

VOLTA RIVER AUTHORITY

FIFTY THIRD  
ANNUAL REPORT &  
ACCOUNTS 2014



**VOLTA  
RIVER  
AUTHORITY**

## **PROFILE OF THE VOLTA RIVER AUTHORITY**

The Volta River Authority (VRA) was established on April 26, 1961 under the Volta River Development Act, Act 46 of the Republic of Ghana, as a body corporate with the mandate to operate mainly as a power generation, transmission and distribution utility. In 2005, following the promulgation of a major amendment to the VRA Act in the context of the Ghana Government Power Sector Reforms, the VRA's mandate has now been largely restricted to generation of electricity. The amendment has a key function of creating the requisite environment to attract independent power producers (IPPs) onto the Ghana energy market.

Through the resultant amendment, the transmission function has been separated into an entity, designated Ghana Grid Company (GRIDCo) while the VRA's distribution agency, the Northern Electricity Department (NED), has been transformed into the Northern Electricity Distribution Company (NEDCO), a stand-alone, wholly-owned, subsidiary of VRA.

### **Power Activities**

The Authority operates a total installed electricity generation capacity of 1,970 MW. This is made up of two hydroelectric plants on the Volta River, with installed capacities of 1,020 MW and 160 MW at the Akosombo and Kpong Generating Stations respectively, and complemented by a 330 MW Combined Cycle Thermal Plant at Aboadze, near Takoradi. A further 220 MW Thermal Plant, Takoradi International Company (TICO) is owned as a joint venture with TAQA, from Abu Dhabi in the United Arab Emirates. This has been converted into a 330 MW combined cycle plant and commissioned in 2015. Additional development of 132 MW (T3) Magellan plant at the same site at Aboadze was commissioned in 2012.

The VRA has developed a number of plants in Tema. These include a 110 MW Tema Thermal 1 Power Plant, an 80 MW Mines Reserve Plant, both commissioned in 2008. A 50 MW Tema Thermal 2 Power Plant commissioned in 2010; and additional development of a 200 MW Thermal Plant located at Kpone, near Tema, expected to be commissioned 2015.

The Authority is also planning additional development of 100-150 MW of wind power, commenced in 2012 at locations in the southern part of the country where conditions are favourable – and up to 12 MW of solar power generation in the next three years in the northern part of the country, where the resource is abundant – beginning with the construction of the first 2 MW solar plant, commissioned in 2012.

The Authority has begun feasibility studies for the development of 140 MW of hydro dams at Pwalugu and Juale in the Northern Region.

The VRA has a strong commitment to renewable energy development to protect the environment and public health and help reduce emissions that cause climate change, while ensuring a system of diversity and security in electricity supply. A renewable energy development programme is one of the most constructive, cost effective ways to address the challenges of high energy prices, energy security, air pollution, and global climate change. Hydroelectric power is currently the largest producer of renewable energy in Ghana. Hydro generation currently accounts for 60 percent of the total system supply.

The VRA, through the Northern Electricity Distribution Company Ltd. (NEDCO), is the sole distributor of electricity in the Brong-Ahafo, Northern, Upper East, Upper West, and parts of Ashanti and Volta Regions of Ghana. Originally, NED was developed as an integral part of the larger Northern Electrification and System Reinforcement Project (NESRP) to extend the national electricity grid to northern Ghana. The new subsidiary company, NEDCO, has a customer population of over 400,000 and a load demand of about 140MW.

## **Customers**

The VRA's major bulk customer is the Electricity Company of Ghana (ECG). Power sold to ECG caters mainly for domestic, industrial and commercial concerns. Bulk sales are also made to a number of mining companies, including AngloGold Ashanti, Newmont Ghana Gold Ltd., Goldfields Ghana Ltd., Golden Star Resources Group. Others are Aluworks, Akosombo Textile Ltd., and Diamond Cement Ghana Ltd.

International energy sales to neighbouring countries include Togo, Benin and Burkina Faso.

### **Links to Customers and Neighbouring Countries**

The VRA reaches its customers in Ghana and neighbouring countries through GRIDCo. GRIDCo's transmission system covers the entire country, and is also connected with the national electricity grids of Cote d'Ivoire, Compagnie Ivoirienne d'Electricité (CIE), Togo, Communauté Electrique du Benin (CEB), and Burkina Faso (SONABEL). These interconnections now serve as part of the arrangement under the West Africa Power Pool (WAPP).

### **Regional Cooperation**

The VRA is participating in the development of a power pooling mechanism to provide the West Africa sub-region increased accessibility, availability and affordability to electricity under the auspices of the Economic Community of West African States (ECOWAS). In this context, GRIDCo has constructed the Ghana component of a new 330kV transmission line, which starts from Aboadze to Tema, and then to Momehagou (Togo) under the West Africa Power Pool Project. The Aboadze to Tema transmission line was commissioned in 2014.

The VRA is the major foundation customer of the West African Gas Pipeline Project (WAGP), which involves the construction of a 20 - inch 600km long natural gas transmission pipeline from Nigeria to Ghana and associated facilities to support the energy requirements of the West Africa sub-region. The objective of the VRA's participation in the WAGP is to obtain natural gas from Nigeria to operate its thermal facilities, and thereby reduce significantly the cost of thermal generation, while increasing electricity availability, accessibility and affordability and protecting the environment. The project has been completed and gas is now being supplied to the VRA thermal facilities. Occasionally, accidental damage to the pipeline disrupts gas supply to thermal facilities and exposes the plants to power generation and financial risks.

Recognizing the VRA's distinctive competencies in power system operations, the United Nations Development Programme (UNDP), appointed the VRA as the principal consulting agency for the implementation of an Emergency Power Programme (EPP) in Liberia after years of conflict. Consequently, the VRA embarked on a power construction scheme to restore power to Monrovia and other critical institutions.

The VRA is a founding member of the Association of Power Utilities of Africa (APUA). APUA aims to promote the integration and development of the African power sector through active cooperation among its members and also between its members on one hand and all international power sector organizations and donors on the other hand. APUA is a permanent member of the Executive Council of the African Energy Commission and a preferred partner of the New Partnership for Africa's Development (NEPAD).

### **Commercialization Initiatives**

The Authority has also embarked on a programme to turn its portfolio of non-power operations into progressively self-financing subsidiaries. The aim is to inject greater efficiency into the operations of these important but non-core activities of the VRA while the Authority focuses more effectively on power generation, and thereby enhance its competitive advantage in the West African sub-region.

These operating subsidiaries are the Akosombo Hotels Limited, and the Volta Lake Transport Company, and Kpong Farms Limited. The Schools; the Health Services; and the Real Estate department, have all been incorporated as limited liability companies.

The VRA continues to demonstrate its social responsiveness through various programmes designed to enhance the socio-economic and physical environment of the lakeside and downstream communities.

This social investment includes annual commitment of the cedi equivalent of US\$500,000.00 to a Resettlement Trust Fund to support development initiatives in 52 resettlement towns. The fund is used to support projects for environmental improvement, social welfare, public health, education, electricity, potable water supply

and sanitation. In addition, VRA has introduced a new Community Development Programme (CDP). The CDP sets out a framework for guiding the process of support for the development of all communities impacted by the operations of the Authority. The CDP also seeks to improve the previous Community Development Initiative (CDI) Framework Document. It aims at promoting the empowerment of the communities to take action for development.

The VRA's hospitals in Accra, Akosombo and Aboadze, equipped with excellent facilities have now been converted into limited liability companies. However, the VRA continues to provide free specialist and general medical care to communities along the Volta Lake accessible only by boat, through its medical boat christened *MV ONIPA NUA*.

Malaria has become endemic with economic consequences. To make a total effort to increase the effectiveness of malaria control and prevention, the VRA has enlisted the support of other institutions. As an alternative to the VRA medical boat services, the Authority has in a joint effort signed a Memorandum of Understanding with the Asuogyaman District Health Management Team (DHMT) to provide services to communities along the Volta Lake to fight malaria, Bilharzia and other water-borne diseases. The VRA with the assistance of The Johns Hopkins University Center for Communication Programs Voices for a Malaria-free Future Project has developed a Strategy Document for malaria control. This document sets out the framework for action by the VRA in creating a Malaria-free environment for its workforce, workers' families and their surrounding communities.

The Authority maintains a dredging programme at the estuary of the Volta River at Ada to reduce the incidence of Bilharzia, and to restore the ecosystem in the area. VRA also runs afforestation programmes aimed at reducing siltation of the Volta Lake through the restoration of permanent vegetative cover on the slopes bordering the Lake.

The VRA runs first and second cycle schools for children of staff and others living in Akosombo, Akuse and Aboadze. It also administers Local Authority functions in the Akosombo Township.

## **Relations with statutory regulatory bodies**

The relevant regulatory environment of the energy sub sector consists of the Ministry of Energy and Petroleum, and Ministry of Power, Energy Commission, and the Public Utilities and Regulatory Commission (PURC).

- Ministry of Power – Supervisory Ministry responsible for formulating, monitoring, and evaluating policies, programmes and projects for the energy sector.
- Public Utilities Regulatory Commission (PURC) – An independent regulatory commission with oversight responsibility for tariff and rate setting, and provision of the highest quality of electricity to consumers.
- Energy Commission - Provides advice to the Government of Ghana on energy planning and policy, conducts indicative planning/least cost expansion planning of wholesale supply of electricity, regulates licenses, establishes and monitors standards of performance as well as industry rules of practice for electric utilities.

## **SUBSIDIARY COMPANIES**

### **Akosombo Hotels Ltd**

The Akosombo Hotels Limited, incorporated in 1970, runs a three-star hotel, restaurant, modern conference/seminar facilities, pleasure activities, including cruising on the Lake by *MV Dodi Princess*, and promotes tourism. *MV Dodi Princess* which was gutted by fire is being reconstructed to resume operations in 2015.

### **Volta Lake Transport Company**

The Volta Lake Transport Company, incorporated in 1970, operates river transportation for passengers, bulk haulage of petroleum products and significant quantity of cement, and cross-lake ferry services along the Volta Lake.

### **Kpong Farms**

Kpong Farms Ltd, originally set up in 1982 as a resource centre of excellence for research into modern agricultural practices, has played a significant role in the overall

agricultural development of Ghana through activities in livestock, rice production, meat processing, and the cultivation of pawpaw for export as a foreign exchange earner. Local interns and expatriates from Egypt, Pakistan and the United States of America have also received training at the Farms.

The VRA has recapitalized the operations of Kpong Farms Ltd., and is seeking strategic investors in a joint venture partnership to transform the Farms into a profitable agribusiness.



## THE VOLTA RIVER AUTHORITY BOARD

### The Members of the Board of the Volta River Authority as at 31st December 2014:

Chairman	Ambassador Lee Ocran <i>Management Practitioner</i>
Member	Ing. Isaac Kirk Koffi <i>Chief Executive, Volta River Authority</i>
Member	Nana Mprah Besemuna III <i>Traditional Ruler</i>
Member	Togbi Tepre Hodo IV <i>Lawyer</i>
Member	Alhaji Attah Nantogmah Mahamadu <i>Lawyer</i>
Member	Mrs. Alice Osei Okrah <i>Investment Banker</i>
Member	Mr. Stephen Opare <i>Structural Engineer</i>
Member	Mr. Ahmed Yakubu Salifu <i>Freight Forwarder, Banker/Accountant</i>
Member	Mr. Ludwig Holdze <i>Administrator/Development Consultant</i>

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Secretary	Mrs. Ellen Bannerman-Quist Volta River Authority
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## **Principal Officers (VRA Management) as at 31<sup>st</sup> December, 2014:**

### **Office of the Chief Executive**

Chief Executive	- Ing. Kirk koffi
Director, Audit	James J. Napour
Director, Planning & Business Development	- Bernard Kofi Ellis
Director, Projects & Systems Monitoring	- Ing. Bright K.D. Siayor
Director, Centre of Excellence	- Edwin M. Gbekor
Ag. Board Secretary	Bannerman Quist (Mrs)
Manager, Corporate Communications Unit	- Samuel Kwesi Fletcher

### **Engineering and Operations Branch**

Deputy Chief Executive	- Ing. Richard Badger
Director, Thermal Generation	- Ing. Richard Oppong Mensah
Director, Engineering Services	- Ing. William Sam-Appiah
Director, Hydro Generation	- Ing. Kwesi B. Amoako

### **Finance Branch**

Deputy Chief Executive	- Alexandra Totoe (Ms.)
Director, Procurement	- Ing. Richmond Evans Appiah
Director, Finance	- Ebenezer Tagoe
Director, Investment	- Samuel K. Gyawu
Director, Management Information Systems	- Dr. Isaac A. Doku

### **Services Branch**

Ag. Deputy Chief Executive	- Ing. Joseph W. Sutherland
Ag. Director, Legal Services	- K. T.K. Agban
Director, Human Resources	- Isaac K. Aidoo
Director, Corporate Risk Management	- Vacant
Director, Real Estate & Security	- William Bobie
Director, General Services	- Abla Fiadjoe (Ms.)
Director, Environment & Sustainable Dev't	- Ing. Theo Okai
General Manager, VRA Schools	- Arnold Seshie
Director, Health Services	- Dr. Rebecca Acquaaah-Arhin (Mrs.)

On Secondment: Mrs. Harriet Wereko-Brobby is on secondment to the West African Gas Pipeline Project as General Manager, Corporate Affairs.

## CHAIRMAN'S STATEMENT

Good Morning, Ladies and Gentlemen:

I warmly welcome you to the VRA's Annual Stakeholders Meeting.

This year's annual meeting marks the 6<sup>th</sup> milestone of our corporate reporting to our key stakeholders. Such a major milestone deserves special recognition. We take this opportunity therefore to rededicate ourselves to the mission and purpose of the VRA.

Our Report for 2014 focuses on our achievements and challenges, perspectives and insights for the future.

Despite the challenges and the uncertainties in the economic and energy environment, we have kept open real possibilities for continued growth and development.

Turning to generation, the Akosombo Generating Station alone generated 6,507.834 GWh of energy and the Kpong Generating Station generated 1,147.654 GWh while the Navrongo Solar Power Plant generated 3.843 GWh of energy. Our thermal units operated mostly on mixed fuel due to low natural gas supply from the West Africa Power Company (WAPCo). Our T1 Thermal units generated 889.41 GWh of energy while T3 units generated 90.82 GWh of energy. Generation from our Tema Thermal Complex was 1,109.40 GWh.

Total electricity generated from both our hydro and thermal sources decreased by 576 GWh (6%) from 10,325GWh in 2013 to 9,749GWh in 2014. Generation from hydro sources decreased by 214 GWh (3%) from 7,871GWh in 2013 to 7, 657GWh in 2014. Thermal generation also decreased by 362 GWh (15%) from 2,454 GWh in 2013 to 2,092GWh in 2014.

We recorded the highest ever peak load demand of **1,970.9 MW** on our power system on January 1, 2014, signaling increased electricity demand. This exceeded the previous peak demand of **1,942.9** by 1.4 percent.

The Akosombo and Kpong plants combined to perform above consolidated target of 90 percent while the Navrongo Solar Power Plant registered availability factor of 100 percent. The Takoradi Thermal Power Station posted 56.8 percent plant availability due to extended major inspection on unit 32G1; unit 32G2 was de-rated to 60MW due to load tunnel temperature limitation while unit 32G3 was mostly run with the Heat Recovery Steam Generator 2 unit (HRSG2), peaking at 82 MW when coupled with the Heat Recovery Steam Generator 1 unit (HRSG1). The Tema Thermal Complex achieved availability and capacity utilization factor of close to 80 percent.

I am pleased to report that for the fourth time running the Akosombo Generating Station has been ranked the 6<sup>th</sup> best performing hydro plant in the world among its peers by the Electricity Cost Group of the United States of America, a world renowned electricity rating agency.

I recommend that other departments take a cue from our hydro generation performance and adapt best practices in our quest in building a world class power utility.

We have started the retrofitting of the Kpong Generating Station, and signed a contract with Andritz Hydro of Austria to modernize our generating facilities and equipment to prolong the life span of the plant for another 30 years. Hatch Energy of Canada is the consultant.

### ***Portfolio Growth***

We continued to pursue our energy infrastructure development programme. For this purpose, we have begun feasibility studies for the development of 140 MW of hydro dams at Pwalugu and Juale in the Northern Region. Additionally, we are constructing a 186 MW Thermal Power Plant (designated T4) at the same site of the Takoradi Thermal Power Station through project financing arrangement to expand the generation capacity.

The Ministry of Energy has entered into an EPC contract agreement with ATHOLL Energy Limited to install, originally, a 49.5 MW of Gas Turbine Generators to 87 MW.

### ***Renewable energy Development Programme***

We made significant progress in our renewable energy development programme to develop 100-150 MW of wind power. Our energy development strategy seeks to diversify our sources of generation, and to reduce the risk of over dependence on just a few types of energy sources, while addressing the challenges of high energy prices, energy security, air pollution, and global climate change. In this regard we completed wind measurement for all our potential sites with our wind developers.

We are collaborating with CENIT Power in a joint venture to convert the two simple cycle units into combined cycle. We have started the Kpone Thermal Power by installing the two gas turbines to add on 220 MW to the system which is expected to be completed before year end.

### ***Gas Supply***

In order to ensure adequate, reliable and stable power supply to meet load growth projections and to be competitive in the global energy market, the VRA has made gas supply its priority.

Further, we are exploring the possibility of securing additional gas supplies with potential suppliers in Nigeria and have initiated a number of Gas Supply Agreements..

We are considering a proposal from Quantum Power Ghana Gas (QPRGG) to deliver re-gasified LNG to our plants in Tema.

### ***Management Information Systems***

We have implemented the *Oracle Hyperion Planning* Tool which is expected to improve planning, budgeting, and forecasting processes.

We have improved communication links in the VRA, strengthening our Wide Area Network (WAN) backup links, and fibre cables to increase reliability, and increased internet accessibility.

### ***Staff Matters***

We secured industrial harmony under the period and have embarked on restructuring of our power and non-power operations. The purpose of the restructuring programme is to enable the VRA to concentrate on the core requisite of its business mission of electricity generation so as increase efficiency and effectiveness and to adapt itself to the challenges of change in the energy business environment and thus strengthen its ability to compete in the growing energy market.

The restructuring involves the separation of identified categories of staff of the restructured departments. Staff concerns in connection with the restructuring exercise are being addressed.

The Authority continued to provide opportunities and support for the development of knowledge and skills by staff, consistent with the needs of the business. Training and development programs, covering all categories of employees, were thus provided in-house, and complemented with external, local and overseas courses. This is in line with its policy of ensuring that the VRA has the requisite human resource capability at all times for efficient performance to meet current business demands and also future business direction.

### ***Financial Health***

Revenue from sale of electricity increased by 0.84 percent (GH¢18.66 million) to GH¢2,230.73 million over the previous year's sales of GH¢2,212.07 million.

The volume of electricity sold however decreased by 553 GWh (5%) from 11,006 GWh in 2013 to 10,453 GWh in 2014.

The Government of Ghana, however, did not extend any subsidies to VRA in lieu of tariff shortfall in 2014 compared to a subsidy of GH¢664.27 million extended to the VRA in 2013.

Operating loss in 2014 was GH¢74.13 million compared to a profit of GH¢208.11 million in 2013.

We ended the year 2014 with a net after tax loss of GH¢799.93 million (2013:GH¢ Profit GH¢61.74 million), loss on exchange fluctuation on foreign debt of GH¢685.70 million (2013: GH¢ loss of GH¢87.91 million)

### ***Corporate Social Responsibility***

We continued with our social responsibility (CSR) activities, particularly in communities where we operate. Our CSR initiatives are aimed at contributing to the wellbeing of communities, in particular skills development, education and enterprise development and thereby promoting jobs, alleviating poverty and improving employability. We awarded scholarships to 61 young people in VRA communities tenable at second cycle and tertiary schools under the *VRA Community Development Programme*.

The VRA cannot succeed without the cooperation of our key stakeholders. I look forward to the strengthening of our relations in building a financially self-sustaining power utility and abundant electricity for development. I thank the management and staff of the VRA for their commitment. Thank you all for your cooperation.

Ambassador Lee Ocran

***CHAIRMAN***

## OPERATIONS REVIEW

### *(a) Power Generation*

The Authority recorded the highest ever peak load demand of **1,970.9 MW** on its power system on January 1, 2014. This exceeded the previous peak demand of **1,942.9** in 2013, by 1.4 percent. The peak demand exceeded the maximum supply level that the electrical power could generate. A total of 9,749 GWh of electricity was generated at our generating plants at Akosombo, Kpong, Tema and Aboadze, a decrease of 6 percent over 10,325 GWh generated in 2013. We were challenged in meeting the high peak because of fuel shortages, prolonged forced outages at some of our thermal plants, and inability to commission new plants on schedule.

Load relief was obtained mainly from the Electricity Company of Ghana (ECG), Northern Distribution Company (NEDCo), Volta Aluminium Company (VALCO), Communauté Electrique du Benin (CEB), and customers such as the mines and other industries depending on the system condition. Among the effects were the destabilization of the electrical system and the load management that persisted for almost one year. A maximum of **620 MW** load was shed, resulting in a loss of about 1,271 GWh of energy to domestic customers and a loss of **201 GWh** energy to CEB.

To ensure optimum operation of our power system, we continued with our maintenance activities on all our generation facilities and equipment. At Akosombo Generating Station, we executed 93.48 percent of planned unit maintenance work and 100 percent of planned maintenance on the balance of plant and outside services equipment. Kpong Generating Station completed 97 percent of planned unit maintenance work and 100 percent of planned maintenance on the balance of plant and outside services equipment. Navrongo Solar Plant achieved 100 percent of planned maintenance activities. Corrective maintenance activities were also carried out on all our generating units at the Takoradi Thermal Power Station and Tema Thermal Power Complex.

The plant availability and forced outage factor for Akosombo Generating Station was 94.46 percent and 0.07 percent respectively. The plant availability and forced outage factor for Kpong Generating Station was 91.66 percent and 0.23 percent respectively. The two plants therefore performed above consolidated target of 90 percent. The Navrongo Solar Power Plant had an availability factor of 100 percent.

The Takoradi Thermal Power Station achieved 56.8 percent availability factor due to extended major inspection on unit 32G1; unit 32G2 was rerated to 60 MW due to load tunnel temperature limitation while unit 32G3 was mostly run with HRSG2, peaking at 82 MW when coupled with HRSG1. The Tema Thermal Complex availability and

capacity utilization factor was 77.68 percent and 65.7 percent compared to 85 percent and 75 percent targets respectively.

We signed a contract with Andritz Hydro GmbH to refurbish the hydro generating facilities at Akuse aimed at modernizing the facility and thus extending the life of the plant . The retrofit project is undertaken by Hatch Energy of Canada.

We initiated a project at the Akosombo Generating Station, designated the Akosombo Generating Station Exciter project, aimed at replacing the GE Silco 5 static excitation systems on all six units with GE EX2001e digital excitation system. The new system is expected to yield fast response time and easy access to maintenance support including availability of spares. The installation work begun in 2013 with units 6 and 3. In 2014, the remaining four units -1G1, IG2, IG4, and IG5- were installed.

The Akosombo Generating Station was ranked the 6<sup>th</sup> best performing hydro plant in the world among its peer group by the international benchmark organization, Electricity Utility Cost Group of the US.

The Authority continued to pursue its energy infrastructure development activities in relation to generation expansion, enhancement of power supply and system reliability and other infrastructural works.

We continued with the development of hydroelectric projects at Pwalugu and Juale in the Northern Region. In this regard the African Development Bank organized a meeting on information sharing on the project with potential financiers where the VRA presented an outcome of a prefeasibility update study to participants. The project consultant organized a one-month training programme in hydrology and reservoir simulation on the Pwalugu project for counterpart staff in Paris. We also awarded a contract to Mott MacDonald for the environmental, social and impact assessment study for the development of the Juale hydroelectric project.

## **Renewable Energy Development Programme**

A renewable energy development programme is one of the most constructive, cost effective ways to address the challenges of high energy prices, energy security, air pollution, and global climate change. Hydroelectric power is currently the largest producer of renewable energy in Ghana. Hydro generation currently accounts for 60 percent of the total system supply, and this is the largest share of the ramping capacity.



Our energy development strategy seeks to diversify our sources of generation to reduce the risk of overdependence on only a few types of our generation sources. We completed wind measurement for all our potential sites in November 2014 and held a strategic meeting with our wind developers, KfW and Lahmeyer International in Germany on loan agreements. We attended a technical committee meeting in Spain in connection with the project. We decided on four wind sites as follows for further study:

- Anloga Extension
- Lekpogunor-Akplabanya
- Amoma North
- Gambaga

### **Ghana Energy Development and Access Programme (GEDAP)**

To improve electricity accessibility and availability, the VRA is expanding its power system under a project designated *Ghana Energy Development and Access Programme* (GEDAP). The project, which is in two parts, involves the development of the Kumasi Second Bulk Supply Point and distribution networks, funded by the African Development Bank. A sub-component of GEDAP, the *NED Intensification Project*, which seeks to improve access to electricity, is being funded by the International Development Association (IDA) of the World Bank. The project is expected to improve the network operation, supply reliability, power quality and safety and increase access to prospective customers and secure additional revenue.

We are collaborating with CENIT Power in a joint venture to convert Tema TTIPP/ TCTPP plants into combined cycle plants. A Brazilian contractor has been engaged to undertake the project. We have engaged Standard Chartered Bank on the financing arrangement with a Partial Risk Guarantee demand from the World Bank.

We have signed a Memorandum of Understanding with Beijing FuxingXiaocheng Electronic Technology Stock Company (BXC) Ltd to develop a 660 MW CCGT under a joint venture arrangement. The first phase of the project involves the development of 125 MW OCGT with equity of \$150 million in a 80/20 shareholding between BXT and VRA. In this regard we have initiated a technical audit and other preliminary studies for the project.

## **Gas Supply**

Gas supply to our thermal plants has not only been inadequate but unstable. We have therefore made gas supply our highest priority. We stepped up our exploration of other alternative of gas supply and fuels. We are working with Sunon Asogli, an Independent Power Producer (IPP) to build a 2 x 350 MW coal-fired power plant. In this regard we have set up a team to work with Shenzhen Energy Group Co. of China.

We led initiatives to explore the possibility of securing additional gas supplies. Network Oil and Gas is seeking to supply gas between 30 MMscf/day to 50 MMscf/day to VRA from the second quarter of 2015. Supply is expected to increase to between 65 MMscf/day and 100 MMscf/day after completion of other projects. For this purpose we have executed Heads of Terms for gas supply agreement. We have also executed a Memorandum of Understanding with Constant Capital (Ghana) Ltd, a corporate and project advisory services and investment firm based in Accra with associated offices in other West African countries including Nigeria. Constant Capital has a potential capability to build 450 MMscf/day of natural gas through the West African Gas Pipeline reception facilities in Ghana. Similarly, we executed a Memorandum of Understanding and Confidentiality Agreement with ElkGrove for the supply of gas. We have executed a gas supply and Interconnection with Ghana Gas.

We received a proposal from Quantum Power Ghana Gas on an LNG project at Tema. The project involves installing, commissioning and operating infrastructure required to import, store, re-gasify LNG and also deliver re-gasified LNG to off-takers in the Tema area for an initial period of 10 years with an option of additional five years. LNG purchased by the Off-takers (VRA, Asogli et al will be transported to the project's facility for storage, regasification, and delivery to thermal plants. The project is expected to operate on a toiling basis. We executed a Non-Disclosure and Confidentiality Agreement with QPRGG to purchase 100 MMscf of re-gasified LNG from this project.

## **Financial Health**

Revenue from sale of electricity increased by 0.84 percent (GH¢18.66 million) to GH¢2,230.73 million over the previous year's sales of GH¢2,212.07 million. This was mainly due to an upward adjustment in the Bulk Generation Tariff (BGT) by the PURC from GH¢0.084495/kwh to GH¢0.114900kwh effective October 1, 2013 to December 31, 2013, which was subsequently adjusted to GH¢0.123937/kWh effective January 1,

2014 and again to GH¢0.143019/kwh effective July 1, 2014. The BGT was finally adjusted upward to GH¢0.1460447/kWh effective October 1, 2014. A 47 percent depreciation of the average GH¢US\$ exchange rate from GH¢1.994/US\$ in 2013 to GH¢2.9341/ in 2014 contributed also contributed to the increase in sales revenue. The volume of electricity sold however decreased by 553 GWh (5%) from 11, 006 GWh in 2013 to 10,453 GWh in 2014.

The Government of Ghana, however, did not extend any subsidies to VRA in lieu of tariff shortfall in in 2014 compared to a subsidy of GH¢664.27 million extended to the VRA in 2013.

Operating loss in 2014 was GH¢74.13 million compared to a profit of GH¢208.11 million in 2013. The operating loss in 2014 was mainly due to the combined effect of increase in total operating revenue by GH¢88.32 million. (4%) from GH¢2,327.10 million in 2013 to GH¢2,415.42 million in 2014 viz-a-viz an increase of GH¢370.56 million (17%) in total operating cost from GH¢2, 118.99 million in 2013 to GH¢2, 489.55 in 2014. The operating loss represents a negative return of 0.455 on average revalued net fixed assets (2013; 5.63) compared to the covenanted 8%.

We ended the year 2014 with a net after tax loss of GH¢799.93 million (2013: GH¢ Profit GH¢61.74 million ), loss on exchange fluctuation on foreign debt of GH¢685.70 million (2013; GH¢ loss of GH¢87.91 million), and financial expenses of GH¢308.67 million (2013: GH¢78.95 million). Financial Income of GH¢8.39 million (2013; 6.13 million ) and exchange gain of GH¢274.94 million (2013; GH¢14.76 million) have also been taken into account.

### **Volta Lake drops by 14.41 ft. by the beginning of the year**

At the end of the 2014 rainy season, the net inflow into the Volta lake was **24, 213 MCM (19.63 MAF)**. This was about 22 percent below the long-term average inflow of **31,007 MCM (25.14 MAF)**. The elevation of the Volta Lake on January 1, 2014 was 78.56 m (257.74ft.), and at the end of the dry season, it was 74.17 m (243.33ft.). The lowest Volta Lake elevation was recorded on August 28, 2014. This represents a drop of 4. m (14.41ft.) from the beginning of the year.

The 2014 Inflow Hydrographs and monthly Net Inflow Comparison for 2013, 2012, 2011, 2012 and LTA are shown as figure 1 and 2 below:

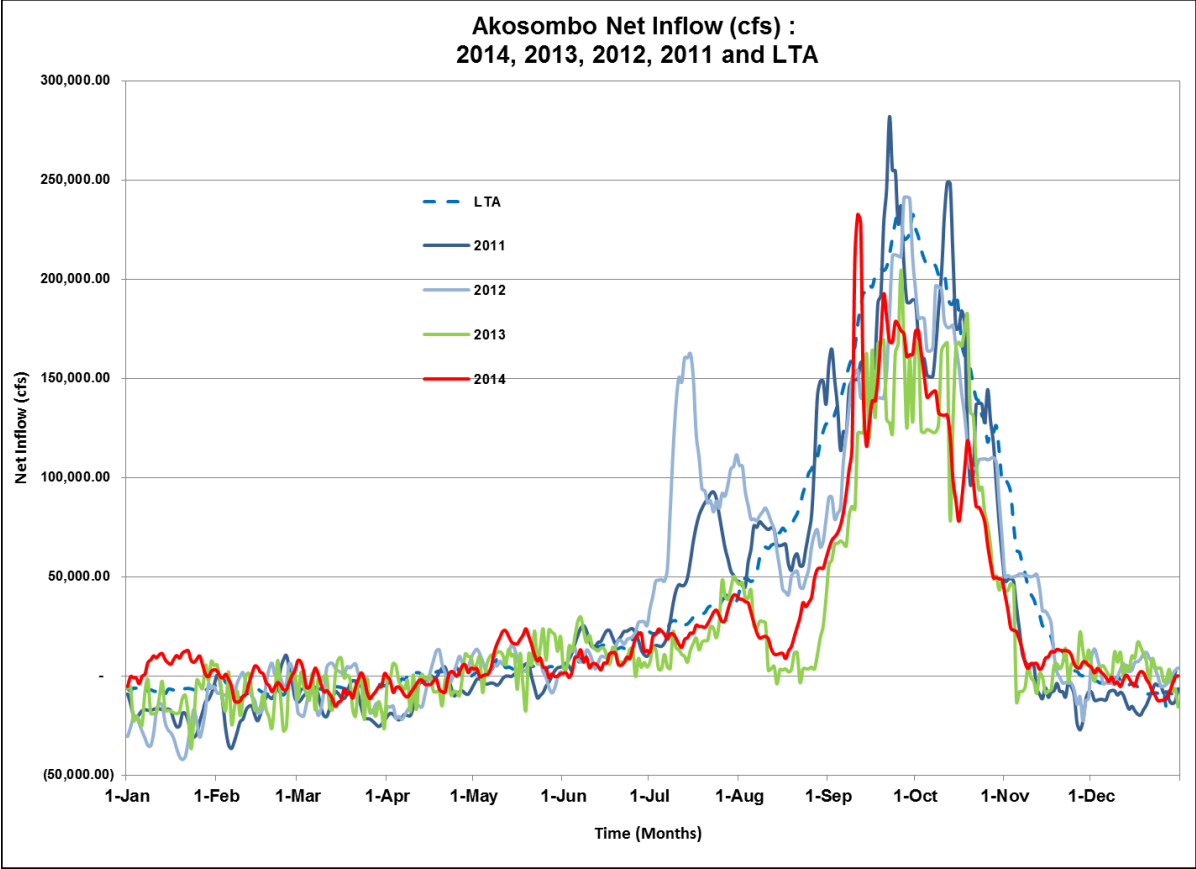


Figure 1: Volta Lake Hydrograph

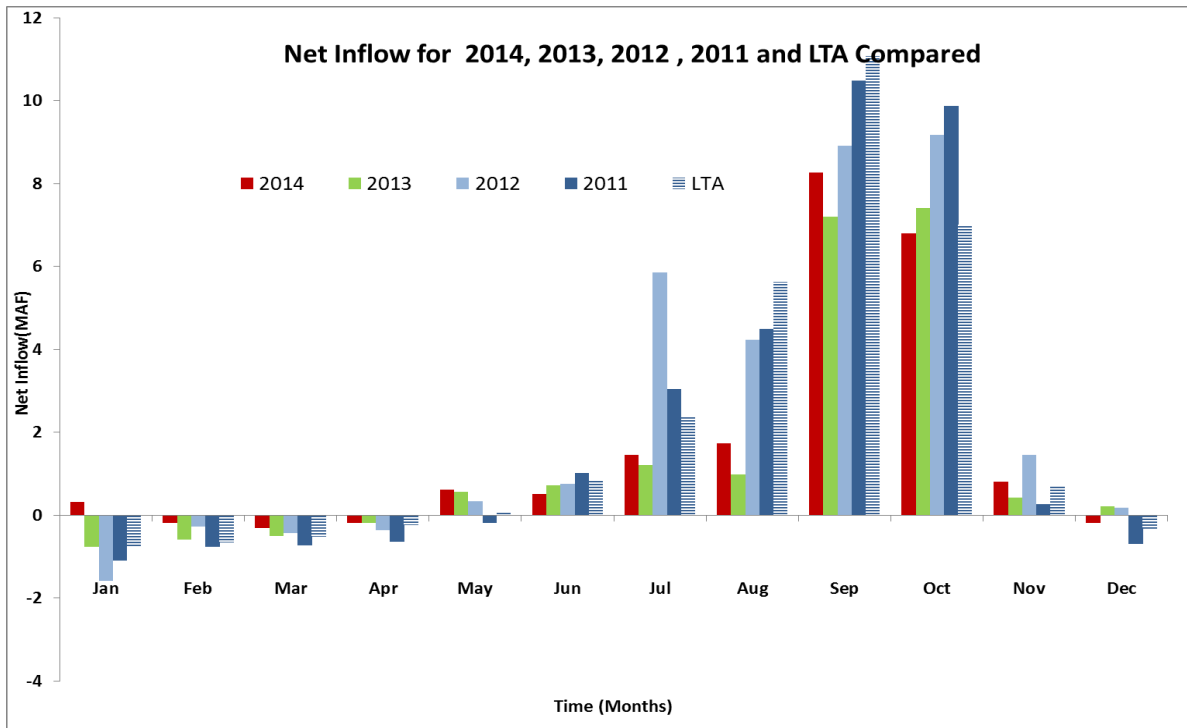
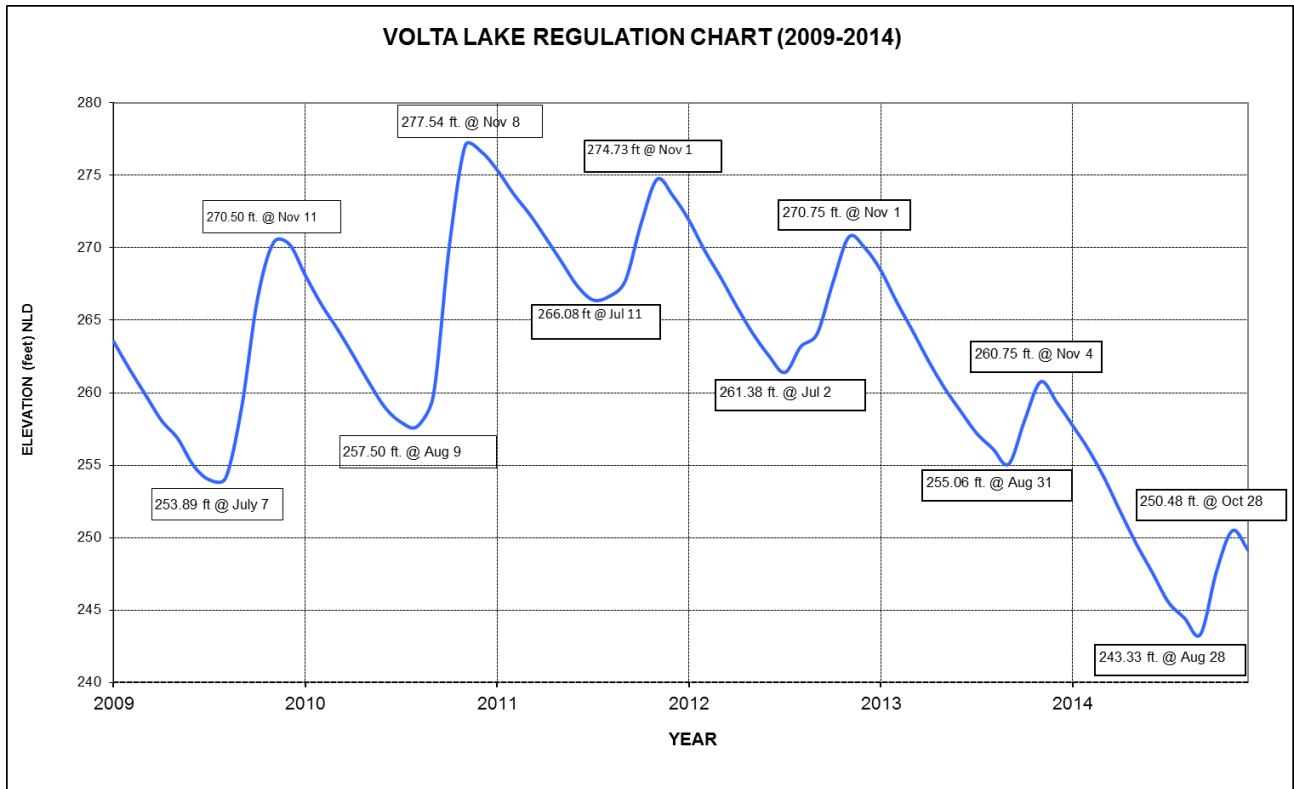


Figure 2: Monthly Net Inflow Comparison 2014, 2013, 2012, 2011 and LTA

The Volta Lake is regulated between 78.56 m (257.74 ft.) and 74.17 m (14.41ft)



## Water Balance for 2014

The water balance for the Volta Lake for 2014 is as follows:

### Storage at January 1, 2014

Elevation 78.56 m NLD (257.74ft.) 106,129 MCM (86.04 MAF)

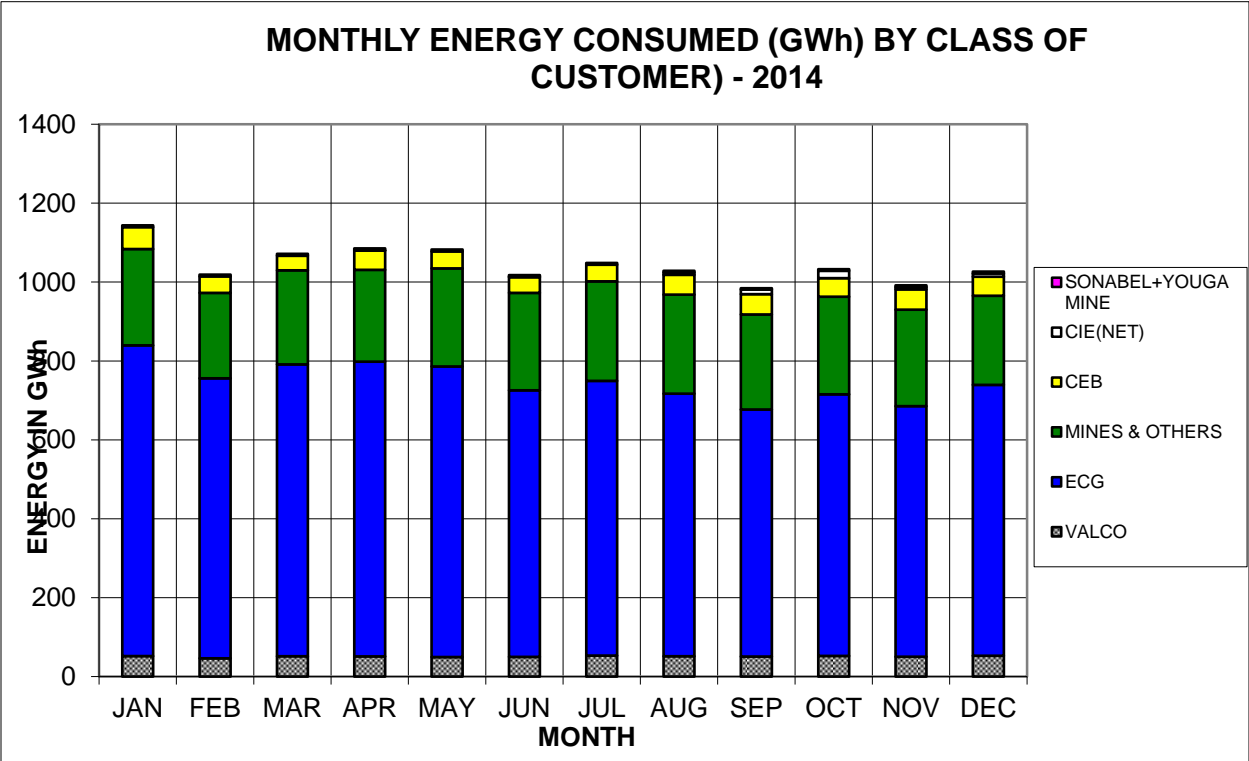
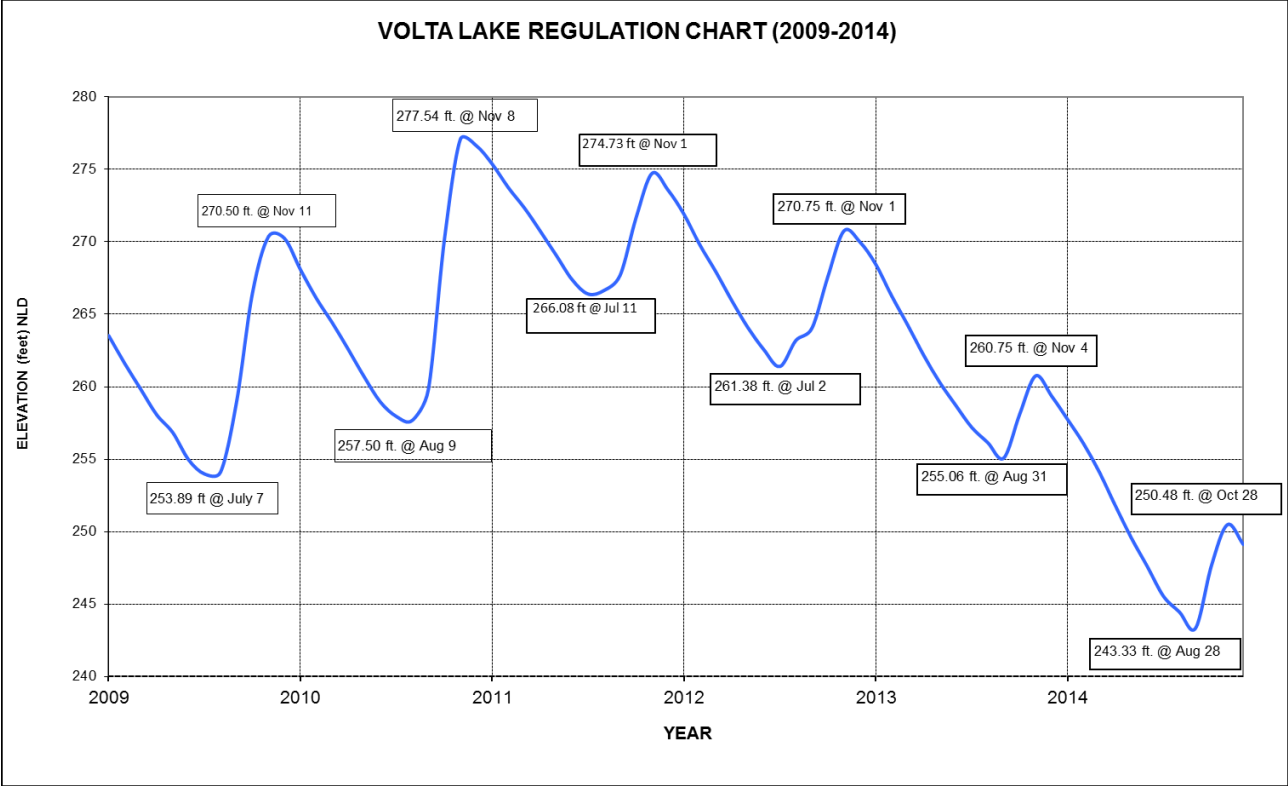
### Storage at December 31, 2014

Elevation 75.34 m NLD (247.19 ft.) 86,689 MCM (70.28 MAF)

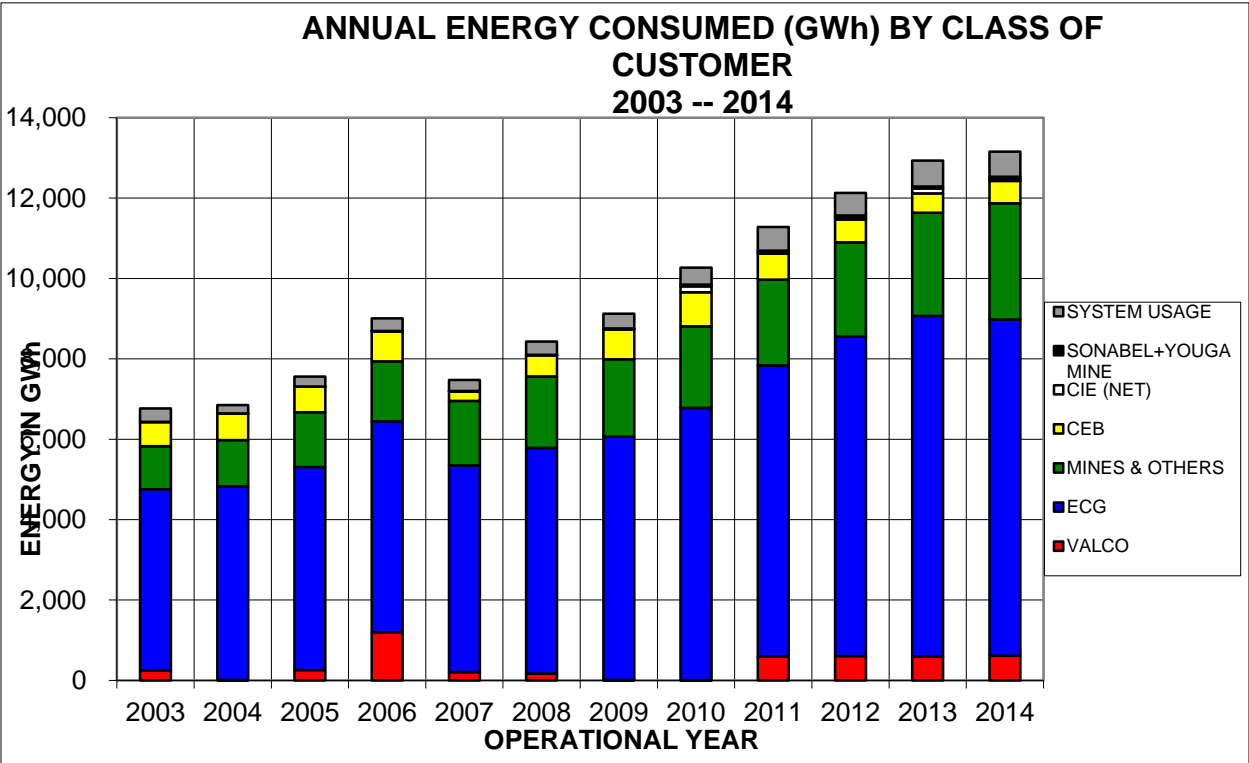
Change in Storage 19,440 MCM (15.76 MAF)

Annual Net Inflow 24,213 MCM (19.63 MAF)

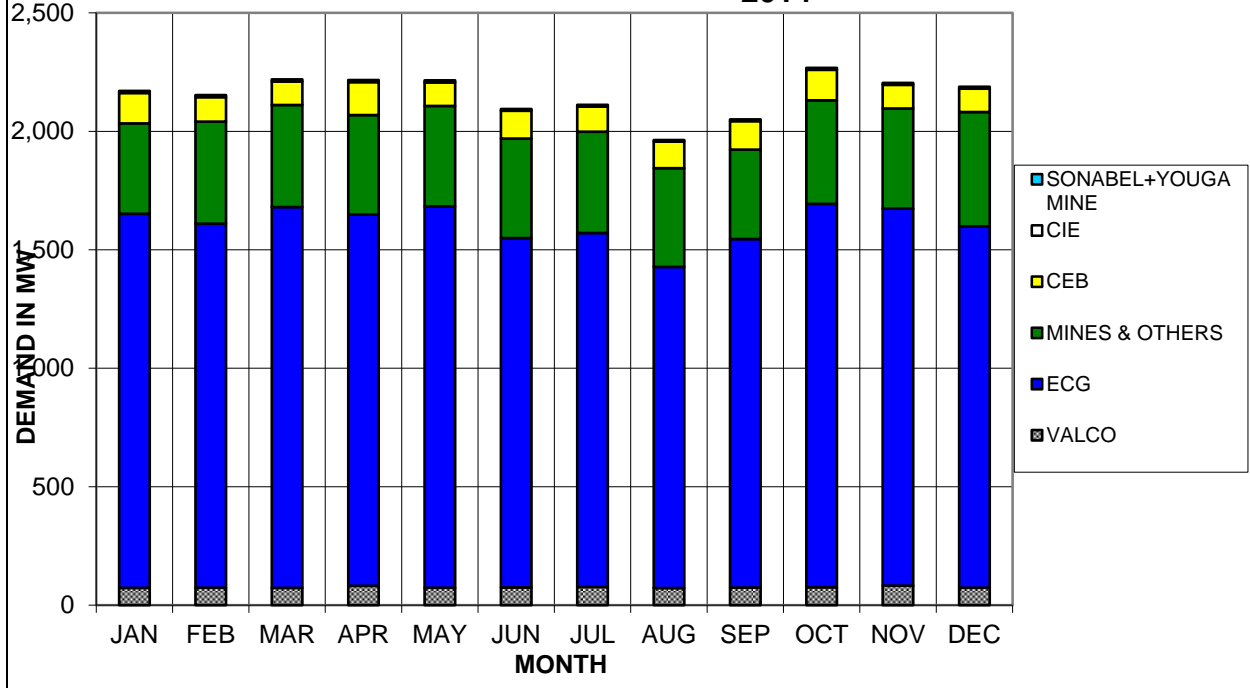
Plant Discharges for Power Generation 43,776 MCM (35.49 MAF)  
at the Akosombo Generation Station



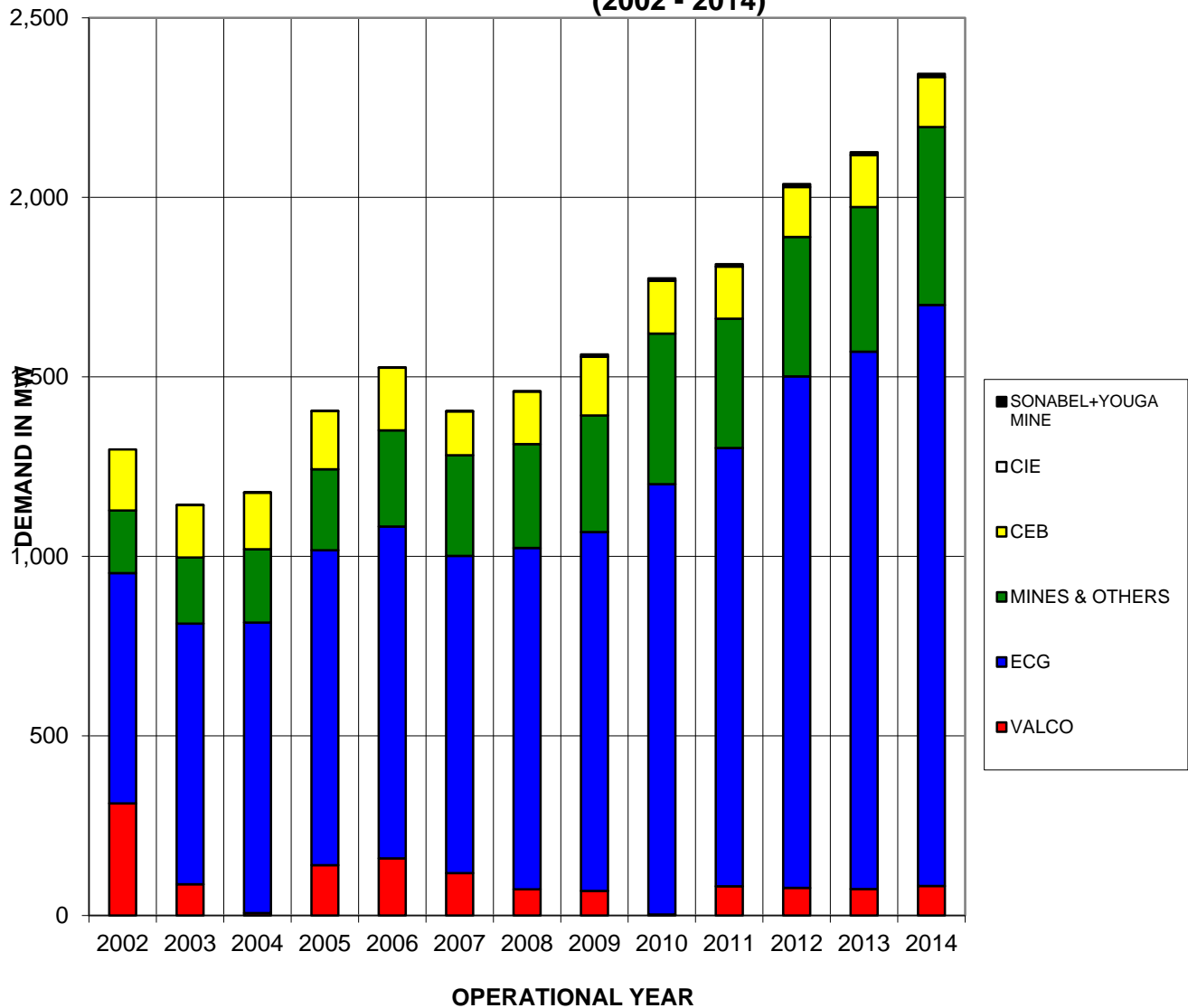




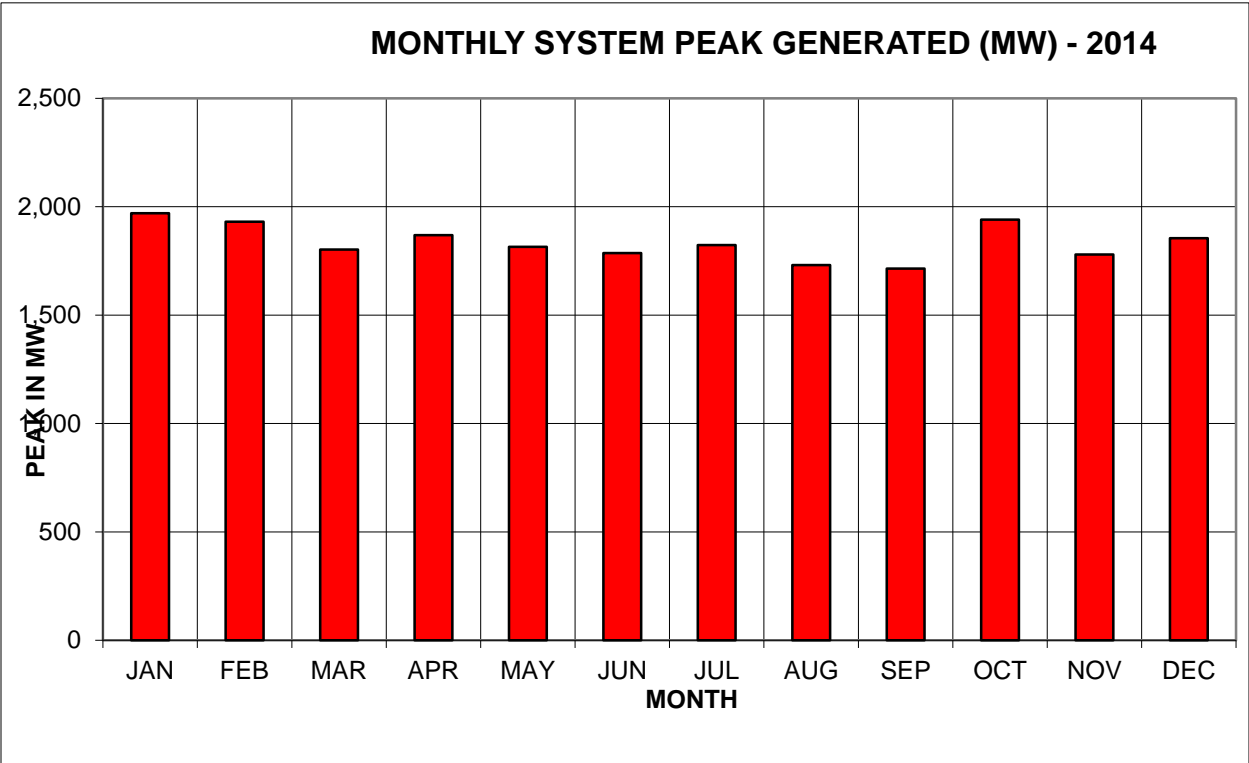
**MONTHLY MAXIMUM DEMAND (MW) BY CLASS OF CUSTOMER  
-- 2014**



### ANNUAL MAXIMUM DEMAND (MW) BY CLASS OF CUSTOMER (2002 - 2014)



1. The reduction in 1999 demand was due to domestic load curtailment. Also there was load curtailment in 2006 and 2007
2. The maximum demand for 2002 is higher than that of 2003 because valco's load was curtailed.
3. Supply to SONEBEL (border towns Po and Leo) commenced in 2003 but is insignificant and therefore not visible on the chart. Supply to Sonabel from 2009 includes Youga Mine



<b>Electricity Production and Transmission.</b>				
<b>A table of electricity produced and transmitted for 2013 and 2014 is as follows:</b>				
		<b>2013</b>	<b>2014</b>	<b>Change</b>
<b>A</b>	Total Energy Generation at Akosombo GS	6,726.692 GWh	6,508.606 GWh	-3.2%
<b>B</b>	Total Energy Generation at Kpong GS	1,144.452 GWh	1,147.645 GWh	0.3%
<b>Bi</b>	Bui Power Station	361.630 GWh	730.367 GWh	
<b>C</b>	Total Energy Generation at Takoradi 1 Thermal GS	1,782.973 GWh	890.195 GWh	-50.1%
<b>Ci</b>	Total Energy Generation at Takoradi 3 Thermal GS	102.428 GWh	87.284 GWh	
<b>D</b>	Total Energy Generation at Takoradi (2) Thermal GS (TICO)	1,031.960 GWh	711.890 GWh	-31.0%
<b>E</b>	Total Energy Generation at Mines Reserve Power Station	.000 GWh	194.887 GWh	3897685432403850%
<b>F</b>	Total Energy Generation at Tema Thermal 1 Power Station	475.020 GWh	697.110 GWh	46.8%
<b>G</b>	Total Energy Generation at Tema Thermal 2 Power Station	94.295 GWh	222.952 GWh	136.4%
<b>H</b>	Total Energy Generation at CENIT Power Station an IPP	454.345 GWh	512.839 GWh	12.9%
<b>I</b>	Total Energy Generation at Sunon-Asogli Power Station an IPP	693.505 GWh	1,254.604 GWh	80.9%
<b>J</b>	Total Energy Generated at all Generating stations (A+B+Bi+C+Ci+D+E+F+G+H+I)	12,867.300 GWh	12,958.379 GWh	<b>0.7%</b>
<b>K</b>	Energy imported from CIE for VRA use	15.119 GWh	33.195 GWh	119.6%
<b>Ki</b>	Inadvertent Import from CIE	11.828 GWh	17.522 GWh	48.1%
<b>L</b>	Energy imported from CEB for VRA use	-	-	-
<b>M</b>	Total Energy Imported From CEB and CIE (K+L)	26.947 GWh	50.717 GWh	88.2%
<b>N</b>	Total Energy Generated Plus Imports (J+M)	12,894.247 GWh	13,009.096 GWh	0.9%
<b>O</b>	Total Energy Used at all Generating Stations	61.182 GWh	52.342 GWh	-14.4%
<b>P</b>	Energy Input to Transmission Systems (N-O)	12,833.065 GWh	12,956.754 GWh	1.0%
<b>Q</b>	Energy used in the Substations	5.495 GWh	5.755 GWh	4.7%
<b>R</b>	Energy Exported & Sold to CEB From VRA	481.952 GWh	557.147 GWh	15.6%
<b>S</b>	*** Energy Exported & Sold to SONABEL From VRA	48.361 GWh	53.194 GWh	10.0%
<b>T</b>	Energy wheeled to CEB From CIE	93.958 GWh	114.528 GWh	21.9%
<b>U</b>	Energy Exported to CIE From VRA	122.313 GWh	19.639 GWh	-83.9%
<b>V</b>	Total Energy Exported and wheeled (R+S+T+U)	746.584 GWh	744.508 GWh	-0.3%
<b>W</b>	Total Consumption within Ghana (incl. VALCO)	11,688.621 GWh	11,870.456 GWh	1.6%
<b>X</b>	Total External Sales (CEB,CIE & SONABEL) (R+S+U)	652.625 GWh	629.980 GWh	-3.5%
<b>Y</b>	Total Energy Billed (W+X+E)	12,341.246 GWh	12,305.549 GWh	-0.3%
<b>Z</b>	Transmission Losses (P+T-Q-V-W+E)	486.324 GWh	450.564 GWh	-7.4%
<b>AA</b>	Percentage of Transmisson Losses $Z/(P-Q)*100$	3.8%	3.5%	-8.2%
<b>AB</b>	Maximum Peak Generated (MW)	1,942.9 MW	1,970.0 MW	1.4%
<b>AC</b>	Average Demand (N/8.76) (MW)	1,471.9 MW	1,485.1 MW	0.9%
<b>AD</b>	Load Factor (AC/AB)	75.8%	75.4%	-0.5%
<b>AE</b>	Average plant discharge at Akosombo GS	1,370.58 cu.m/sec (48,430.56 cfs)	1,389.67 cu.m/sec (49,104.99 cfs)	1.4%
<b>Note:</b>				
1. ** Generation from the Emergency Diesel Station is injected directly into the ECG network.				
2.*** Energy exported to Sonabel includes supply to Youga Mine which started from October 2009				

## **(b) Management Information Systems**

As part of the Build the Business (BtB) programme, we are implementing the Oracle Hyperion Planning application. Oracle Hyperion Planning is a centralized, Web-based planning, budgeting, and forecasting solution which enables collaborative, integrated event-based planning processes throughout the Authority. Planning, Budgeting, and Forecasting which was previously done on using MS Excel Spreadsheet is designed to be hosted on the Oracle Hyperion platform. This is expected to facilitate the production of insight and high quality budgets, shorten planning and budgeting cycle time, and improve information management.

We installed Wide Area Network (WAN) backup links, and a new fibre cable aimed at improving reliability. We redesigned the Northern Electricity network connectivity and setup, moving the hub of the network from Kumasi to Tamale office. This improved the management and security of the networks. We increased the bandwidth sizes of several WAN links to improve accessibility. These included those of NEDCo, the Data Centre and Disaster Recovery Site, the Head Office, Heritage and Ridge Tower links. We also set up Local Area Network installations in Akosombo, Akuse and Ada.

We extended the VOIP system to the Ridge and Heritage Towers, Navrongo Solar Plant, Tema Thermal Station 2 and the Kpong Generating Station Retrofit Project offices to provide PLC services.

We increased internet bandwidth from 45Mbps to 90Mbps to improve internet accessibility at no additional cost to the Authority.

## **Real Estate**

We continued to manage the Akosombo township as a Local Authority in accordance with EI 42 of May 1982. The AMC met every quarter to consider issues affecting the township.

Revenue collected through Local Authority activities for the year 2014 was GH¢143,844.13 while Non-Local Authority activities yielded GH¢3,443,733.24 bringing the total revenue generated during the period to GH¢3,587,577.37.

The Local Authority component will be shared equally by the Authority and the Asuogyman District Assembly in accordance with the existing agreement.

An amount of GH¢524, 754.60 was collected as rent income from non-staff which exceeded a target of GH¢141,000.00

In Akuse township, a total of 2,588 guests were catered for at the Authority's guest houses. Operations from the Club Complex yielded a revenue of GH¢73, 379.50 while

the Mess Hall and Guest houses realized a revenue of GH¢864,356.63 and GH¢448,272.00 respectively. These include cash and non-cash revenue.

In Aboadze township, operations from the guest houses yielded an amount of GH¢183,274.00 while the restaurant operation realized a gross profit GH¢252,269.04 with a total 2,967 guests. Service charges and rentals realized a revenue of GH¢34,763.00.

At Accra/Tema Estates, four guests were catered for at the Authority's guesthouses at a cost of GH¢10,950.00. The Head Office canteen realized a revenue of GH¢278,702.00.

In Akosombo, a total of 194 guests were catered for at the Authority's guest houses while the trading outlets at the Maritime Club, Swimming Pool, Community Centre and the Dobson Club realized a total amount of GH¢437,590.50 and Ohemaa LXI generated GH¢40,750.00. The Mess hall realized a revenue of GH¢443,239.70.

### ***Staff Matters***

The total number of employees in the Authority at the end of 2014 was 2,999, an increase of over the 2013 figure of . The number of contract staff was 166. A total of 105 separated from the service of the Authority. Thirty-two internal appointments and 51 external appointments were made during the year.

The industrial atmosphere was generally calm except a moment of tension generated by management's decision to restructure three non-power operations of the VRA, namely VRA Schools, Real Estates and Security and VRA Hospitals Departments. The purpose of restructuring the VRA is to allow it to concentrate on the core requisite of its business mission of electricity generation so as increase efficiency and effectiveness to enable it adapt itself to the challenges of change in the energy business environment and thus strengthen its ability to compete in the growing energy market.

The restructuring involves the separation of identified categories of staff of the restructured departments. Management's concern is to carry out the exercise in a very humane manner and endeavour as much as possible to prevent any undue stress and hardship on the affected staff. Consequently, a Restructuring Sensitization Team in collaboration with the Change Management Unit organized various meetings designed to addressing staff concerns.

A review of staff remuneration resulted in implementation of new levels.

The Authority continued to provide opportunities and support for the development of knowledge and skills by staff, consistent with the needs of the business. Training and development programmes, covering all categories of employees, were thus provided in-house, and complemented with external, local and overseas courses. This is in line

with its policy of ensuring that the VRA has the requisite human resource capability at all times for efficient performance to meet current business demands and also future business direction.

Two long service award ceremonies were organized early in the year and at the end of the year to reward staff loyalty and service. To build rapport among staff of the power utility companies the VRA sponsored games at the Akuse Club House. Electricity Company of Ghana, Energy Commission, PURC, NEDCo, BUI Power Authority, Sunon Asogli participated in the games. The theme for the event was “Uniting to Power the Economy.”

## **SUBSIDIARIES**

We are supporting various entities in our investment portfolio guided by the National Public Private Partnership (PPP) Policy where applicable to seek various investments requiring private investor participation. The purpose of re-organization will allow the VRA to concentrate on the core requisite of power generation so as to increase efficiency and effectiveness to enable it adapt itself to the challenges of change in the new energy business environment and thus strengthen its ability to compete in the growing energy environment.

In this regard, we have taken steps on a leasehold agreement for Kpong Farms Ltd. This arrangement is expected to allow the Authority to retain control and ownership of the land and farm facilities while protecting the VRA from business and financial risks associated with agricultural production.

We are seeking financing arrangement for expansion of Akosombo Hotels Ltd. The hotel would require over \$20,000,000 to complete construction of 65 rooms and construction of a new cruise boat, *Dodi Princess*.

The Volta Lake Transport Company (VLTC) is reevaluating strategies of attracting funding to turn its operations around while pursuing its long-term development plans. VLTC’s highest priority is to rehabilitate its existing barges and to secure funding to build and operate new barges.

We also took significant steps at reorganizing the VRA’s existing non-power operations, namely Real Estate; VRA Schools; and Hospitals, into subsidiary companies that would allow them to exploit their core competence, in such a way that will allow them to achieve both market objectives and objectives of organizational effectiveness. These companies have all been registered, and are being prepared to improve their



competitiveness to enable them, ultimately to compete in the environment in which they operate as full-fledged, stand-alone, self-financing subsidiary companies of the VRA.

A five-year business plan has been developed for all the subsidiary companies to guide operationalization of the companies.

## **CORPORATE SOCIAL RESPONSIBILITY**

We continued with our social responsibility (CSR) activities, particularly in communities where we operate. Our CSR initiatives are aimed at contributing to the wellbeing of communities; but also towards skills development, education and enterprise development and thereby promoting jobs, alleviating poverty and improving employability. We continue to build local capability to deliver local solutions.

Specifically, we undertook the following activities:

- Prepared corporate information on the VRA 2.5 MW Solar Power Plant as a signatory to the UN Global Compact.
- Prepared a Framework Document for the development of Aqua culture on the Volta Lake.
- Awarded scholarships to 100 youth in VRA communities tenable at second and tertiary schools under the VRA Community Development Programme.
- Organized a one-day *Career Guidance and Teaching Programme* at Manya Krobo Senior high School at Nuaso, Krobo Odumase.