

Ministry of Power



Five Years of Implementing the Renewable Energy Law Act 832 – Successes and Challenges

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The Renewable Energy Act 832

- The Renewable Energy Bill passed by Parliament of Ghana, presidential assent and was gazetted in December 2011 - the Renewable Energy Act 2011 (Act832).
- The Act is aimed at providing the legal basis for fiscal incentives and regulatory framework in attracting investment in the renewable energy sector.



Key Provisions in Act 832

- **Feed-in-tariff scheme** under which electricity generated from renewable energy sources is offered a guaranteed price.
- **Purchase Obligation** under which power distribution utilities and bulk electricity consumers would be obliged to purchase a certain percentage of their energy required from electricity generated from renewable energy sources
- **Licensing regime** for commercial renewable energy service providers among others to ensure transparency of operation in the renewable energy industry.
- **Off-grid Electrification** – promote Mini-grid and stand-alone RE systems for remote off-grid locations



Key Provisions in Act 832

- **Woodfuels & Biofuels**– Promote efficient production and utilization of woodfuels and biofuels for internal use and export where applicable.
- **Research & Development** – Innovative RE options including biofuels for transport and export (where necessary)
- **Renewable energy fund** to provide incentives for the promotion, development and utilization of renewable energy resources.
- **Establishment of Renewable Energy Authority** to own, implement and manage renewable energy assets on behalf of the State. (particularly for off grid electrification)

Progress Since Passage of RE Law in December 2011

- **Feed-in-tariff scheme**

- 1st RE-FIT gazette – Oct. 2013

- ❖ Limited to 10 years, no provision for investment in energy storage for grid stabilization for variable RE (wind & Solar)

- 2nd RE-FIT gazette - Oct. 2014.

- 10 years with capacity limit for variable RE (wind & Solar) and provision for grid stabilization and storage.

- 3rd RE-FIT gazette – August 2016

- Provision for 10 and 20 years and capacity limit subject to grid impact studies

- Acknowledged the support of the World Bank through GEDAP for building capacity of PURC, EC and MOP for the development of the RE-FIT Methodology.

RE-FIT gazette – August 2016

TYPE OF TECHNOLOGY	Phase 1 (1 - 10 years) Guaranteed FIT	Phase 2 (11 - 20 years) Indicative Range		20 years Guaranteed FIT
	USCents per Kwh	Minimum FIT (Uscents/kWh)	Maximum FIT (USCents/kW)	USCents / Kwh
Wind	16.5541	11.5900	13.2400	14.2575
Solar PV	15.1029	10.5700	12.0800	13.0076
Hydro <= 10 MW	13.4114	9.3900	10.7300	11.5508
Hydro (>10 MW and <=100 MW)	14.3204	10.0200	11.4600	12.3336
Tidal Wave (Ocean Wave)	13.4114	9.3900	10.7300	11.5508
Run off River	13.4114	9.3900	10.7300	11.5508
Biomass	17.5100	12.2600	14.0100	15.0807
Biomass (Enhanced Technology)	18.4565	12.9200	14.7700	15.8959
Biomass (Plantation as Feed Stock)	19.7865	13.8500	15.8300	17.0414
Landfill Gas	17.5100	12.2600	14.0100	15.0807
Sewage Gas	17.5100	12.2600	14.0100	15.0807
Geoplutonic (Geothermal)	11.8000	8.2600	9.4400	10.1600

Gazette in Ghana Cedis at GHS3.9498/USD (July 31 Interbank Exchange rate - (PURC))

Development of Utility Scale RE projects

- 20MW Solar Park (largest in the West Africa sub region) near Winneba by BXC (IPP) through the RE-FIT scheme under the RE Act.

Project implemented
without government
guarantee



Renewable Energy Purchase Obligation (REPO)

- The Act obliges all electricity distribution utilities and bulk consumers to purchase a % of their energy required from electricity generated from RE sources.
- Ghana currently has 3 distribution utilities and 32 bulk consumers.
- The PURC is yet to establish the % required for each of these consumers
 - GIZ is currently supporting the PURC and relevant stakeholder institutions to build capacity for establishing the required percentage and mode of implementation.
- ECG is therefore overwhelmed with RE developers seeking to sign PPAs in addition with request for government guarantee due to poor ECG financials.

MOUs & PPAs Under Consideration (ECG)

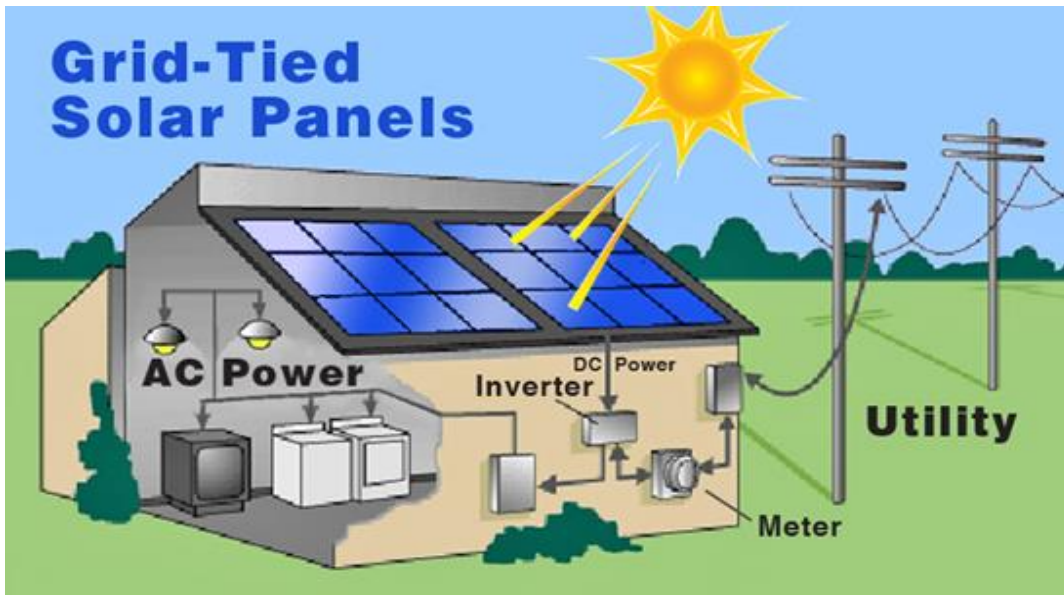
	MOUs	Signed PPAs	Advanced PPAs
Solar	36	12	5
Wind	3	1	1
Biomass/WtE	5	1	2
Hydro/Tidal	5	2	0
Total	49	16	8

Progress Since Passage of RE Law

- **Licensing regime**
- Licensing Framework, Grid Code and Manual for RE investment has been developed by the EC
- Investment interest for utility scale RE grid integration is high due to the very attractive RE-FIT.
- About 66 Provisional Licenses; 17 sitting and 2 Construction permits issued by the EC to date.
 - Solar – 44
 - Wind – 7
 - Biomass/WTE – 11
 - Hydro - 3
 - Tidal Wave - 1

Renewable Energy Net-Metering Scheme

- 200,000 Solar Roof Top programme being implemented by the Energy Commission.
- Government providing capital subsidy of 500W panel per installation.



Net Metering (Distributed Generation) - MOP

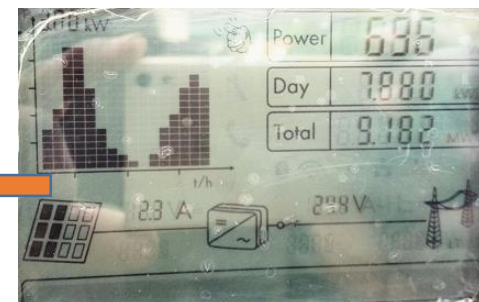


500x100Wp Solar panels

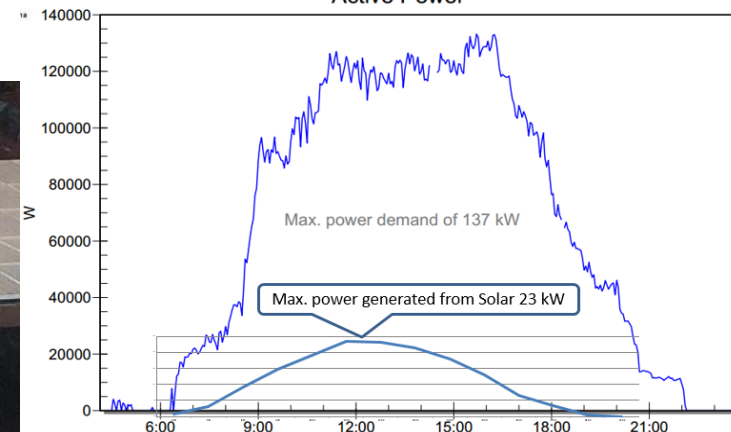


50KWp Solar Park, Ministry of Power

7x8kW SMA Invertors



Active Power

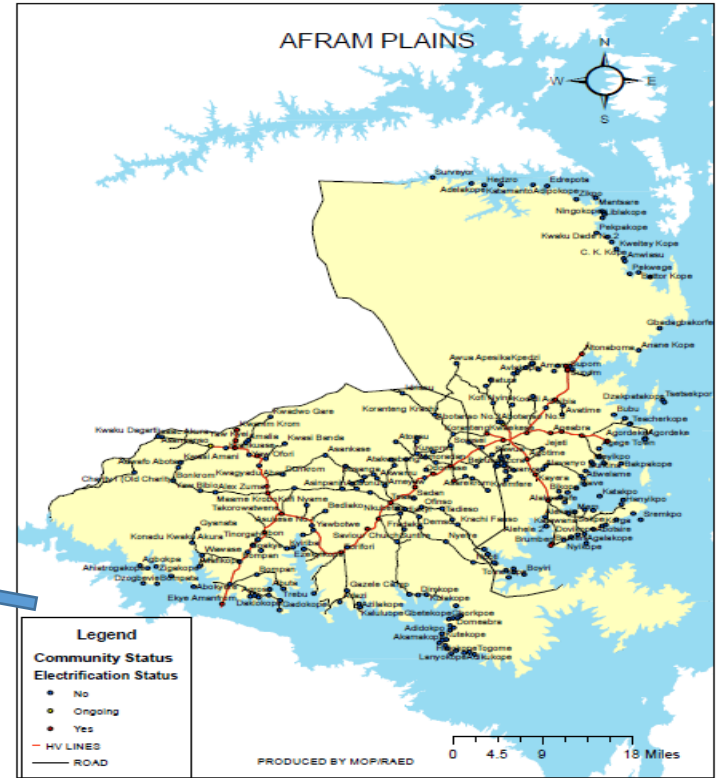
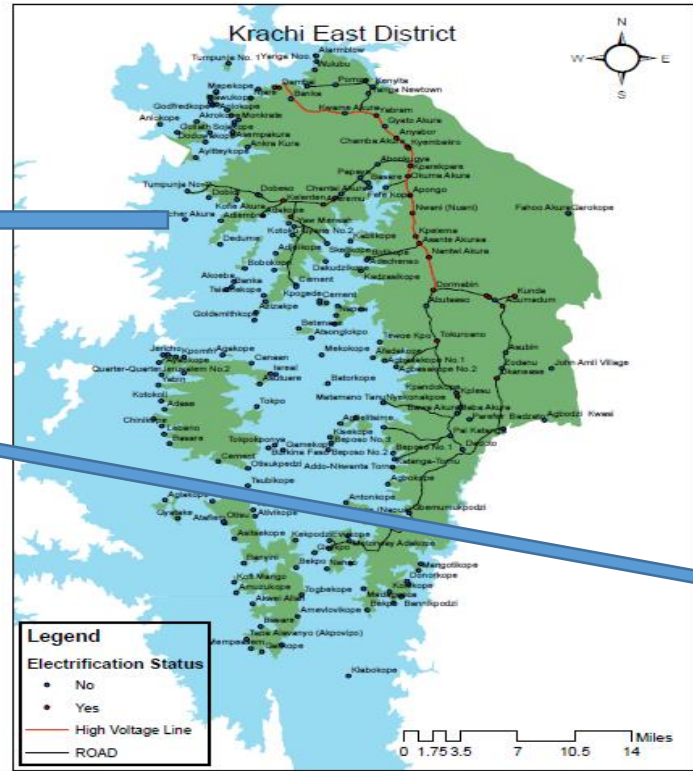
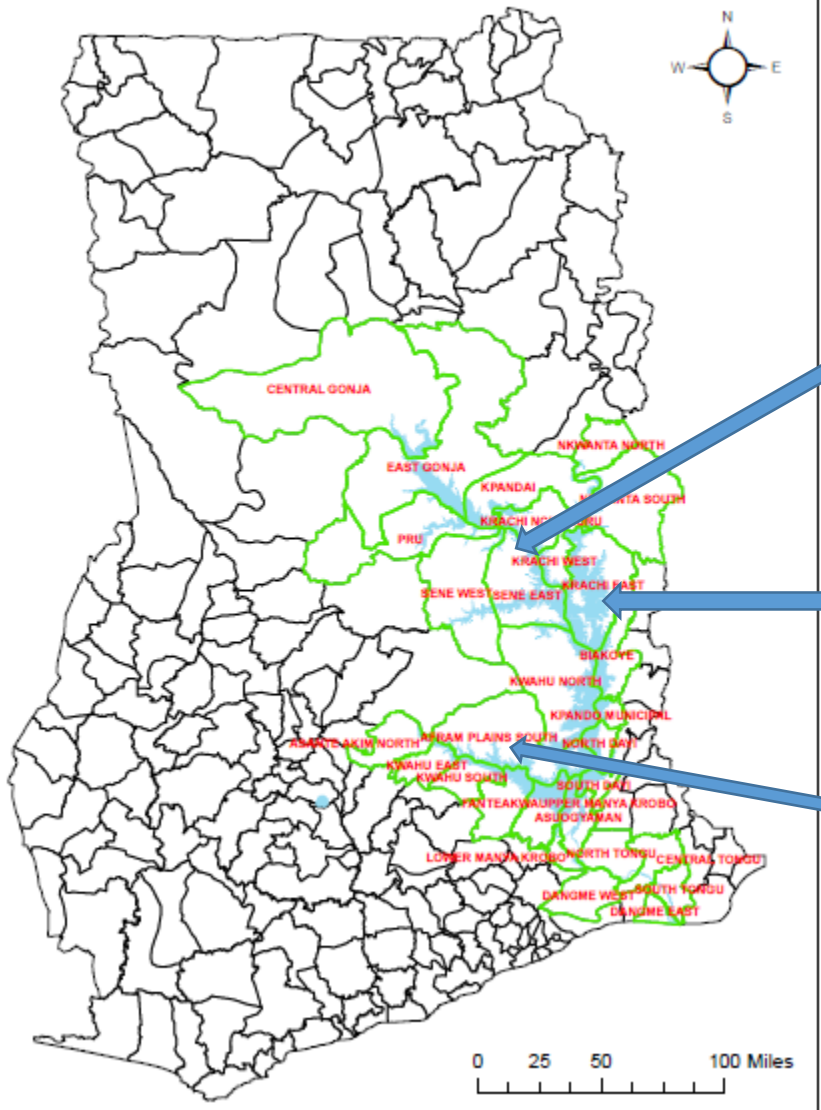


Average daily generation from Solar from Jan-Jun is about 156KWh. Translates to a savings (15% of total consumption)

Scale-Up Renewable Energy Programme (SREP)

- Developed and obtained approval for \$230m Ghana SREP Investment Plan
 - 4 projects under SREP
 - 55 Mini-Grid & 38,000 SHS
 - 15,000 Net-metering
 - 20-30MW utility scale Solar/wind Project
 - Technical Assistance
- Secure \$40m financing from the Climate Investment Fund of which \$30m is grant to finance the above 4 projects.
- Additional \$1.5m project preparation Grant has been approved by CIF to develop the above project.

LAKESIDE DISTRICTS

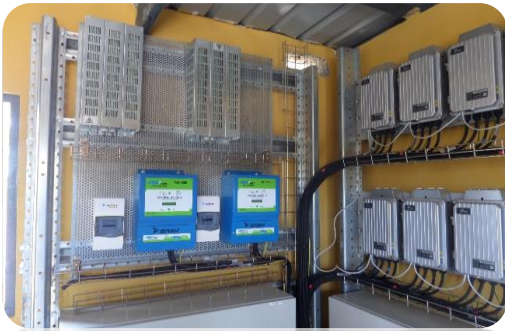
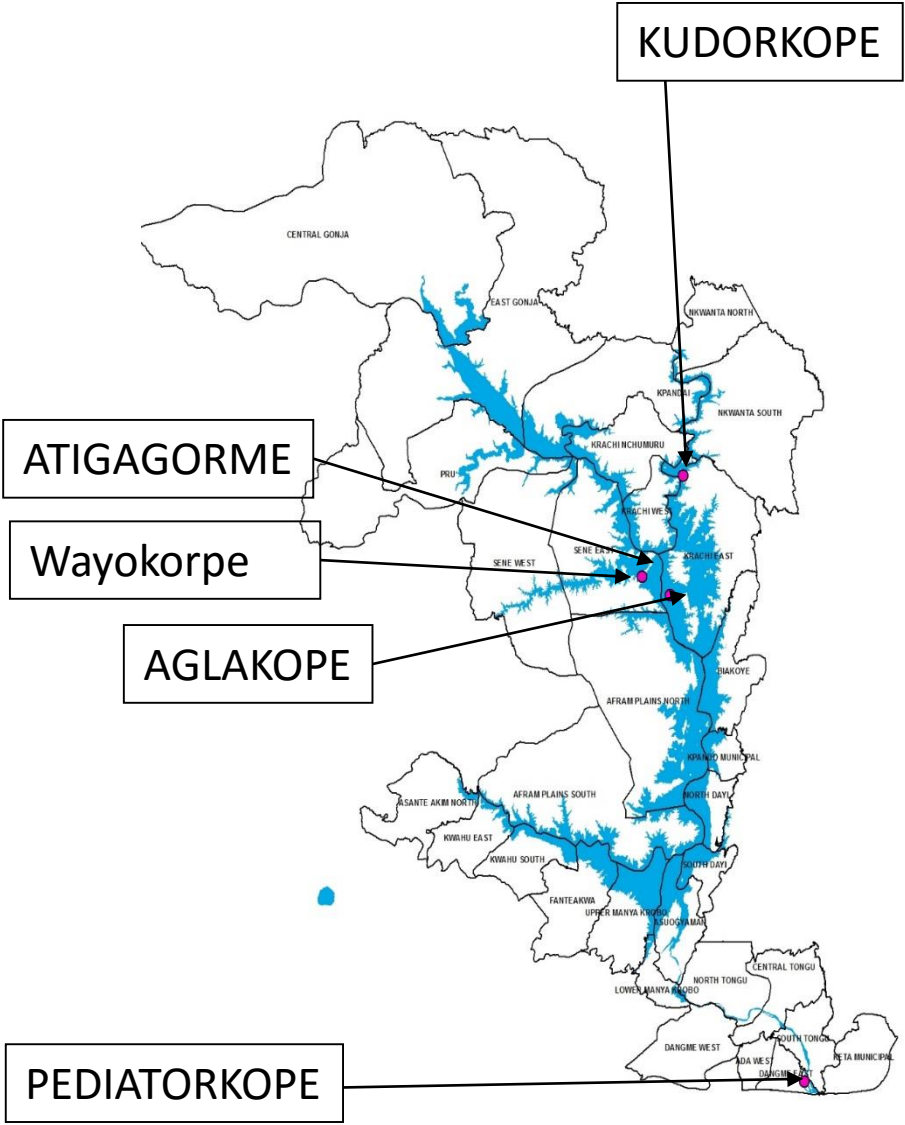


0 25 50 100 Miles

0 1.75 3.5 7 10.5 14 Miles

0 4.5 9 18 Miles

Mini-Grid Electrification Project



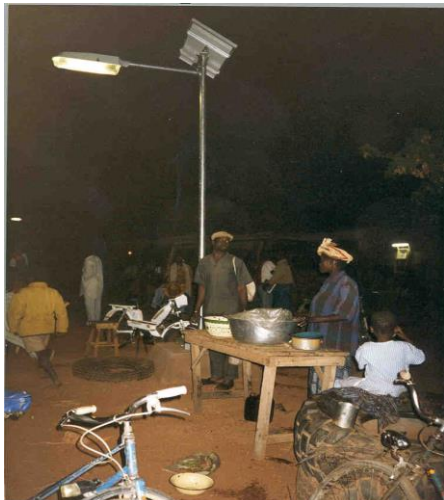
PEDIATORKOPE

Mini-Grid Renewable Energy Electrification Programme

- Hybrid Mini-grids developed in 5 island communities on the Volta lake to provided electricity services for over 6000 inhabitants.
- Policy developed to mainstream Mini-grids into National Electrification Programme.
 - Public sector led investment with VRA and ECG/NEDCo responsible for generation and distribution respectively.
 - Uniform pricing tariff, zero connection fee for mini grid customers
- Launched socio-economic studies for 3 additional mini-grids under SECO grant financing for Island Communities in the Ada East District.

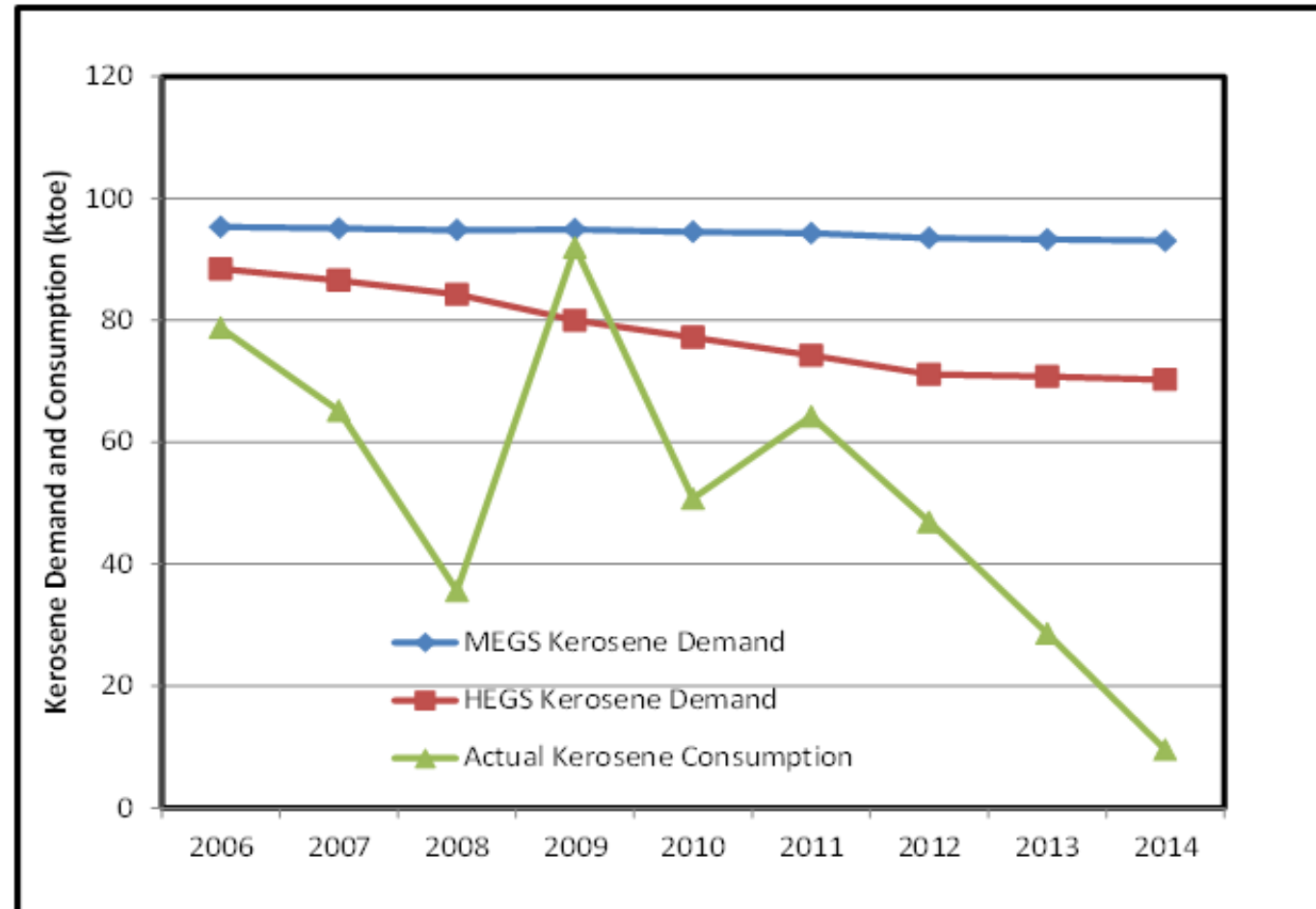
Off-grid Stand Alone Electrification Programme

- Solar Streetlights installed in remote off-grid communities.
- Solar systems installed in remote clinics, security outpost and schools.
- Energy service centers established in remote un-electrified communities for charging mobile phones, batteries etc



Kerosene Lantern Replacement Program

- 70,000 solar lanterns sold under 70% subsidy to replace kerosene lanterns.
- The target is 2,000,000 by 2030.
- Private sector has taken up the challenge to deploy both solar and battery operated lanterns to power LED lamps.
- Kerosene consumption has drastically reduced



Source: EC SNEP-2015

Sustainable Energy for cooking and Productive Use

1. Monitored cookstove initiatives (total improved woodstoves disseminated by private sector – 22,856 as June 30, 2016).
2. 32 Institutional Stoves constructed in 5 Districts for Gari Processors through a 50% grant facility from SNV/GIZ
3. Rehabilitation works of Appolonia Renewable Energy Center has commenced - 30% work done to date.
4. Completed market assessment for solar pumps for irrigation



Key Programme initiatives

- World Bank /IDA – Funding for the 5 mini-grids
- AfDB – funding secured for S/M Hydro power pre-feasibility studies for 10 sites
- SECO – Funding secured for 2 minigrids and other RE related initiatives
- GIZ - Supporting implementation of RE law and productive use of RE.
- SREP/AFDB – Funding secured for the development of framework for establishment of RE Authority.
- China, Japan Israel, India – Human resource capacity development in the RE Sector.
- USAID / Power Africa Initiative support to the RE Sector
- ECREEE /UNIDO / UNDP – Support for the SE4ALL Agenda
- EU – Support study for RE Fund Operationalization – **Low Outcome**

Conclusion

- Ghana has made significant progress in the deployment of RE since the enactment of the RE Act.
- Mini-grid and stand alone RE system will accelerate the attainment of Universal access.
- Pricing policy framework to address challenges in the off-grid RE market is being developed.
- Efforts underway to consolidate various plans and actions into a renewable energy master plan.
- Issues regarding regulatory framework and financing for the off-grid sector still remain a major challenges
- **Appreciate the continuous support of the donor partners and the private sector in advancing RE development in Ghana.**

• **THANK YOU**