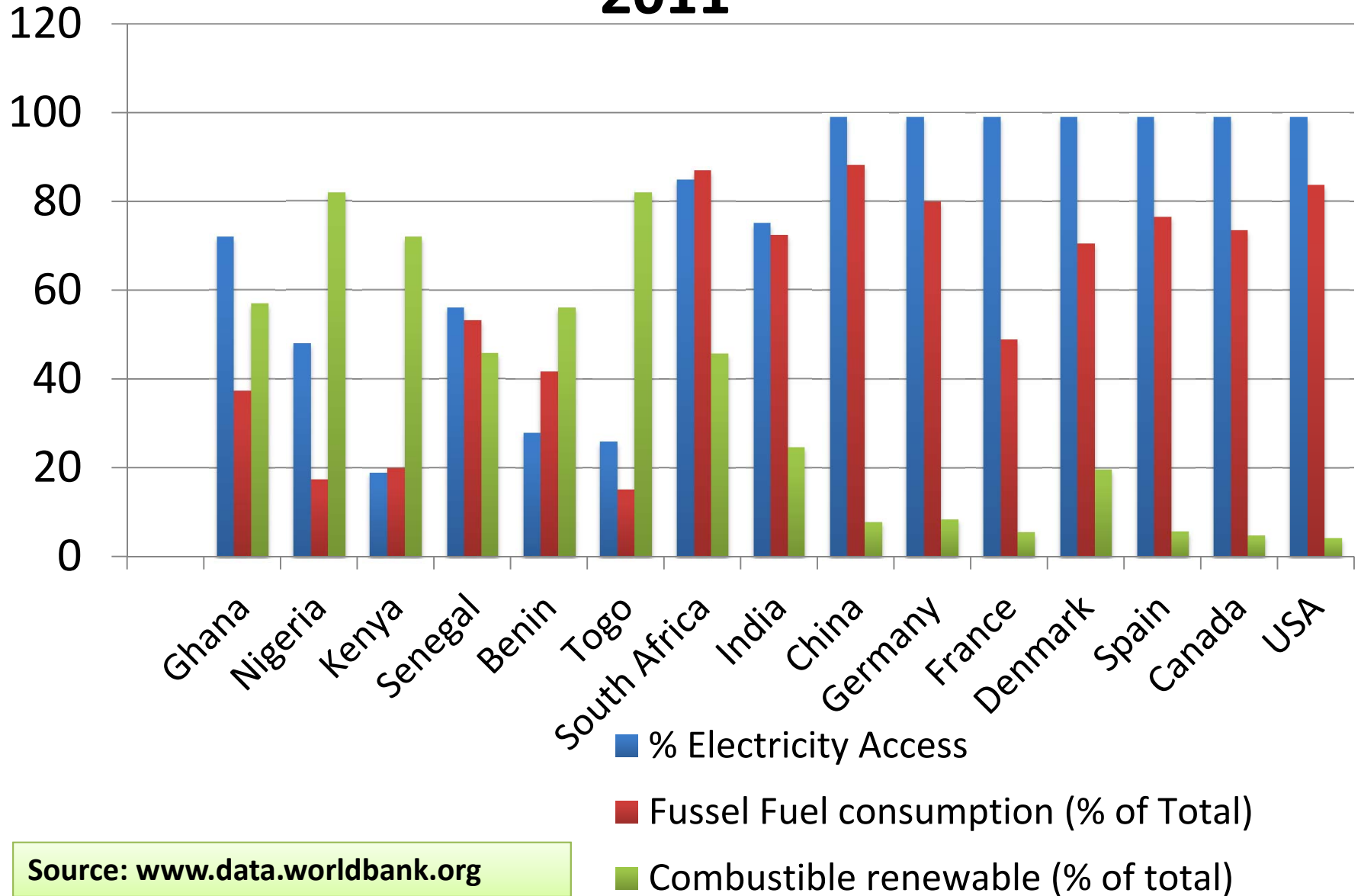
Webinar - 9th July 2014

Per Capita Energy Consumption & CO2 Emission in Selected Countries - 2011



Source: www.data.worldbank.org

Electricity Access & Fossil Fuel Consumption 2011



Source: www.data.worldbank.org

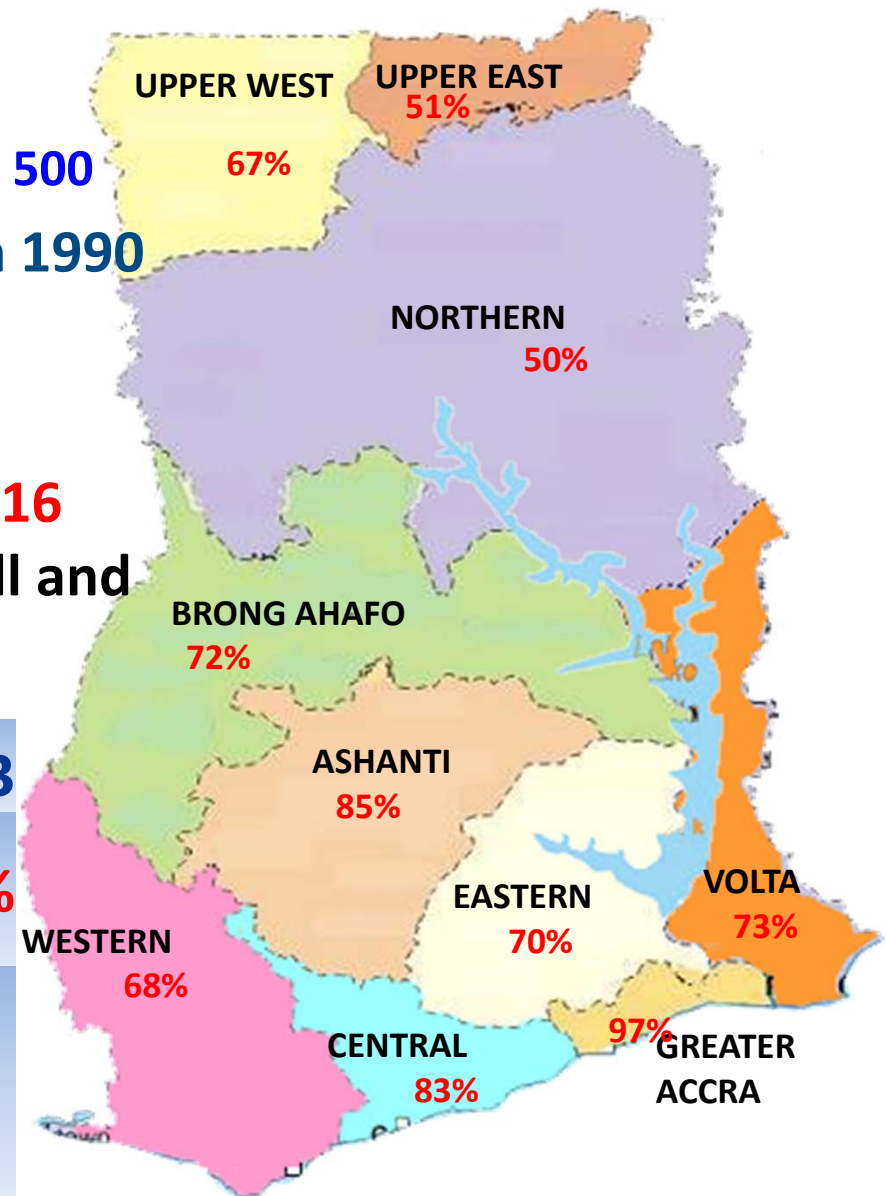
Ghana's Energy Policy in line with SE4ALL

- Increase access to modern energy services and achieve universal access to electricity for productive use by 2016.
- Diversify the national energy mix to include environmentally friendly indigenous sources and achieve 5,000MW installed capacity by 2016
- Increase the contribution of Renewable Energy source by 10% for grid, mini grid and off-grid applications; by 2020.
- Reduce share of combustible renewables (woodfuel) in total energy mix to levels below 50%
- Ensure and promote the use of efficient enduse energy appliances for electricity, woodfuel and petroleum products.
- Promote Private Sector Participation in the energy sector



Progress – Electricity Access

- **Baseline for rural Electrification**
 - Communities with populations above 500
- Only **478** communities had access in 1990
- Currently over **6,800** communities connected: **76%**
- Target: Universal access (90%) by **2016** for productive use to stimulate small and medium scale economic enterprises



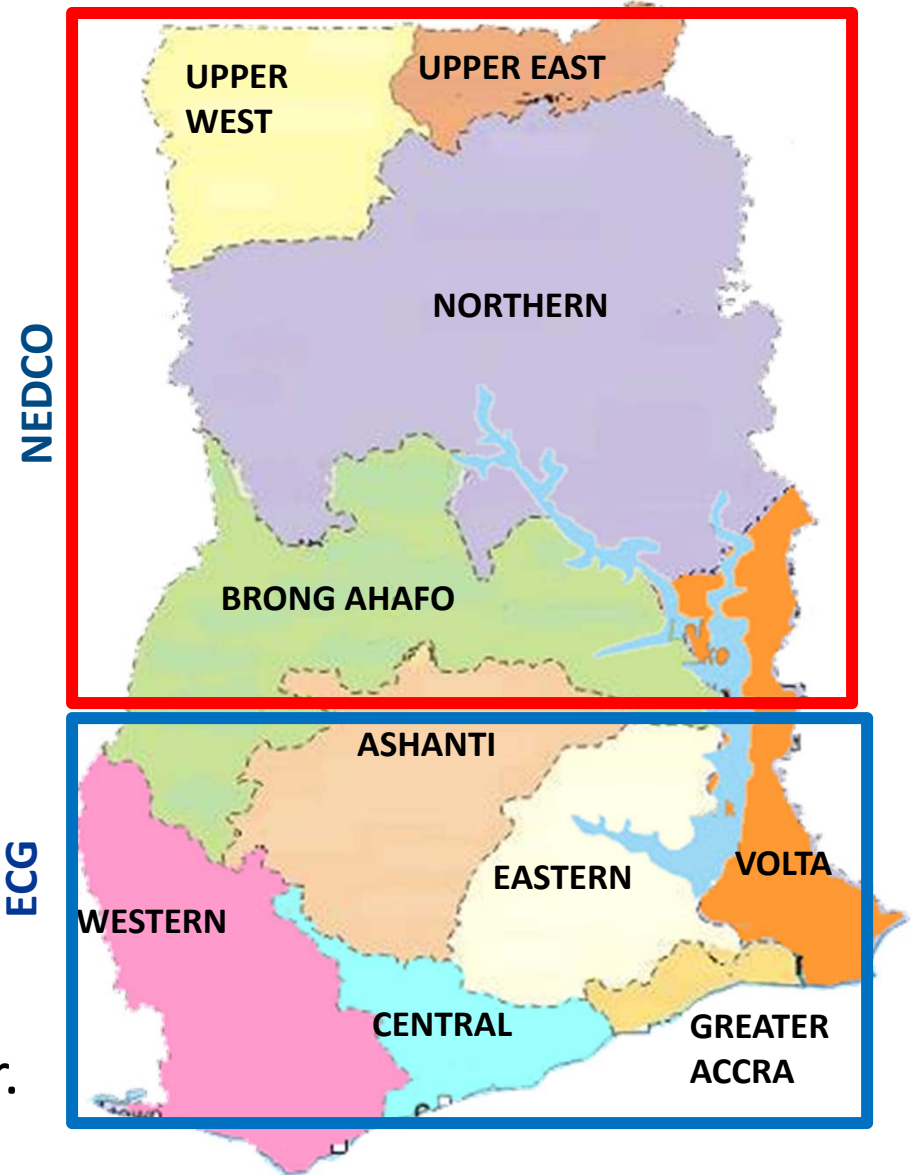
	1990	2000	2010	2013
Access (Population)	28%	43%	72%	76%
Penetration (Households)	15%	39%	61%	-

ELECTRICITY CONSUMPTION



Year	ECG GWh	NEDCO GWh	TOTAL GWh
2000	2,910	239	3,149
2010	4,952	473	5,425

- Two thirds of the country consumes only 10% of the Electricity generated
- Need to promote productive use to stimulate agriculture development and SMEs. Particularly in the northern sector.





Progress: Renewable Energy

- **The Renewable Energy Act 2011 (Act 832)** in place to Provides the fiscal incentives and regulatory framework to encourage private sector investment.
- Key Provisions includes:
 - **Feed-in-tariff Scheme**
 - **Purchase Obligation**
 - **Net Metering (distributed generation)**
 - **Off-grid Electrification for Isolated Communities**
 - **Promotion of Clean Cookstoves**
 - **Research & Development**
 - **Renewable Energy Fund**
 - **Establishment of Renewable Energy Authority**

Progress: Renewable Energy

- **Institutional Framework in Place** with Clear Roles and responsibilities for the regulatory Agencies: **Energy Commission, PURC, EPA, NPA, GRA etc:**
- **Other developments include**
 - Grid Code for utility scale RE grid interconnection
 - Net metering Code
 - Draft Standardized Power Purchase Agreement (PPA)
 - Guidelines on Renewable Energy Purchase Obligation
 - Licensing framework developed

Progress Since Passage of RE Law

- Ongoing activities
 - Wind resource assessment in 13 potential sites at 60m and 80m height.
 - Biomass resource assessment for power generation.
 - Feasibility studies for three potential hydro sites with total estimated capacity of of 200MW
 - Request to Cabinet to seek parliamentary approval for the setting up of the Renewable Energy Fund to support and sustain RE projects targeting social intervention
 - 2.5MW utility scale solar farm established and operational in Northern Ghana.

Progress Since Passage of RE Law

- Feed-in-Tariff for Renewable Energy gazette
 - Solar => 40.21 Ghp/Kwh, (US\$0.20)
 - Wind => 32.1Ghp/kwh (US\$0.15)
 - Hydro <10MW => 26.5574Ghp/Kwh (US\$0.13)
 - Hydro (10MW -100MW) =>22.7436 Ghp/Kwh(US\$0.11)
 - Biomass/ (Waste to Energy) etc: 31.4696 Ghp/Kwh (US\$0.15)
- 37 companies granted Provisional Wholesale Electricity Generation and Supply Licenses as at 1 April, 2014
 - solar PV – 2,155MW
 - wind – 436MW
 - tidal wave – 1,000MW
 - biomass – 60MW
 - waste to energy – 254MW
 - **NB:** The Provisional License does not endorse capacities requested for by proponents and the proposed sites

RE CONTRIBUTION TO ELECTRICITY GENERATION IN GHANA (2013)

PLANT TYPE	QTY	TOTAL CAPACITY (MW)	%
THERMAL POWER PLANT	8	1,168	42.4%
LARGE HYDRO POWER PLANTS	3	1,580	57.4%
GRID CONNECTED SOLAR	20	3.0	0.1%
OFF GRID SOLAR	41,820	0.8	0.02%
OTHER RENEWABLES (Biomass)	4	2.0	0.1%
TOTAL INSTALLED CAPACITY		2,754	
CONTRIBUTION OF MODERN RE		5.8	0.21%

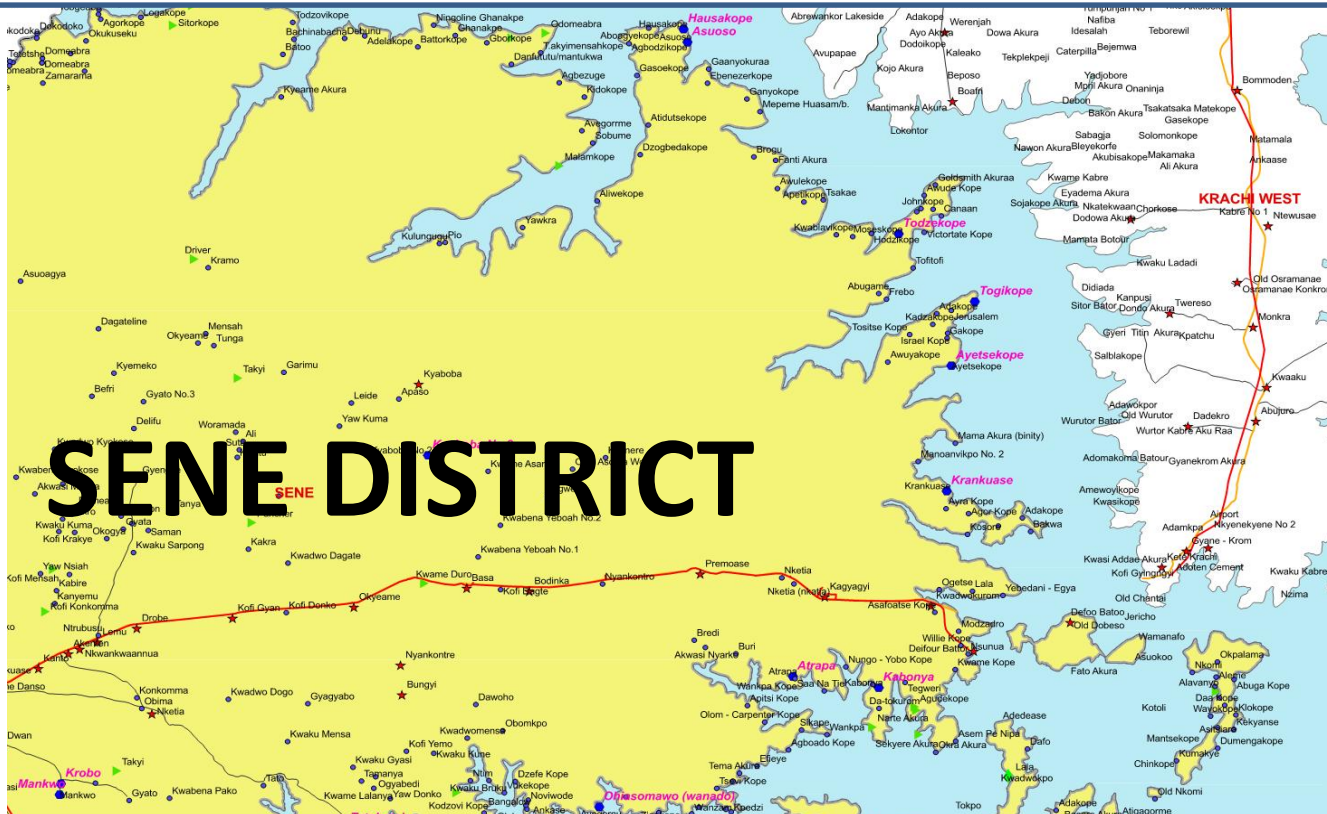
EXCLUDES STANDBY DIESEL/PETROL GENERATORS AND INDIVIDUAL SOLAR HOME SYSTEMS

Priority Areas for Grid Connected Renewable Energy Investments



Programme	Preliminary Target Installed Capacity by 2020
Feasibility study and the development of medium hydro potential sites	3-6 potential sites (200-300MW)
Utility Scale Wind Park	150-300MW
Utility Scale Biomass & W2E (Waste to Energy) Power Plants	50-100MW
Utility Scale Solar Farms	50-100MW
Distributed grid connected RE generation through Net-metering (solar, wind, biomass, hydro)	30-50MW

MINI-GRID / OFF-GRID ELECTRIFICATION



- Over 200 islands and 2000, lakeside/ reomote communities are not likely to be connected to the national grid by the said target date of 2016.
- Policy is to provide Mini Grid and off-grid solutions to such communities until such a time that grid electricity is provided.

Off-grid Solar Electrification

- Off-grid Solar PV electrification - seen significant growth in Ghana from 0.3MWp in 2000 to 3.8MWp in 2013
- Over 41,000 off-grid systems installed in remote rural communities.
 - Solar lanterns, solar home systems , battery charging
 - solar vaccine refrigeration in rural health facilities,
 - street lighting for public places and street illumination,
 - water pumping and communication transmitters etc
- Fee-for-service model and
- Dealer –Sale/Credit model with loan subsidies tested

Map of Installed Solar Systems



Priority Areas for Mini & Off Grid Renewable Energy Investments



Programme	Target by 2020
Mini Grid Renewable Energy based electrification in isolated communities	20–50 communities (2MW)
Deploy Solar Home Systems (SHS) in isolated off-grid households	50,000 SHS (5MW)
Deploy Solar Lanterns (SL) with mobile phone charging facilities through local assembling and partial subsidy	2 million lanterns (20MW)
Solar electrification in off-grid public facilities (schools, clinics, security outposts)	6,000 Public facilities (1.5MW)
Solar Community Lighting Systems (Solar Street lights) for isolated communities	12,000 systems (1.5MW)
Promotion of Improved Clean Cooking stoves for households and institutions.	2 million stoves
Pilot Wind & solar water pumps, Biogas, Solar crop dryers etc to support SMEs in the Agric sector	100 systems

Challenges for off-grid Electrification

- Despite the positive impacts for off-grid electrification, sustainability and affordability for maintenance of the RETs are major challenges:
 - High cost of battery and regulator replacement
 - Very little opportunity for local production and repair of solar components - job creation.
 - All components of solar system are Import based. Panel, regulator, lamps, inverters etc.
 - RETs are abandoned when components are due for replacement due to the inability of the beneficiaries to afford.

Conclusions

- Ghana is committed to the achievement of Universal Access to electricity by 2016 ahead of the SE4ALL target.
- Focus will be on productive use of the electricity to create wealth and improve standard of living.
- Communities very remote from the grid will be provided with off-grid renewable energy based solutions as pre-electrification options until such a time that grid is extended.
- THE OPERATIONALIZATION OF THE **RE FUND** AND THE ESTABLISHMENT OF A **RENEWABLE ENERGY AUTHORITY** TO MANAGE THE OFF-GRID SECTOR WILL GUARANTEE SUSTANABILITY

The support of the UN Foundation and other development partners is key to ensure the attainment of Ghana SE4ALL Action Plan.



**THANK
YOU**

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