

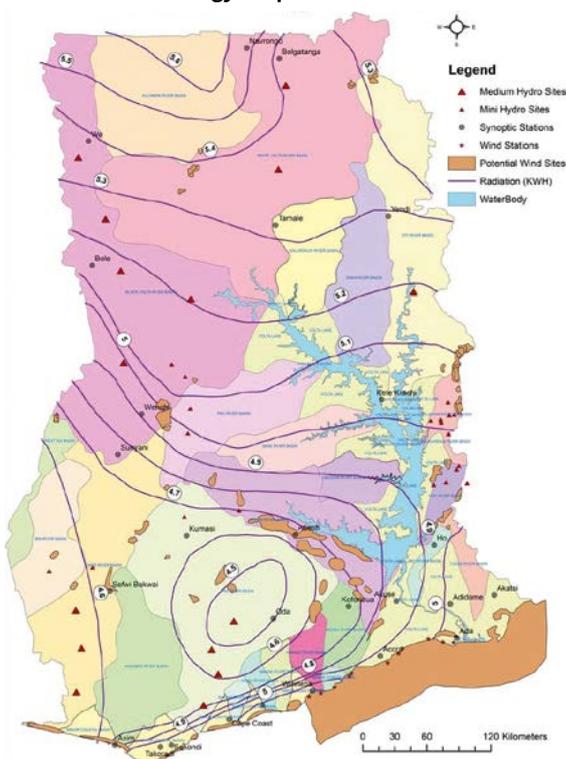


Ghana – GIS-based Support for Implementing Policies and Plans to Increase Access to Energy Services

Background

Ghana's energy policy aims at ensuring reliable and cost-effective supply of high quality energy services for households, businesses, industries and the transport sector nationwide. The need to secure future electricity and modern fuel supplies has been touted as the pivot of the Millennium Development Goals (MDGs). However, in spite of the popular notion underpinning the energy access-poverty reduction nexus, policies and plans intended to create an enabling environment for an improved energy access are seldom evaluated in most developing countries. Between 2009 and 2011, the EUEI PDF, upon request of the Ghana Ministry of Energy, supported The Energy Center (TEC) of Kwame Nkrumah University of Science and Technology (KNUST) in the implementation of a project aiming at employing and complementing existing policies, strategies, plans and recommendations from the Energy for Poverty Reduction Action Plan (EPRAP) and the Ghana Energy Development and Access Project (GEDAP) to achieve national goals and the MDGs. It is a pilot project whose results shall be replicated in other countries of the ECOWAS Sub-region.

Renewable Energy Map of Ghana



Country	Ghana
Project Partner	Ghana Ministry of Energy, The Energy Center (TEC) of Kwame Nkrumah University of Science and Technology (KNUST)
Project Manager	Steffen Behrle
Term	January 2009 – September 2011

Objectives

- ▶ To review existing energy policies, strategies and plans for increasing energy access in Ghana with reference to the targets set in the Government's policy statements/documents, the ECOWAS White Paper and the MDGs.
- ▶ To use GIS (Geographical Information Systems) to collate and analyze national level data and provide timely information on population distribution, services, economic activities, and status of energy access programmes.
- ▶ To identify the gaps in energy policies and plans for achieving expected energy access targets by 2020 and proffer timely mitigation measures.
- ▶ To develop methods and tools to facilitate business models, investment plans and capacity development to complement currently planned activities to achieve energy access targets by 2015.
- ▶ To facilitate project identification, planning, implementation and impact assessment for the Energy Commission of Ghana, the Ghana Ministry of Energy and the ECOWAS Commission for timely development, implementation and monitoring of energy access strategies.

Results

- ▶ **Review of energy trends, policies and plans in Ghana:** The intent was to assess trends and all the programmes developed over years to ensure increased access to energy services by 2020 and beyond. It was found that, despite the good intentions of governments, existing policies and plans have not delivered the best results, especially in the rural areas.
- ▶ **Assessment of energy needs and comparison with ECOWAS targets and MDGs:** Ghana has surpassed the ECOWAS rural electricity targets of 36% access and is close to achieve the 100% urban access by 2015; it is also placed second in terms of electricity access.



However, access rates available for 2008 indicate that access to modern fuels (LPG) in Ghana was only 12%, implying that the country will not be able to achieve the ECOWAS target of 100% by 2015. The LPG access rate is far below the ECOWAS target of 50% and the MDG target set by United Nation's Millennium Project (to reduce to 50% of those without access to LPG).

- ▶ **Development of GIS e-maps for energy services:** Data mapped include substations of the Electricity Company of Ghana, location of mini-hydro dams, potential wind sites, solar radiation, access to electricity in schools, access to electricity in hospitals and access to biogas. Geo-processing operations have been carried out using the WGS1984 UTM Zone 30N and 30S geographic projections. A manual has been prepared for end users in ArcGIS for basic editing, querying, navigation and updating of the e-maps.
- ▶ **Development of methods and tools for capacity building**
 - i. **Electrification cost modelling:** A modelling tool called Network Planner was adopted to model electrification costs for non-electrified communities. It can determine the least-cost technology to connect a community and it can help planners to estimate investment costs and financing requirements to support electrification programmes.
 - ii. **GIS-based Energy Access Review (GEAR) toolkit:** It focused on the development of a platform that can enable users get information pertaining to electrified and non-electrified communities in Ghana. The Toolkit is intended to display results of the modelling exercise as well as LPG data and show electrification trends in order to facilitate planning. The production of a digital map and a functional geo-database of the facilities would assist in the adequate distribution of energy.
- ▶ **Publication:** The project has resulted in a peer-reviewed publication: Francis Kemausuor, George Yaw Obeng, Abeeku Brew-Hammond, Alfred Duker, *A review of trends, policies and plans for increasing energy access in Ghana*, Renewable and Sustainable Energy Reviews, Volume 15, Issue 9, December 2011, Pages 5143-5154, ISSN 1364-0321.

The Way Forward

Follow-up recommendations include:

- ▶ **Addressing weaknesses in the current energy supply system:** Measures to address power system losses, both technical and commercial, must be sought in order to reduce such losses. Another weakness in the current energy system is the frequent shortages in LPG supply. A number of actions would have to be taken to increase access to LPG including creating a favourable investment environment to attract the private sector into the provision of LPG to ensure a regular and adequate supply to peri-urban and rural areas. Better targeting of LPG subsidies by the government is also needed in order to support domestic users of LPG.
- ▶ **Integration of renewable energy systems in electrification programmes:** There is a need to ensure a proper integration of Solar PV and other renewable energy systems into electrification programmes at both national and sub-national levels. The use of planning tools should also be promoted to determine which areas are best suited for grid electrification, mini-grids and decentralized options. It is also important that communities are educated on the relevance of mini-grid/off-grid electrification solutions. Politicians must be sensitized to desist from promising 'grid' electricity to remote communities where the costs are likely to outweigh the benefits in the short term.
- ▶ **Need for dynamic and shared energy access database:** There is a need for more studies to generate a database for determining the pattern of energy access improvement over the years, challenges and prospects as well as the main drivers of energy access in the country.

Project Partners:



Pictures: EUEI PDF, GIZ

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