

*Regional Workshop on RE, EE and Energy Access
Monitoring and Reporting Framework
November 21-22, 2017
Abidjan, Côte d'Ivoire*

Lessons learnt from developing the National Energy Data Processing and Information Centre (NEDPIC) in GHANA

**Ethel Linda Mensah
Energy Commission**



PRESENTATION OUTLINE

- ❑ **Background to NEDPIC**
- ❑ **Funding**
- ❑ **Team**
- ❑ **Activities**
- ❑ **Outputs**
- ❑ **Challenges**
- ❑ **Lessons Learnt**

- ❑ **Format**
 - ❑ **45 minutes in total**
 - ❑ **30 for presentation**
 - ❑ **15 minutes for Q & A**

NEDPIC - Background

- ❑ **DELIMITATION** The National Energy Data Processing and Information Centre (NEDPIC) conceived in 2007 has chalked a few successes but is still a work in progress.

Rationale:

- ❑ A Legal mandate
 - ❑ Section (2)(d) of the Ghana Energy Commission Act, 1997 (Act 541) to secure a comprehensive database for national decision making on the extent of energy resources available to the nation;
 - ❑ Section 15 (b) of Act 541 requires as part of the conditions for the grant of licenses by the Commission all licensees to provide documents, accounts, estimates, returns or other information as the Commission may require for the purpose of exercising the functions conferred on the Commission;
 - ❑ Section 19 of Act 541 directs that licensees who fail to submit returns for a particular year shall be deemed to have not utilized the license and may be sanctioned.
- ❑ Investment Planning vested with government while the private sector operators reigned in the petroleum sector;
- ❑ Electricity data reporting is part of licensing conditions;
- ❑ Tenets of energy development – availability; reliability; affordability; sustainability; investment; management

Pre-NEDPIC Situation

- ❑ Informal procedures for data collection, storage, processing and communication; for example:
 - ❑ No procedures for internal reporting, data handling and storage within the EC had been developed;
 - ❑ No agreed format for national statistics – 1st set published in 2007;
 - ❑ No formal contacts regarding exchange of energy data with other government institutions had been established;

- ❑ Data was available but scattered among various institutions;

- ❑ There was no link established between data management and policy formulation or strategy development;

Pre-NEDPIC Situation (contd.)

- ❑ Informal procedures for data collection, storage, processing and communication; for example:
 - ❑ No procedures for internal reporting, data handling and storage within the EC had been developed;
 - ❑ No agreed format for national statistics – 1st set published in 2007;
 - ❑ No formal contacts regarding exchange of energy data with other government institutions had been established;

- ❑ Reliability of data was to a large extent assured but not often updated

Funding

❑ Sources of Funding

❑ Internal

- ❑ Energy Commission

❑ External

- ❑ Renewable Energy and Energy Efficiency Partnership
- ❑ United Nations Development Programme (UNDP)

❑ An annual budget of about US\$ 10,000.00 is estimated but less than half is approved.

❑ Equipment and resources required for the Centre are also added to the Commission's Procurement Plan for each year.

❑ Relying on the legal requirement of Act 541, funding for the Centre is featured in the Energy Commission's yearly Work Programme which is submitted as part of the national budget approval processes.

❑ Institutions involved included the VRA; ECG; NED; GSS; NPA; WAPCo; CEPS;

Data Team

- ❑ **Internally** run by an Energy Data Management Team (EDMT) drawn from various Departments of the Energy Commission
- ❑ The EDMT comprises:
 - ❑ statisticians
 - ❑ IT specialists
 - ❑ engineers and
 - ❑ management professionals
- ❑ Education qualification for most EDMT members is at the Masters level in their respective fields;
- ❑ **Externally**, the Commission receives data from the following groups:
 - ❑ Energy service providers – licensees:
 - ❑ electricity, renewable, including charcoal producers and exporters

Data Team (contd.)

- ❑ **The Ghana Energy Access Data Task Force** : made up of senior representatives from the following institutions:
 - ❑ Ministry of Energy and Petroleum (MoEP)
 - ❑ Ministry of Local Government and Rural Development
 - ❑ Energy Commission (EC)
 - ❑ National Petroleum Authority (NPA)
 - ❑ Northern Electricity Distribution Company (NEDCo)
 - ❑ Electricity Company of Ghana (ECG)
 - ❑ Ghana Statistical Service (GSS)
 - ❑ The Energy Centre (TEC)
 - ❑ Centre for Remote Sensing and Geographic Information Systems (CERSGIS)
 - ❑ The Biogas Association of Ghana (BAG)
 - ❑ The Renewable Energy Association of Ghana (REAG)

Activities of the EIC

❑ Main Activities and Cycles

- ❑ Coordination of EC's Annual Reports – yearly
- ❑ Manage content of EC's Website @ www.energycom.gov.gh – all year round
- ❑ Coordinate activities of the National Energy Access Task Force – quarterly
- ❑ Coordinate with IT Unit to populate the GhEA Database and update the GhEA Toolkit

❑ Data Management processes

- ❑ Requested from stakeholders via letters sent to their institutions
- ❑ Submitted to the Inspectorate Division in hard and soft copy by service providers
- ❑ Data also received from GhEA Task Force Members via email in pre-designed templates
- ❑ Data forwarded to IT Unit for populating of GhEA Database and updating of Toolkit received and for

❑ Monitoring and Evaluation

- ❑ The Energy Commission is in the coming year to set up an M & E Unit which will monitor plans, programmes and projects and collate data as part of the process to feed policy formulation
- ❑ This is crucial to the EC fulfilling its mandates under Act 541 because the EC is the technical advisor to government for the energy sector;
- ❑ The Energy Policy is a document made available online and it advises **all stakeholders** in the energy sector as to what government direction is. Availability of up to date data is critical, it goes all the way to informing central government decisions, including budgeting for all areas of the economy.

Outputs

- ❑ The Energy Commission website @ www.energycom.gov.gh - Features following Reports prepared the Planning Division:
 - ❑ EC Annual Reports
 - ❑ Energy Statistics
 - ❑ Energy Outlook
 - ❑ Key Ghana Energy Statistics (2016)

- ❑ The GhEA Task Force
 - ❑ Coordinates meetings and data collation processes from Task Force Member Institutions

- ❑ The GhEA Database
 - ❑ Populates Database with data received from Task Force Members, including updates

- ❑ The GhEA Toolkit

Outputs – Energy Balance

SECTION ONE: ENERGY INDICATORS AND ENERGY BALANCE

Table 1.1: Energy Indicators (2007 – 2016)

Energy Indicator	Unit	2007	2008	2009	2010	2011	2012	2013	2014	2015 ¹	2016
Total Primary Energy Supply	KTOE	6,404	6,273	6,036	6,946	7,609	8,362	8,564	9,147	9,550	9,660
Total Final Energy Consumed	KTOE	5,259	5,187	5,706	5,629	6,174	6,613	6,887	6,983	7,162	7,086
Total Electricity Generated	GWh	6,978	8,324	8,958	10,167	11,200	12,024	12,870	12,963	11,492	13,022
Total Electricity Consumed	GWh	6,441	7,219	7,454	8,317	9,187	9,258	10,583	10,695	9,685	11,418
Total Petroleum Products Consumed	KTOE	2,127	2,071	2,598	2,491	2,827	3,318	3,422	3,377	3,545	3,320
Total Biomass Consumed	KTOE	2,594	2,518	2,493	2,464	2,576	2,589	2,676	2,792	2,785	2,783
Population	million	22.3	22.9	23.4	24.7	25.3	25.9	26.5	27.0	27.7	28.3
GDP (Constant 2006 prices)	million Ghana cedis	19,913.4	21,592.2	22,336.0	24,101.0	27,486.0	30,040.0	32,237.0	33,522.0	34,808.0	36,016.0
Energy Intensity of the Economy	TOE/GHS 1,000 of GDP	0.26	0.24	0.26	0.23	0.22	0.22	0.21	0.21	0.21	0.20
Total Energy Consumed/capita	TOE/capita	0.24	0.23	0.24	0.23	0.24	0.26	0.26	0.26	0.26	0.25
Total Electricity Generated/capita	kWh/capita	312.9	363.5	382.8	411.6	442.7	464.2	485.7	480.1	414.9	460.2
Total Electricity Consumed/capita	kWh/capita	288.9	315.3	318.5	336.7	363.1	357.4	399.4	396.1	349.6	403.5
Total Petroleum Products Consumed/capita	TOE/capita	0.10	0.09	0.11	0.10	0.11	0.13	0.13	0.13	0.13	0.12
Total Biomass Consumed/capita	TOE/capita	0.12	0.11	0.11	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Total Electricity Consumed/GDP	kWh/GHS 1,000 of GDP	323.5	334.4	333.7	345.1	334.2	308.2	328.3	319.0	278.2	317.0
Total Primary Energy Supply/GDP	TOE/GHS 1,000 of GDP	0.32	0.29	0.27	0.29	0.28	0.28	0.27	0.27	0.27	0.27
Total Petroleum Products Consumed/GDP	TOE/GHS 1,000 of GDP	0.11	0.10	0.12	0.10	0.10	0.11	0.11	0.10	0.10	0.09
Total Primary Energy Supply/capita	TOE/capita	0.29	0.27	0.26	0.28	0.30	0.32	0.32	0.34	0.34	0.34
Grid Emission Factor (wind/solar projects)	tCO ₂ /MWh	0.41	0.41	0.41	0.35	0.32	0.35	0.51	0.32	0.28	0.39
Grid Emission Factor (all other projects)	tCO ₂ /MWh	0.58	0.56	0.57	0.51	0.44	0.48	0.73	0.36	0.31	0.43

¹Revised

Source: GDP and Population data from Ghana Statistical Service

NB: Total Electricity Consumed include commercial losses

Grid Emission Factor is the amount of CO₂ emitted per unit of electricity generated and supplied into the national grid

Outputs – Energy Balance

Table 1.2: Energy Balance, 2016 (ktoe)

SUPPLY AND CONSUMPTION	Crude Oil	Natural Gas	Petroleum Products	Biomass	Hydro	Solar	Electricity	Total
Indigenous Production	4,706.2	587.3	-	3,602.4	478.3	2.3	-	9,376.5
Imports	1,474.5	100.9	3,738.1	-	-	-	43.9	5,357.4
Exports	-4,357.5	-	-553.5	-1.9	-	-	-16.1	-4,929.0
International Marine Bunkers	-	-	-2.5	-	-	-	-	-2.5
International Aviation Bunkers	-	-	-122.6	-	-	-	-	-122.6
Stock Changes	-81.4	-	-	-	-	-	-	-81.4
Total Energy Supply	1,741.8	688.2	3,059.5	3,600.5	478.3	2.3	27.9	9,598.4
Electricity Plants	-492.7	-517.6	-402.6	-	-478.3	-2.3	1,119.9	-773.5
Oil Refinery	-784.3	-	765.4	-	-	-	-	-18.9
Other Transformation	-	-	-	-	-	-	-	-
Own use	-	-	-	-	-	-	-7.2	-7.2
Losses	-	-	-	-817.1	-	-	-158.7	-975.8
Final Energy Consumption	-	-	3,320.2	2,783.4	-	-	982.0	7,085.5
Residential Sector	-	-	175.7	2,440.1	-	-	503.2	3,119.0
Commerce & Services Sector	-	-	14.0	122.0	-	-	221.0	357.1
Industry	-	-	384.6	221.3	-	-	257.0	862.9
Agriculture & Fisheries Sector	-	-	103.2	-	-	-	0.3	103.5
Transport	-	-	2,642.3	-	-	-	0.5	2,642.8
Statistical Difference	464.9	170.5	160.9	-	-	-	-	796.3

NB: Electricity consumption include commercial losses

Outputs - Snapshots of GhEA Toolkit

Energy Commission - Ghana Energy Access Toolkit

File Modules Manage Reports Options Window Help

Welcome Elect. Access Map LPG Access Map Renewables Geo-Database Energy Calculator Energy Access Rates Trend Analysis Help Center

Home

**GHANA ENERGY
ACCESS TOOLKIT**
VERSION 1.0.0.0

RENEWABLE ENERGY SOURCES : TO 100% DEPENDENCY

Connected to GHEADB on localhost | User: master | Role: ADMINISTRATOR | User Group: ENERGY COMMISSION

TOOLKIT HOME PAGE

Ghana Energy Access Toolkit

Home Toolkit Sign Up Sign In Forums About us

Welcome to GhEA Toolkit

Official home page

An online Energy Information tool for planning renewable and non-renewable energy access from community to national scale.

[Tools & Dataset](#)

GhEAT 2.0 Released

The latest version of GhEA Toolkit is released. This version can be accessed online and compatible with all OS. Click on tools and Dataset button to visit the applications page.

Development Team

- [TEC Development Team](#)
- [Join Development Team](#)
- [Consultancy Services](#)

Quick Links

- [Getting started with toolkit](#)
- [Recent forum posts](#)
- [Quick video](#)

Sponsors

UNDP reeep renewable energy & energy efficiency partnership ENERGY COMMISSION

© 2016 | Energy Commission, Ghana. All Rights Reserved


giz


TOOLS AND DATABASE WINDOW

Ghana Energy Access Toolkit

[Home](#)
[★ Toolkit](#)
[@ Sign Up](#)
[➔ Sign In](#)
[🗨 Forums](#)
[🌐 About us](#)

The Ghana Energy Access Toolkit is a set of interactive tools for monitoring and evaluating energy access and renewable energy (RE) resources in Ghana. The platform presents both spatial and attribute data in a GIS context as well as statistical data. The tool is intended to inform and stimulate policies designed to attract public and private investment in the RE sector of Ghana.





Get access to national energy data for your energy related analysis.

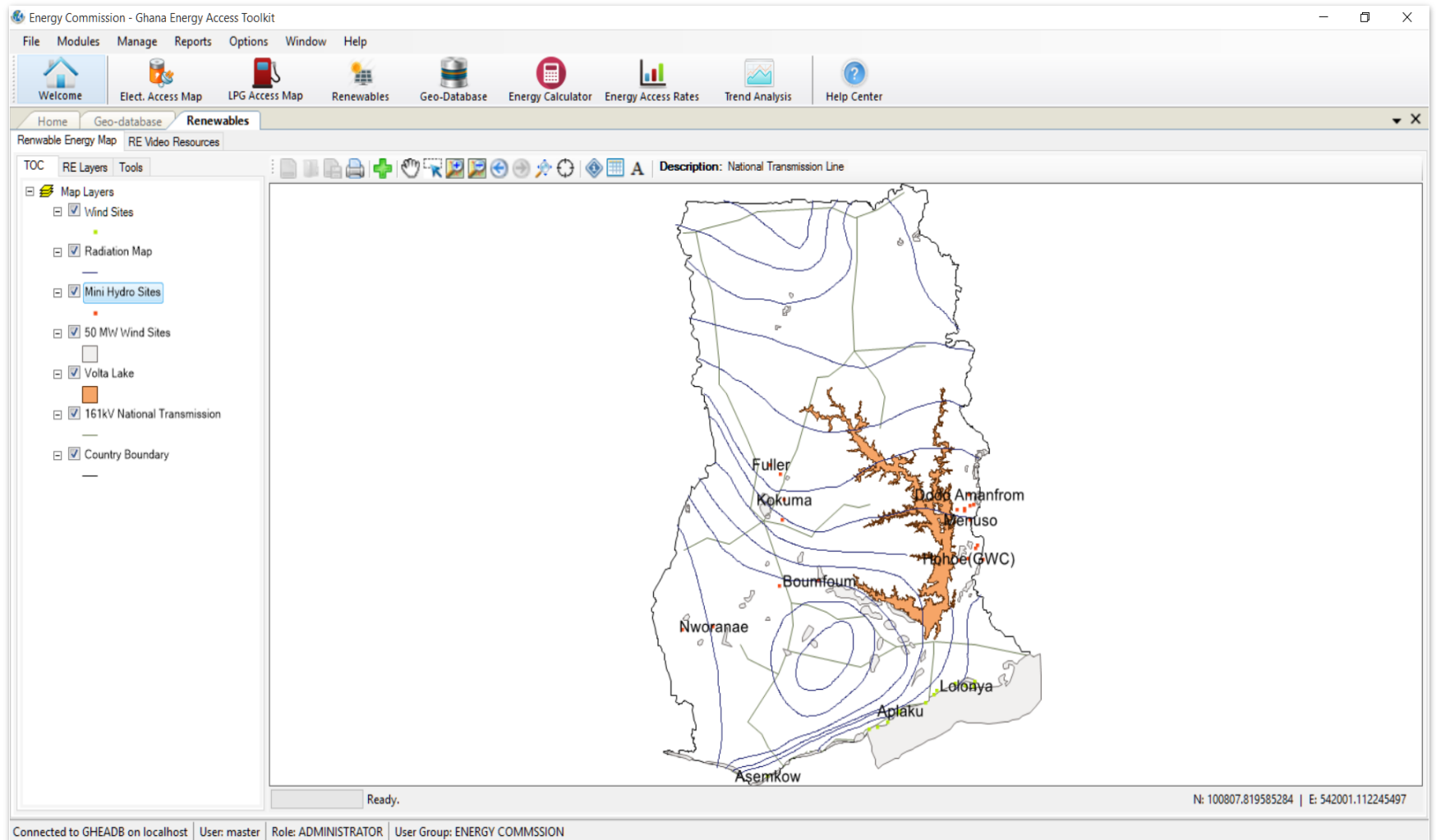
Tools & Dataset

<div style="margin-bottom: 10px;"> Renewable Energy Resources Wind, Solar and Other RE potential </div> <div style="margin-bottom: 10px;"> Electricity Access Map Community Access to Electricity </div> <div style="margin-bottom: 10px;"> Energy Access Trendline Electricity and LPG Trends </div> <div style="margin-bottom: 10px;"> User Manual View user manuals & documentation </div>	<div style="margin-bottom: 10px;"> Energy Access Database Power Generation, Electricity Access & Fuels </div> <div style="margin-bottom: 10px;"> LPG Access Map LPG Stations and Access </div> <div style="margin-bottom: 10px;"> GhEA Toolkit Update Datasets and Perform Analysis etc </div> <div style="margin-bottom: 10px;"> GhEAT online forum Join the discussion and find answers you need. </div>
---	--

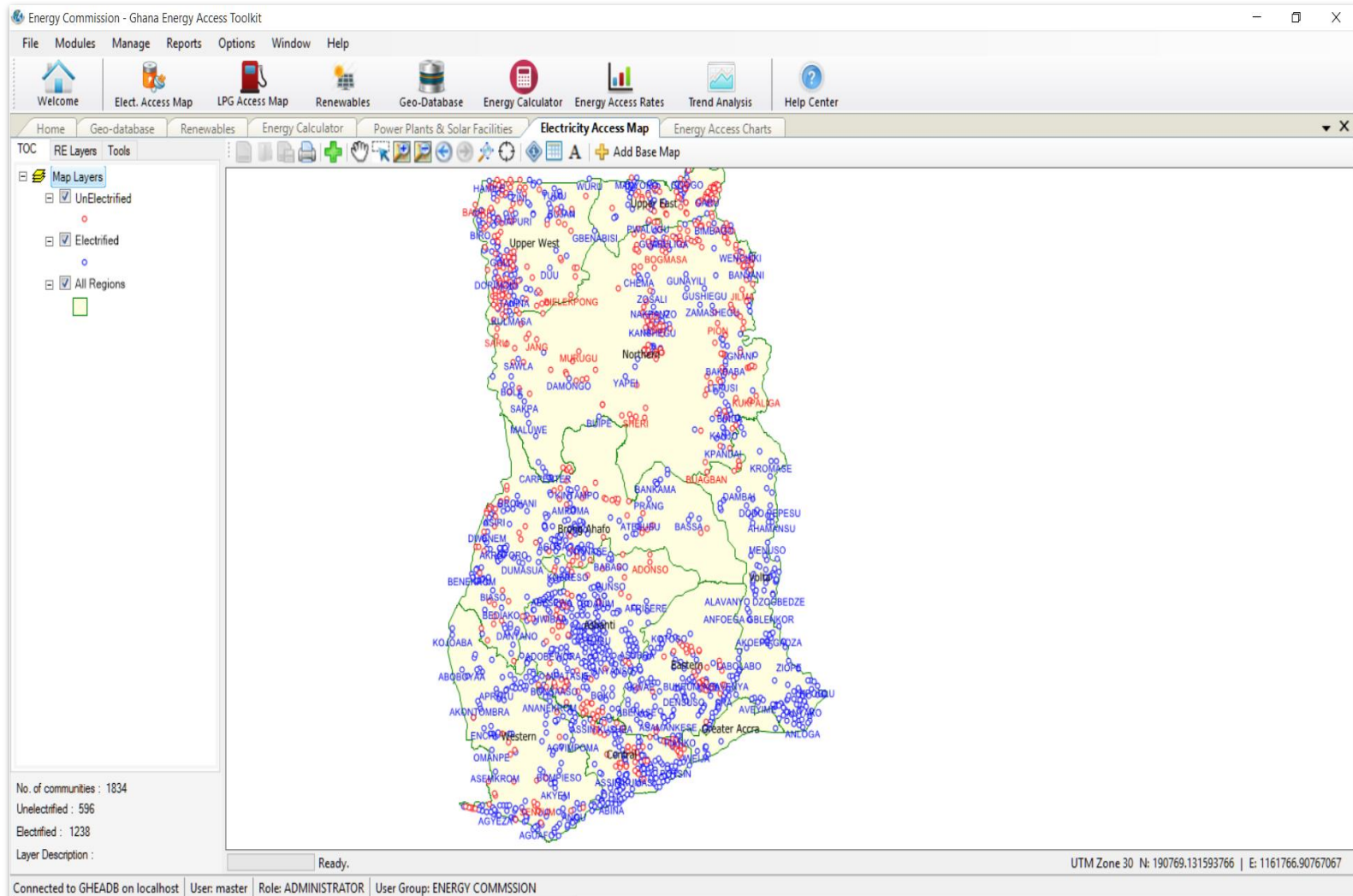
Notifications

- Electricity And LPG Trendlines
- Electricity Access Map**
 Community Access to Electricity
- LPG Access Map**
 LPG Access Maps
- Renewable Energy Resources**
 Wind, Solar and RE Potential
- Energy Access Database**
 Power Generation, Electricity and LPG Access, Fuels
- Maps and User Interactions

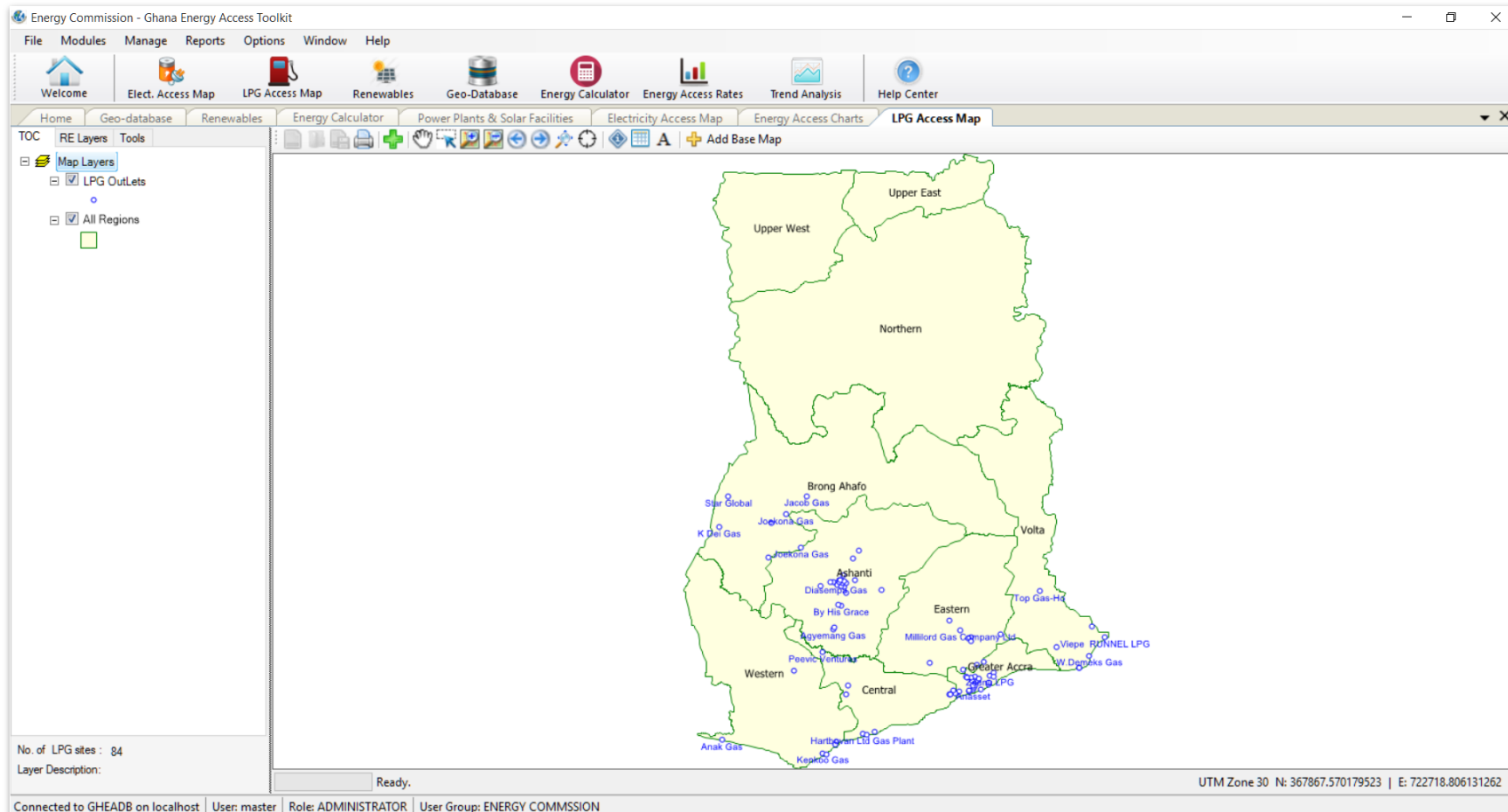
RENEWABLE ENERGY WINDOW



COMMUNITY - ELECTRICITY ACCESS WINDOW



LPG ACCESS WINDOW



DATA CAPTURE WINDOW

Energy Commission - Ghana Energy Access Toolkit

File Modules Manage Reports Options Window Help

Welcome Elect. Access Map LPG Access Map Renewables Geo-Database Energy Calculator Energy Access Rates Trend Analysis Help Center

Home Geo-database Renewables Energy Calculator **Power Plants & Solar Facilities**

Power Generation Plants Grid Connected Solar Power Others Solar Powered Facilities

1 of 14 Add Power Plant Delete Power Plant Edit Power Plant Search Refresh

Plant Name	Region	Location	Generation Type	Fuel Type	Installed Capacity (MW)	Available Capacity (MW)	Latitude	Longitude
Akosombo Generation Station	Eastern	Akosombo	Hydro	Water	1020	900	6.299973	0.059465
Kpong Generation Station	Western	Kpong	Hydro	Water	160	140	6.119995	0.125
Takoradi Power Company (TAPCO) Plant	Western	Takoradi	Thermal	LCO/Natural Gas	378	300	4.97157	-1.658613
Takoradi International Company (TICO)	Western	Takoradi	Thermal	LCO/Natural Gas	252	200		
Sunon Asogli Power Plant	Western	Kpone	Thermal	Natural Gas	220	180		
Cenit Energy Plant	Greater Accra	Tema	Thermal	LCO/Natural Gas	126	110		
Tema Thermal 1 Power Plant (TT1PP)	Greater Accra	Tema	Thermal	LCO/Natural Gas	126	110		
Mines Reserve Plant (MRP)	Greater Accra	Tema	Thermal	Diesel	85	80		
Tema Thermal 2 Power Plant (TT2PP)	Brong Ahafo	Tema	Thermal	Natural Gas	49.5	45		
Bui Power Generation Station	Brong Ahafo	Brong Ahafo/Northern	Hydro	Water	400	342	8.278625	-2.235801
Takoradi T3	Western	Takoradi	Thermal	LCO	132	120		
Effasu Power Barge	Western	Effasu	Thermal	Natural Gas	125	100		
Genser Power - IPP	Greater Accra	Tema	Hydro	LPG	5	2.1		
VRA Solar Plant	Upper East	Navrongo	Solar	Sunshine	2.5	1.9		

GENERATION BY PLANT

1 of 13 Add Delete Edit

YEAR	Generation By Plant(GWh)
2000	5.557
2001	5.524
2002	4.178
2003	3.211
2004	4.404
2005	4.718
2006	4.690
2007	3.104
2008	5.254
2010	5.961
2011	6.495
2012	6.950
2013	562

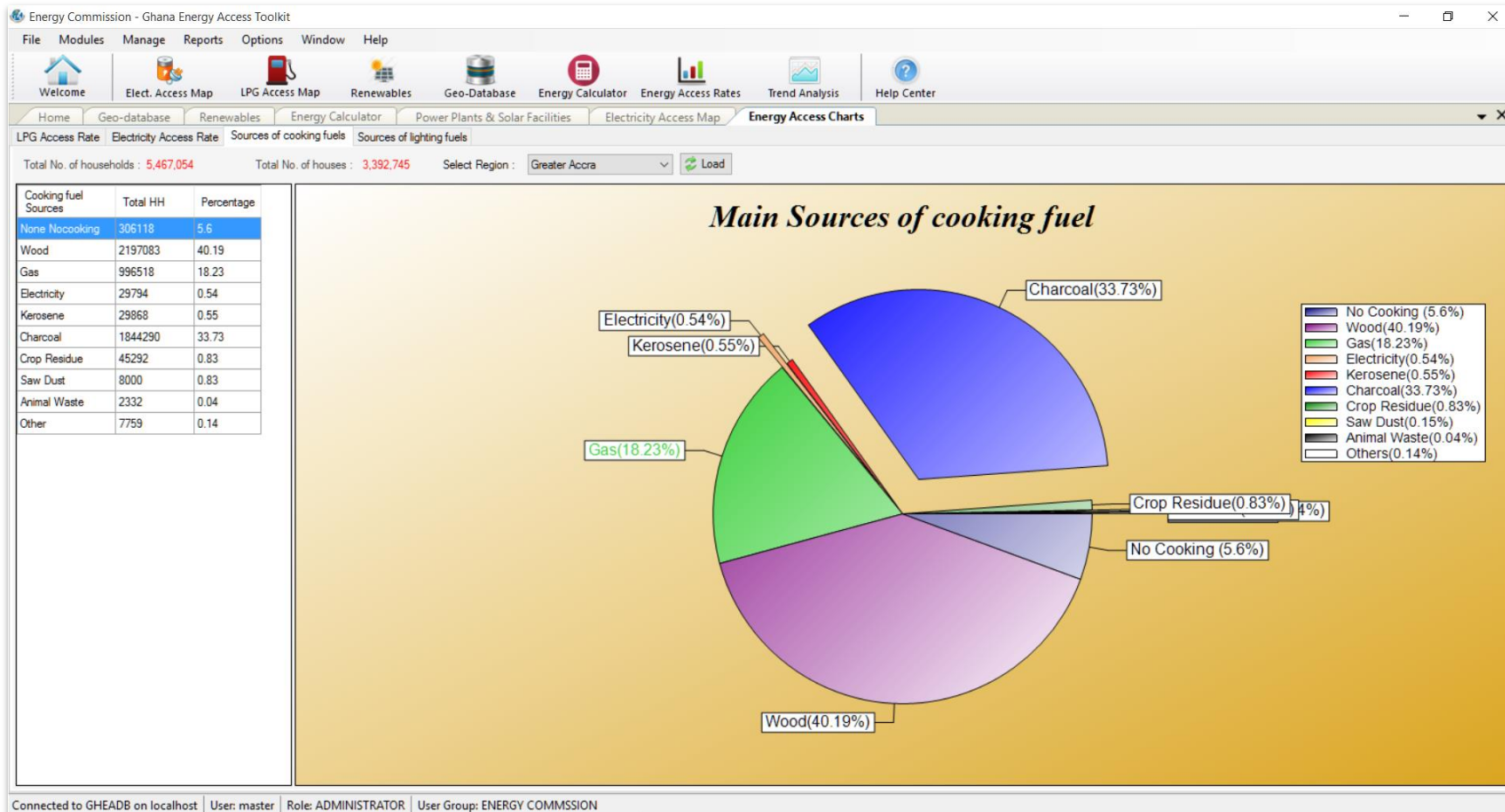
Existing Proposed: Updated By:

Date Inserted: Inserted By:

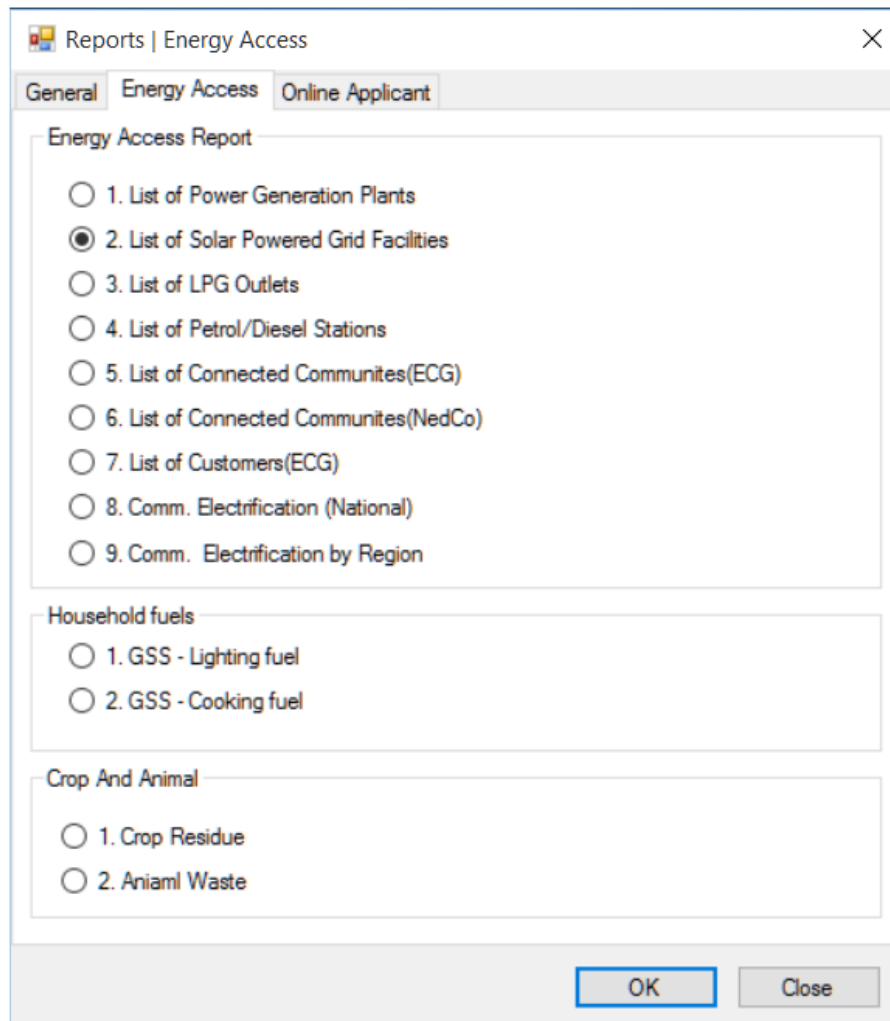
Date Updated:

Connected to GHEADB on localhost | User: master | Role: ADMINISTRATOR | User Group: ENERGY COMMISSION

ANALYSIS WINDOW



LIST OF REPORTS



The screenshot shows a software window titled "Reports | Energy Access" with a close button (X) in the top right corner. The window has three tabs: "General", "Energy Access", and "Online Applicant". The "Energy Access" tab is selected. Below the tabs, there are three sections of report options, each with a title and a list of radio buttons:

- Energy Access Report**
 - 1. List of Power Generation Plants
 - 2. List of Solar Powered Grid Facilities
 - 3. List of LPG Outlets
 - 4. List of Petrol/Diesel Stations
 - 5. List of Connected Communities(ECG)
 - 6. List of Connected Communities(NedCo)
 - 7. List of Customers(ECG)
 - 8. Comm. Electrification (National)
 - 9. Comm. Electrification by Region
- Household fuels**
 - 1. GSS - Lighting fuel
 - 2. GSS - Cooking fuel
- Crop And Animal**
 - 1. Crop Residue
 - 2. Aniaml Waste

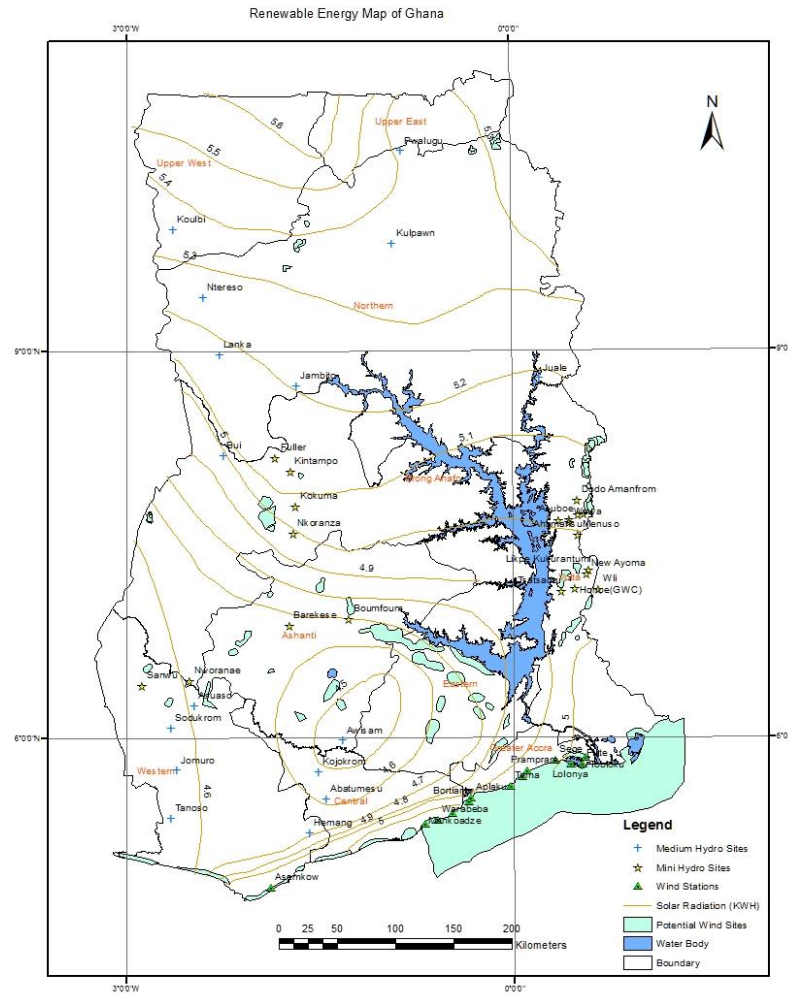
At the bottom of the window, there are two buttons: "OK" and "Close".

REPORT VIEWER

Report viewer

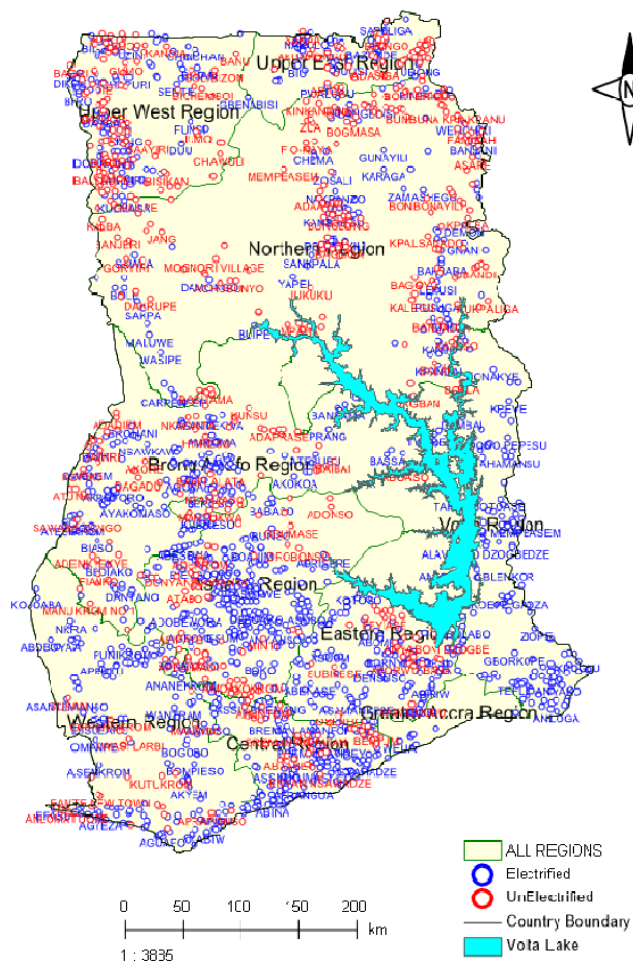
Sn.	Region	District Assembly	Institution	Locality	Installed Capacity	Latitude	Longitude	Date Installed
1.	GREATER ACCRA	ACCRA METROPOLITAN ASSEMBLY	Ministry of Energy	Accra	50	05.5514N	000.2008W	1 Jan 1998
2.	GREATER ACCRA	ACCRA METROPOLITAN ASSEMBLY	Energy Commission	Accra	4.25	05.5975N	000.1829W	1 May 2008
3.	ASHANTI	KMA	KNUST	Kumasi	4	06.6735N	001.5654W	1 May 2008
4.	ASHANTI	KMA	KNUST	Kumasi	20	06.6735N	001.5654W	1 Mar 2012
5.	GREATER ACCRA	GA EAST	Valley View University	Oyibi	8.36	05.7974N	000.1224W	1 May 2010
6.	GREATER ACCRA	GA EAST	Presby Women's Centre	Abokobi	4.18	05.7386N	000.2046W	1 May 2010
7.	BRONG AHAFO	KINTAMPO MUNICIPAL	Pure Company Ltd	Benkrom	4.18	08.7610N	001.4493W	1 May 2010
8.	GREATER ACCRA	ACCRA METROPOLITAN ASSEMBLY	V. Attafuah - Residence	East Airport, Spintex Rd, Accra	4.18	05.6227N	000.1416W	1 May 2010
9.	GREATER ACCRA	ACCRA METROPOLITAN ASSEMBLY	V. Adomako - Residence	Dzowulu, Accra	4.18	05.6154N	000.1950W	1 May 2010
10.	GREATER ACCRA	TEMA	S. Adjei - Residence	Tema	4	05.6431N	000.0151W	1 Sep 2011
11.	EASTERN	AKWAPIM SOUTH	G Mills - Residence	Peduase	3.8	05.8050N	000.1760W	1 Sep 2011
12.	GREATER ACCRA	LEDZOKUKU	Abdulai - Residence	Tesiriganor	3.29	05.6413N	000.1343W	1 Nov 2011
13.	GREATER ACCRA	GA EAST	Trade Works Company Ltd (Office)	South Dome	10.575	05.6491N	000.2506W	1 Nov 2011
14.	EASTERN	ASUOGYAMAN	Wienco Gh Ltd	Atempoku	42.77	06.2777N	000.0718E	1 Nov 2011
15.	GREATER ACCRA	ADENTA	O Asante - Residence	Fafraha-Ashyie	0.8	05.7357N	000.1465W	1 Dec 2011
16.	GREATER ACCRA	TEMA	Dr. George Pupilampu Clinic	Sakumono	4	05.6304N	000.0751W	1 Dec 2011
17.	EASTERN	AKWAPIM SOUTH	Rita Marley Music Studio	Aburi	4	05.8321N	000.18321W	1 Oct 2012

SAMPLE MAPS



SAMPLE MAPS

Electricity Access Map of Ghana



CHALLENGES

- ❑ Technical nature of energy as a concept poses issues for information dissemination and reporting by non-technical personnel
- ❑ Apathy towards information development, management
- ❑ Unwillingness of data owners to share data
- ❑ Funding – data collection, collation, processing, analysis and dissemination is an expensive venture
- ❑ Poor infrastructure – poor town and country planning;

LESSONS LEARNT

BENEFITS FOR ENERGY PLANNING

Government

- A comprehensive, one-stop database enhances policy formulation and decision-making
- Facilitates monitoring and evaluation of energy access; value for money assessment opportunity

Business

- Ease of access to data for business and investment planning
- Availability of relevant, timely and reliable data
- Facilitates investments in the energy sub-sector

Academia

- Reduced cost of research
- Enhanced quality of research, reliability of data
- Motivation for further research
- Enhanced teaching and learning activities
- Bridges some of the gap between academia and industry

LESSONS LEARNT (contd.)

❑ Data Security

- ❑ Ensure no protocols are breached as regards various datasets – flexibly classify

- ❑ **Innovation** is key – explore, learn what others are doing then design a system to suit your own needs

❑ Centre Sustainability

- ❑ Legal framework critical
- ❑ Funding – PPPs offer an option
- ❑ Make effort national – involve as many stakeholders as possible
- ❑ Teamwork
 - ❑ Identify shared goals
 - ❑ Share results/benefits
 - ❑ Shared challenges
 - ❑ Saves money and time – eliminates duplication of efforts

Thank you!

Ethel Linda Mensah (Ms.)
Energy Information Centre Manager
Energy Commission
PMB, Ministries
ACCRA, GHANA
www.energycom.gov.gh

233 (0)302 813756/7/9 (Office – Main)
233 (0) 302 811306 (Direct)
233 (0)302 813764 (Fax)
233 (0)208 828295 (Cell)

Email – lmensah@energycom.gov.gh; lindaethel19@gmail.com



giz