OSONOR PLANT

126MW POWER PROJECT

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This Project Information Memorandum ("**PIM**") contains information regarding the development of the 126MW Tema Osonor Plant Limited power project ("the Transaction").

_____, is acting as an adviser to Osonor Plant Ltd ("**OP**") for the purposes of the Transaction. Consequently any Person considering participating in the Transaction is recommended to seek and to rely on independent advice other than that of the Adviser.

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CONFIDENTIALITY STATEMENT

This memorandum contains confidential information on the OP power project and the proposed project financing arrangements.

The purpose of the Information Memorandum is to provide necessary detailed information on the Project to selected prospective potential participants, which is deemed critical in the process of making decisions with regards to financial commitments and otherwise in the financing arrangements.

This Information Memorandum has been prepared for the purpose of providing information regarding OP in connection with the equity being raised by FS towards the completion of the OP power plant project in Tema, Ghana.

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LIST OF ACRONYMS AND ABBREVIATIONS

ACRONYMS

AfDB	African Development Bank
CCGT	Combined Cycle Gas Turbine/Steam Plant
EAIF	Emerging Africa Infrastructure Fund
EPA	Environmental Protection Agency (Ghana)
EPC	Engineer, Procure and Construct contract
EIS	Environmental Impact Statement
EU ETS	European Union (Greenhouse Gas) Emission Trading Scheme
EU LCPD	European Union Large Combustion Plant Directive
FMO	Nederlandse Financierings Maatschappy voor Ontwikkelingslanden
GE	General Electric
GECAD	
IEC	International Electrotechnical Commission
IPP	Independent Power Producer project
ISO	International Standards Organization
NFPA	National Fire Protection Association
ORAP	Operational Reliability Analysis Program
OP	Tema Osonor Plant Ltd
TOPP	Tema Osonor Power Plant
VRA	Volta River Authority
WAGP(Co)	West Africa Gas Pipeline (Company)
WHO	World Health Organization

ABBREVIATIONS

^{o}C	degrees Celsius
bara	bar (absolute)
barg	bar (gauge)
BoP	balance of plant
capex	capital expenditure
C&I	control and instrumentation
CI	combustion inspection
CCR	central control room
CO	carbon monoxide
CO_2	carbon dioxide
COD	Commercial Operation Date
dB(A)	Decibels
DC	direct current
DCS	distributed control system
DFO	distillate fuel oil
EOH	equivalent operating hours
EPC	Engineer, Procure and Construct (Contract)
FM	Financial Model

g	gramme
GJ	Gigajoules
GRF	gas receiving facility
GT	gas turbine
GWh	gigawatt hours
h	hours
HGPI	hot gas path inspection
HHV	higher heating value
HMI	human machine interface
HP	high pressure
I/O	input/output
IPB	isolated phase bus-bar
kJ	kilojoule
km	kilometre
kV	kilovolt
kWh	kilowatt hour
LDs	liquidated damages
LCO	light crude oil
LHV	lower heating value
LP	low pressure
LTSA	Long-term Services Agreement
m^3	cubic metre
mbar	millibar
mg	milligrams
MW	Megawatt
MWh	Megawatt hour
NOx	nitrogen oxides
O_2	oxygen
O&M	operations and maintenance
ODAF	oil directed, air forced
OEM	original equipment manufacturer
OFAF	oil forced, air forced
OH	operating hour
opex	operating expenditure
pa	per annum
PAH	poly aromatic hydrocarbons
SCR	selective catalytic reduction
SO_2	sulphur dioxide
ST	steam turbine
TA	Tolling Agreement
TBC	thermal barrier coating
TEWAC	totally enclosed, water to air cooled
TIT	turbine inlet temperature
TSC	turbine stress controller
US$, $	United States dollar

Table of Contents

1. EXECUTIVE SUMMARY

This Project Information Memorandum ("PIM") is an invitation to selected investors to subscribe for an interest in the equity required for the proposed 126MW Independent Power Plant being developed in Tema, Ghana. Interested parties are invited to subscribe for any amount of equity. The Promoters would specifically welcome an interest by an industry operator to take a stake in the Project. An equity contribution of **US$12.74 million** is being sought which represents **49% of the total equity requirement (being US$ 26.0m).**

1.1 Project Introduction

GECAD, comprising GECAD Inc, which is incorporated in Delaware, USA, and its affiliate GECAD (Ghana) is the project developer of a 126MW independent thermal power plant in Tema ("the Project"). A Special Purpose Vehicle has been set up for this purpose, being the Osonor Plant (OP).

The key elements of the Project are as follows:

1. The Ministry of Energy will be the off-taker for the power generated from the plant as a result of the current reforms in the energy sector. It is expected that the Ministry will transfer the rights to the power from the project to one of the Government of Ghana entities in the energy sector such as the Volta River Authority ("VRA"), the state owned electricity utility in charge of power generation in Ghana.

2. Osonor Plant has signed a 25 year Power Purchase Agreement (PPA) with the Ministry of Energy who is 'warehousing' the PPA until such time as it transfers the rights to the power to one of the Government of Ghana entities. As a consequence the VRA is also a party to the PPA negotiations, on behalf of the Ministry.

3. The power sales tariffs under the PPA are based on the following:

    - Capacity payments;
    - Operation and maintenance costs; and
    - Tolling arrangement whereby VRA/Government is responsible for fuel purchases and supplies.

4. The primary fuel will be natural gas and the secondary fuels will be light crude oil ("LCO") and distillate fuel oil ("DFO"). VRA will negotiate a Gas Sales and

Purchase Agreement with WAGPCO for the Project. The Base Case financial model is run using LCO so the conversion to natural gas will remain an upside for the investor.

5. VRA is to provide land at the Tema Thermal 1 Power Plant ("TT1PP") complex site for the installation of the Plant. There will be a Common Facilities and Services Agreement (CFSA) signed with VRA.

The plan is to convert, in the future, the existing TT1PP 126 MW Gas Turbine ("GT") plant and the OP proposed GT plant into a combined cycle gas turbine/steam (CCGT) plant by the addition of a heat recovery steam generator plant and steam turbine generator plant, thus raising the site output from a notional 220 MW to 330 MW.

1.2 Project Commercial Structure

The Project will follow the principles of project financing whereby in order to optimise the risk return profile of the Project, there needs to be an allocation of risks to parties that are best suited to bear them. The key success factor in developing projects of this nature is to identify and work with parties that are experienced in dealing with the complexities of these projects. The Project is being developed on a "Build, Own, Operate" ("BOO") basis.

The commercial arrangements of the Project are summarised as follows (a detailed diagram is shown in Section 4.1):

- OP, currently comprising of GECAD as the sole shareholder, has entered into a long term PPA with the Ministry of Energy;
- West African Gas Pipeline Company will provide OP with natural gas, the major fuel source, in the near future (expected in the third quarter of 2009). The bankers' case financial model however is based on LCO as the fuel source which is delivered to the site by pipeline from a dedicated LCO tank in the nearby Tema Oil Refinery;
- OP and GE signed a Gas Turbine Generator supply contract in June 2007 (expected delivery date is October 2008);
- TOPL will enter into loan agreements with the lenders;
- Currently GECAD is the sole shareholder of OP. GECAD is to remain the majority shareholder in OP but equity participation is sought as part of this PIM;
- The EPC contractor is GECAD with Sea Gull and Mott MacDonald as sub-contractors to GECAD;
- A comprehensive process has been embarked upon to determine an O&M contract;

- A Contractual Services Agreement ("CSA") is expected to be concluded with GE or another suitable party for the turbine; and

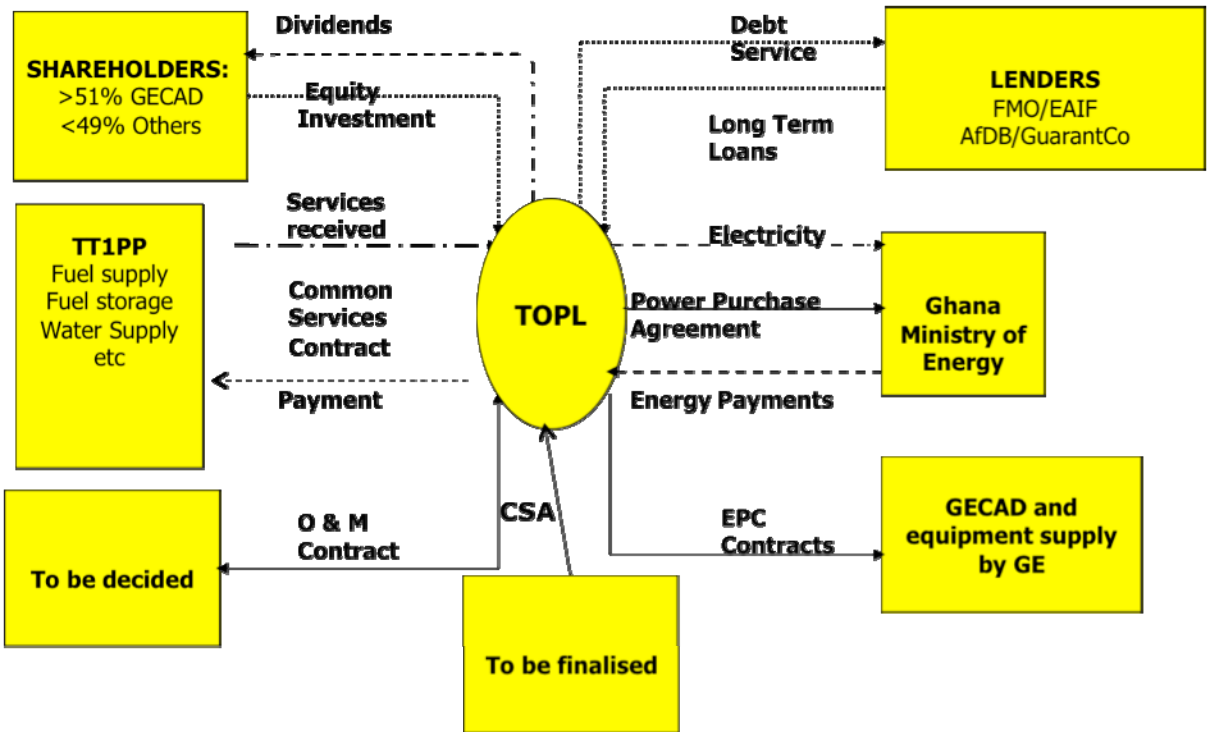
- TOPL and the VRA are to enter into a Common Facilities and Services Agreement, which would include the supply of fuel, storage facilities etc.

The team of advisers to TOPL are as follows:

- Legal:
    - Norton Rose (local adviser Oxford & Beaumont)

- Financial and Transaction Advisory:
    - FS (Pty) Ltd

- Technical:
    - Mott MacDonald



The OP Project involves a number of contractual relationships, most of which have been negotiated, and contracts executed, with the balance in the process of being finalized.

The commercial arrangements of the Project are based on a typical project finance structure. The following agreements and permits inter alia need to be completed in order to reach Financial Closure:

- Power Purchase Agreement;
- Generating License;
- Engineering, Procurement and Construction Contract;
- Supply Contract with GE;
- Operations and Maintenance Agreement;
- Common Facilities and Services Agreement, including Fuel Supply;
- Contractual Services Agreement ("CSA") with GE;
- Loan Agreement;
- Shareholders Agreement;
- Standby Letter of Credit from the Government of the Republic of Ghana;
- Insurance Arrangements;
- Environmental Impact Assessment Permit; and
- Environmental Usage Permit.

1.3 Project Cost

The total investment cost of the 126 MW Power Plant Project based on current prices is estimated at **US$ 128.9 million**.

The project is proposed to be financed **80% (US$ 102.9m)** from debt and the remaining **20% (US$ 26.0m)** as equity.

1.4 Key Parties

GECAD, as the Project Developer is seeking to sponsor with interested equity partners the construction and commissioning of the Tema Osonor Power Plant Project. Tema Osonor Plant Ltd is currently the registered company under the laws of the Republic of Ghana that will be used as the main investment vehicle to implement the Project.

The VRA owned TT1PP is to share resources with TOPL, including the supply of fuel, water, storage facilities etc (This is contained in the Common Facilities and Services Agreement, which needs to be finalized as there is currently only a Heads of Terms agreement signed).

The Ministry of Energy is the off-taker of the electricity produced. The Ministry has the right to pass on its rights and obligations under the PPA to the VRA or similar government entity (i.e. the Electricity Company of Ghana or the Ghana Grid Company).

1.5 Financial Analysis

a. Key Assumptions

The assumptions for plant operations and power output are specified below

Operational Data

Plant Capacity (Site)	113.7 MW
Plant Availability (average)	91%
Heat Rate (min)	12397 kJ/kWh
Plant Efficiency	29.1%

b. Revenue Components

OP revenue is determined by the tariff payment scheme agreed upon between OP and the Ministry of Energy, as the Off-taker under the Power Purchase Agreement ("PPA").

The PPA is essentially a tolling agreement, in which the Ministry of Energy is responsible for the supply of fuel and the cost thereof (supply and fuel costs). The Ministry of Energy has delegated the responsibility of the supply of fuel to the VRA, which own TT1PP.

The tariff payment scheme comprises the following:

- Capacity payments for the purchase of available capacity; and
- Electric power payments for the electric energy delivered to the Ministry of Energy.

Capacity payments to TOPL

The capacity payment comprises the capacity base charge ("CBC") less deductions for shortfalls in dependable capacity, misdeclarations and trips and includes an incentive fee for availability.

The CBC is made up of a capacity tariff ("CT"). The CT in turn comprises a capital recovery and tax component ("CRTC"), fixed operation and maintenance component ("FOMC") and a major maintenance component ("MMC").

Electric power payments to OP

Electric power payments are made up of a variable operation and maintenance charge ("VOMCh"), which is dependent on the electric energy delivered to the Ministry of Energy and is intended to reimburse OP for variable costs other than fuel

costs. In addition, a heat recovery correction charge ("HRCCh") is built into the electric power payment.

The table below presents the build up of costs justifying the economic rate being set for the Plant to cover Capacity and O&M Payments under the PPA.

PPA Tariff Derivation

Capacity Payment		
Capital Recovery and Tax Component	US$/kWh	0.02120
Fixed Operating and Maintenance Cost	US$/kWh	0.00793
Major Maintenance Component	US$/kWh	0.00400
Total Capacity Rate	US$/kWh	**0.03312**
Variable Operating and Maintenance	US$/kWh	0.00291
Total PPA Charge	US$/kWh	**0.03603**

c. Sources of Funds

GECAD will be a 51% shareholder in TOPL with the remaining 49% being sourced from the market through this equity PIM.

The total equity requirement is illustrated below. This represents 20% of the Total Project Cost.

	Share %	**US$m**
Equity	15%	19.9
Shareholder's Loans	5%	6.1
Total Equity	**20%**	**26.0**

FMO is the Lead Arranger for the long term debt providers. A draft indicative term sheet has been signed between the Lenders (being FMO, Emerging Africa Infrastructure Fund and African Development Bank) and OP. The amounts and terms are as follows:

	Share %	**US$m**	**Tenor incl. Construction**	**Debt Payback**	**Interest Rate**	**Grace Period**
FMO/EAIF	57%	72.9	15 years	14 years	9.7%	1 year
AfDB	23%	30.0	15 years	14 years	9.7%	1 year
Total Debt	**80%**	**90.2**				
TOTAL FUNDING REQD		**128.9**				

In the interest of the Lenders and the minority equity investors, OP has agreed to appoint an independent engineer to provide oversight to the EPC contract. This role has been tendered and proposals are expected shortly.

d. Uses of Funds

Development Costs	***16.0***
Financial Fee	0.3
Legal Fee	0.9
Technical Fee	0.9
Development Cost	5.8
Permitting and Environmental Assessment	0.5
External Infrastructure	0.3
Development Fee	6.5
Operational Insurance	0.1
Construction Insurance	0.6
Financing Costs	***5.0***
Financial Project Fee	0.5
Debt Raising Fee	-
Equity Raising Fee	0.2
Lender's Front end fee and Appraisal Fee	1.6
Lenders Advisors	1.2
Bridge Finance Costs	1.5
EPC Costs (breakdown in Section 3E)	***94.2***
DSRA Allocation	7.5
Working Capital Allocation	0.5
Debt Commitment Fees	0.4
Interest During Construction	5.4
TOTAL PROJECT COST	**128.9**

1.6 Financial Results

The Banker's base case financial model was conservatively run using LCO as the primary fuel. The conversion to gas however will represent an upside to the investor.

The resultant IRRs are shown in the table below:

Primary Fuel	**IRR**
Light Crude Oil	17.0%
Gas	19.2%

1.7 Project Timing

The Project Developer commenced design engineering in the first quarter of 2008 so that the Plant would be able to generate its first electrical power in the third quarter of 2009. GECAD has pre-arranged with its affiliate GE Energy and procured the required generation equipment to be manufactured by GE in Belfort, France and has also set in motion service contract arrangements.

Description	Target date
Selection of O&M Contractor	31 July 2008
Finalisation of O&M Contract	31 August 2008
Finalise CSA contract	31 July 2008
Draft Project Information Memorandum	23 June 2008
Equity Roadshow	03 July 2008
Selection of Equity Partners	11 July 2008
Finalisation of Equity Agreements	30 September 2008
Finalise Debt Term Sheet	30 June 2008
Finalisation of Loan Agreements	30 September 2008
Financial Closure	01 October 2008
Commercial Operational Date	31 August 2009

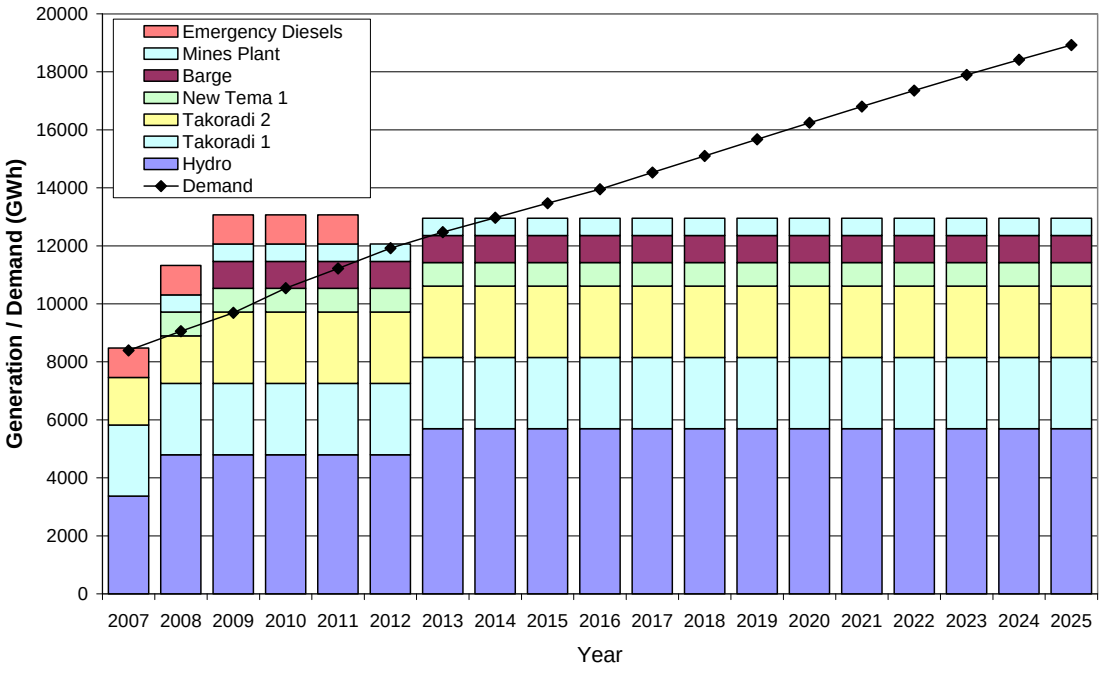
2. GHANA ELECTRICITY SECTOR ANALYSIS

A comprehensive analysis of the Ghanaian electricity sector is attached as Annexure 1. This section serves as a synopsis of the analysis and shows the demand for new generating capacity.

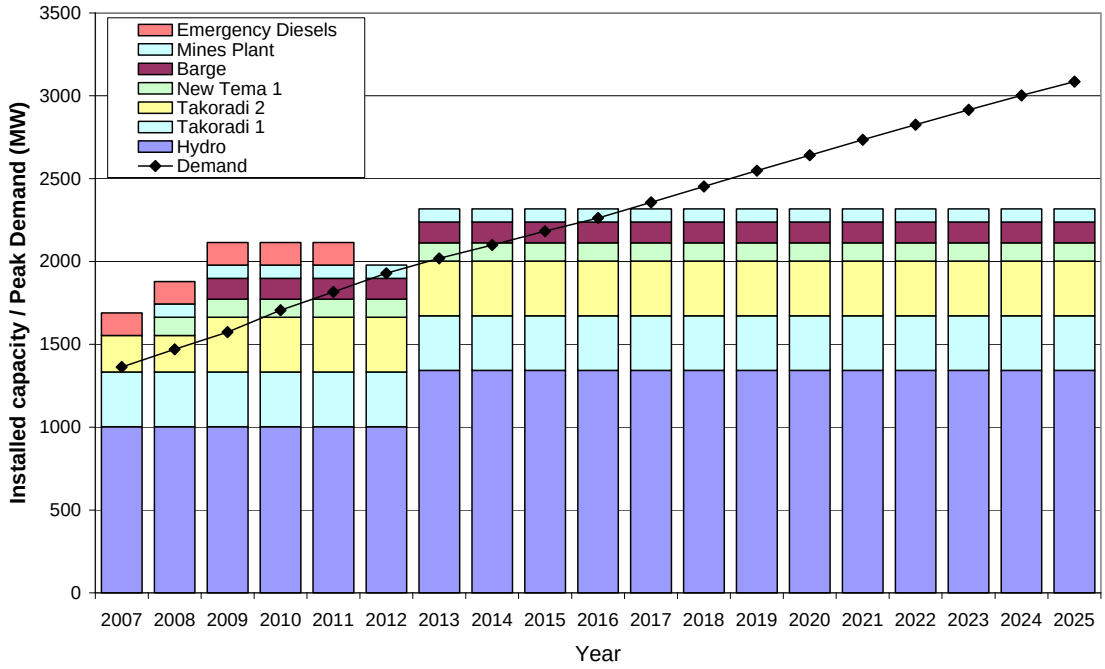
The key points of the analysis are as follows:

- The total capacity of existing generating plant, 1866 MW, compares with a maximum VRA system demand for 2006 of 1393 MW. This provides a theoretical reserve margin of 34 per cent, or 24 per cent excluding the emergency diesel plant. This reserve is misleading however, because the capacity at Akosombo and at Kpong is sensitive to the available head in the respective reservoirs.
- The charts below indicate that surplus energy and capacity is expected to be sustained up to 2011 but power and energy deficits appear in 2012 indicating the need to install additional generating capacity by then. By 2025, an energy deficit of about 6000 GWh is forecast. A similar picture is shown in the following chart where the capacity deficit would be about 900 MW were no additional power plants commissioned.

Energy balance for Ghana



Capacity balance for Ghana



It is obvious from the supply demand balance analysis indicated above that the Ghanaian electricity system will require significant investment in the future, particularly from 2011/2012 onwards. With the current energy crisis gripping the nation (due, in part, to an over-reliance on hydroelectric power and declining rainfalls) it is apparent that thermal plant has an important role to play in helping Ghana meet its energy needs in the future.

3. PROJECT DESCRIPTION

3.1 Location and Site

OP is situated at the Tema Thermal 1 Power Plant site in Tema, Ghana. The plant will be constructed adjacent to, and share certain facilities such as water, air, fuel supply, storage and treatment facilities (as per the Common Facilities and Services Agreement) with, the new TT1PP currently under construction by GECAD for the VRA.

3.2 Project Benefits

The Project will have a significant impact on the macro-economic base of Ghana. Some of its inherent benefits are as follows:

a. Job Creation- The Project will create approximately over 700 jobs during the construction phase and upon commercial operations will create up to about 100 jobs for both skilled and unskilled workers.

b. Skills Development - The operators of the Plant will provide training in modern power generation plant management practices to the Ghanaian counterpart staff at the Plant

c. Tax Revenue- The Project is projected to pay, on average, corporate taxes in excess of US$1million per annum to Government over the life of the project

d. Infrastructure Development - The Project will also contribute vital electrical power infrastructure and will significantly support the development of the Ghanaian economy and stimulate industrialisation in Ghana and the West African sub region.

e. West African Power Pool - The Project will add to the much needed generation capacity in the sub-region to support the viability of the West African Power Pool.

f. Economies of Scale (Maintenance)- The Project will additionally improve the stock of capital spares for the GE F9 installed base in Ghana and ensure an efficient maintenance regime by a parts exchange program between the F9 installed bases.

g. Returns to Project Developer/ Investors – The Project yields an overall equity return of 17.0% using LCO as the primary fuel.

3.3 Project Objectives

The Tema Osonor Power Plant Project seeks to bring on stream in the first instance within 14 months a 126MW Power Plant in Ghana. The Plant is to be fuelled by natural gas, light crude oil or distillate. Initially the Plant will be fuelled by light crude oil until such time as gas becomes available through the West African Gas Pipeline.

The main objectives of the Tema Osonor Power Plant Project are:

- To provide reliable power supplies which will assist in reducing the current generation deficit in the country and alleviate the current power crisis;
- To promote indigenous Ghanaian investor-led independent power production;
- To shift the burden of investment capital for power generation from central government to the private sector;
- To promote commercial development of thermal technology and cost reduction that enables Ghana to become a major net exporter of electricity across West Africa; and
- To build and sustain local capacity in the development and maintenance of power generation infrastructure.

Specifically, the operational viability of the Project will be demonstrated through operation of a thermal plant by an IPP with commercial power sales and delivery arrangements with the grid company in Ghana and other major bulk off-takers.

Technology development would also be supported through technical assistance and training for local Ghanaians as part of the overall strategy of institutionalising local content in Ghana's Energy Sector. This will help to increase the capacity and capability of local technical expertise and further sustain the development of thermal power in Ghana in the longer term.

The Project therefore addresses the following key government policy objectives:

- The Provision of additional baseload generation capacity at a competitive price;
- The development of the Ghanaian industrial sector, especially free zone areas in Tema and Accra;
- The provision of energy security;
- Job creation; and
- Promoting Private Sector as the engine for growth.

3.4 Project Developer

The Project Developer, GECAD is a private Engineering Services Company providing reliable and high quality engineering services to the energy industry in Ghana and West Africa.

In partnership with GE (General Electric USA), GECAD has delivered since 1998 major projects to the tune of over $500 million in the Energy Sector in Ghana and West Africa. Also, as part of the GE family, GECAD benefits from GE Energy's global network that offers state-of-the-art gas turbines and hydroelectric turbines as well as component parts, inspection and repair services. GECAD's relationship with GE Energy USA also guarantees reliability and access to technical support in the design, planning, procurement, construction and operation of energy sector projects.

GECAD has set up Osonor Plant (OP) as a private limited liability company registered under the laws of the Republic of Ghana in June 2006. The current shareholding in TOPL is 75% GECAD Inc and 25% GECAD Ghana.

This special purpose company will be the investment vehicle to develop the Tema Osonor Power Plant Project as an Independent Power Plant (IPP) in Ghana to be led by local & indigenous entrepreneurs with a wealth of experience in the power sector.

GECAD is currently the EPC Contractor for VRA's 126 MW Thermal Plant (TT1PP) under construction.

3.5 Project Costs

The total investment cost of the project based on current prices is estimated at **US$ 94.2million**. The details of the total investment cost of the Project are presented below:

CAPEX	US $ million
1. GT Turbine & Related Cost	39.08
2. Initial Spare Parts Requirement	1.00
3. Mobilisation	0.50
4. Plant Start Up/Commissioning	0.50
5.Training	1.00
6. Total EPC Cost	48.27
7. Initial Operating Tools & Equipment	0.50
8. Transmission & Interconnection	0.50
9. Monitoring Equipment	0.08
10. Contingencies (3%)	2.74
Total EPC & Other Capital Costs	94.2

3.6 Environmental Compliance

The Environmental Impact Assessment has been conducted. The EIA report is attached as Annexure C.

3.7 Permits and Approvals

Permits have been granted. The environmental permit was issued on 01 October 2007 and is valid for 18 months, during which time the operations need to commence.

3.8 Insurance

A comprehensive insurance proposal must be in place for the construction phase as well as the operation phase. OP shall obtain and maintain in force the following insurance during the period between the Effective Date of the PPA and the Commercial Operations Date:

- "All Risks Builders Insurance" to cover the engineering, procurement, construction and commissioning works from any damage arising out of any cause whatsoever;
- "Third Party Liability Insurance" to cover injury to or death of third parties or damage to the property of third parties caused by the Company, its contractors or subcontractors;
- "Workmen's Compensation Insurance" in accordance with the laws of Ghana to cover injury to or death of Company, contractors or subcontractors employees;
- "Marine/Transit Cargo Insurance" to cover loss or damage to materials and equipment to be incorporated into the Facilities during transportation to Ghana;
- "Auto mobile Insurance" to cover loss or damage to company, contractor and subcontractor, owned, leased or hired vehicles and construction equipment where not covered by the "All Risks Construction Insurance" and where required by the laws of Ghana;
- "Contract Works Insurance";
- "Consequential/Advance Loss of Revenue cover"; and
- "Riot & Strike Damage insurance".

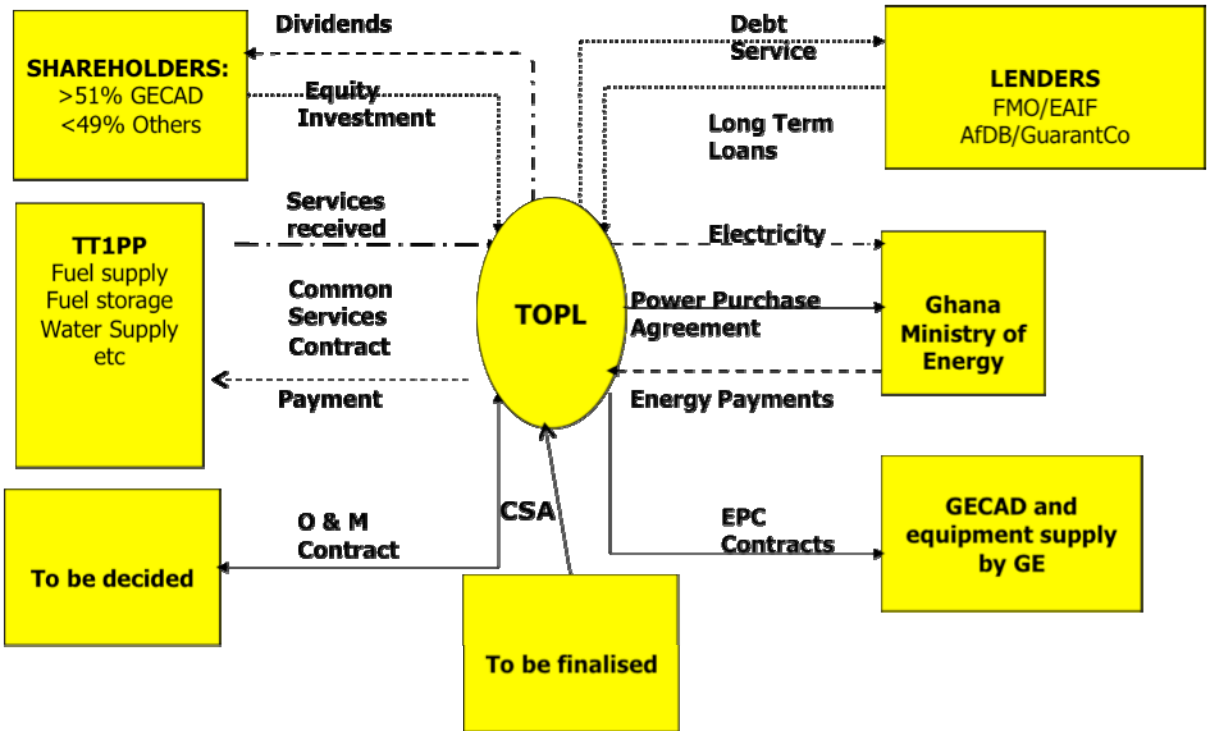
OP shall obtain and maintain in force the following insurance programs after the Commercial Operations Date:

- “General Third Party Liability Insurance” to cover injury to or death of third parties or damage to the property of third parties caused by the Company, its contractors or subcontractors;
- “Workmen’s Compensation Insurance” in accordance with the laws of Ghana to cover injury to or death of Company, contractors or subcontractors employees;
- “Machinery Insurance” specifically applicable to the Gas Turbine Generating Equipment contained as a part of the Facilities which insurance shall cover for damage to the equipment;
- “Business Interruption (Loss of Revenue) Insurance” to cover the costs incurred in loss of or damage to the equipment in the Facilities;
- “Automobile Insurance” to cover loss or damage to company, contractor and subcontractor, owned, leased or hired vehicles;
- “Fire & Allied Perils insurance”;
- “Loss of revenue insurance”;
- “Machinery Breakdown insurance”;
- “Machinery Breakdown loss of revenue insurance”; and
- “Riot & Strike Damage insurance” (fire and allied perils and fixed standing charges).

The loss of revenue cover is significant insofar as the operational risk is concerned.

4. PROJECT COMMERCIAL STRUCTURE

4.1 Structure of Project Agreements



As per the above diagram, the Project agreements are the following:

- Power Purchase Agreement;
- Engineering, Procurement and Construction Contract;
- Supply Contract with GE;
- Operations and Maintenance Agreement;
- Common Facilities and Services Agreement, including Fuel Supply ;
- Contractual Services Agreement (“CSA”)
- Loan Agreement;
- Shareholders Agreement; and
- Standby Letter of Credit from the Government of the Republic of Ghana.

4.2 Power Purchase Agreement

Negotiations for a PPA between Ghanaian Ministry of Energy and OP were concluded and signed in April 2008.

Key points on the PPA are as follows:

4.2.1 Design and Construction

- GECAD will design, construct, own, operate and maintain a 110MW power generation facility.
- GE will be responsible for the supply of one 126MW Frame 9E gas turbine, including electronic control equipment.
- GECAD will be responsible for the procurement and/or design, construction, erection and testing of all balance of plant equipment.

4.2.2 Effective Date

- The PPA in its present state becomes effective on the commercial operation date (COD). The COD is defined to be the day after the day upon which the commissioning engineer issues his final test certificate certifying the COD tests have been passed.

4.2.3 Bonds and Guarantees

GECAD are to provide performance security in the following percentages of the contract price:

- Bank Guarantee valid until a date 28 days from the issue of the certificate of completion (10%),
- Performance Bond valid until 1 year from the date of issue of the certificate of completion (15%), and
- Advanced Payment Guarantee (15%) provided against the down payment.

4.2.4 Payments

- Following the end of each billing period, OP shall prepare, and provide to the Offtaker, an invoice for any amounts due from the Offtaker to OP under the terms of the PPA, for such billing period.
- OP shall render to the Offtaker an itemized invoice for each billing period within seven days after the end of each billing period.
- Each Invoice shall detail the various elements of the tariff payments due in respect of each billing period and the corresponding computations, together with any other sums due from the Offtaker to OP or from OP to the Offtaker.
- All amounts due pursuant to each invoice shall be paid within forty-five days after the date of the invoice.
- Where in any billing period there is both an amount payable by the Offtaker to OP and by OP to the Offtaker, the two amounts shall be set-off

against each other and the balance only shall be paid by the Offtaker to OP or by OP to the Offtaker (as appropriate).

- The PPA establishes a tolling arrangement, whereby OP makes available the dependable capacity of the OP Plant for the conversion of gas or fuel oil delivered by the Offtaker to electric power in consideration for the payments set out below

    - Capacity charge of USc 3.313 kWh which comprises a Capital Recovery and Tax component, a Fixed O&M component and a Major Maintenance Component.

    - Energy charge of USc 0.291 per kWh which comprises a Variable O&M Component

    - The Electric Power Payments and Capacity Payments shall be denominated and payable in US Dollars.

    - There shall be a review of the components of the Tariff Payments on the fifth anniversary of the COD, and each subsequent fifth anniversary thereafter during the PPA term, to reflect changes in costs incurred by OP in performing its obligations under the PPA.

4.2.5 Term

- The term of the PPA agreement is 25 years.

4.2.6 Insurance

- During the construction of the plant, OP shall, at OP's expense, maintain or cause to be maintained property damage insurance covering the plant on an "all-risk" basis, for the full replacement value thereof.

- Commencing on the COD, OP shall, at OP's expense, maintain or cause to be maintained appropriate property and casualty loss insurance for the value of the plant, and other appropriate insurance for the plant in accordance with Prudent Industry Practice.

4.3 EPC Contract

EPC contract between OP and GECAD was signed on 21 Dec 07. The EPC contract is for a non fixed amount of USD 48.3 mil and excludes supply of the gas turbine generator plant, which will be supplied under a separate contract with GE. The EPC contract will need to be amended as a fixed price contract. The Lenders' technical advisor raised comments with respect to the EPC contract, which are currently being addressed.

The EPC list of deliverables includes, but is not limited to, the following:

- Control and instrumentation equipment
- Civil engineering work
- Power evacuation
- Construction of infrastructure for heavy transport and lifting
- Supply of switch yard equipment
- Supply of plant step up transformer
- Supply of emergency generator
- Spares and spare parts
- Design, supply, install and commission 161kV power line
- Mechanical and electrical installation of gas turbine generator and balance of plant equipment
- Testing, commissioning and handover

4.4 Operations and Maintenance Contract

GECAD, will through a reputable O&M Company, and possibly in association with GE Energy Services, operate and manage the Plant after commissioning under a medium term operation and maintenance contract and capital spares management program.

The O&M contract for the Project shall encompass comprehensive routine and preventive maintenance programs and detailed operations and safety procedures at site to meet the requirements of ISO9002. Additionally an operations manual will be kept to define standards of performance in order that the required operating procedures are undertaken to optimize power plant capacity, availability, efficiency, and emission levels.

The plant will be operated and maintained by suitably qualified companies to oversee the technical, financial and legal operations of the Project. TOPL will enter into negotiations with parties identified through a competitive bidding process for the O&M Contract.

The following potential O & M contractors have been identified and through a competitive bidding process been invited to partake in the Project:

- STEAG;
- GE Capital;
- Union Fenosa;
- ESBI; and
- Aldwych.

It is expected that a long-term (12-15 years) service agreement will be entered into with possibly GE to supply parts and execute major and regular service maintenance.

The agreement to Operate and Maintain the power generation facility is based on the requirements below:

- Gas turbine type Frame 9E, 9171E, standard combustion with water injection for NOx abatement.
- Control system mkVI.
- TEWAC manufactured by ALSTOM Belfort type T30-131.
- GCP provided by ELIN.
- Inlet filter house Reverse pulse self-cleaning, American Air Filters.
- Commercial Operation Date estimated on August 2009
- Unit running on Natural gas as primary fuel, diesel fuel oil and Light Crude oil as back up fuels if gas is not available, all fuels would be within GE fuel specifications.
- The average site conditions are the following
- Elevation 0 m
- Average air temperature of 29ºC
- Relative humidity 85%
- It is to be considered that a shared service agreement would be in place for the supply by Volta River Authority to TOPL of the following feed to the generation equipment:
- Fuel
- Water for injection for NOx abatement
- All associated running maintenance on the systems providing the above feeds are to the account of VRA

The terms of the proposal for the Operation and routine Maintenance would be as follow:

- Contract to be presented for a period of 15 years from COD Date
- Contract to be on a fee for services added to the operating budget to be agreed
- Mobilization fee and required mobilization period
- Operation cost based on manpower provided for a 24 hours operation of the plant
- Routine maintenance cost associated with the gas turbine/generator package and its auxiliaries, Main step up transformer, auxiliary unit transformer.
- Proposal to include guarantees for the plant availability.

Proposals were requested on the following options:

Option 1: Add on to the Operation and maintenance program the following items

- Water treatment plant
- Light Crude oil treatment facility
- Liquid Fuel Forwarding skids
- Gas handling skids
- Site fire fighting system

- Diesel Tanks
- Light Crude Oil Tanks
- Treated Fuel tanks
- Treated water tanks
- Raw water tanks
- Sub station
- Waste management

Option 2:

- Operation and Maintenance of a similar frame 9E with associated auxiliaries.

4.5 GE Contract for the Supply of PG9171(E) 50 Hz Combustion Gas Turbine Packaged Power Plant

Gas turbine supply agreement between OPL nd GECAD has been concluded for a price of USD 39 mil. GE will be responsible for supplying the following:

- 126 MW Frame 9E gas turbine
- Gas turbine generator control equipment
- Generator Frame Size T900B Alstom Generator 14.4kV, 50Hz
- Electrical and Mechanical auxiliaries
- GE will supply the above equipment to the Tema port with the necessary insurance in place
- GE will provide assistance to GECAD during the installation, commissioning and testing of the gas turbine

4.6 Common Facilities and Services Agreement ("CFSA")

OP will be located directly adjacent to the Tema Thermal 1 Power Plant (TT1PP), which is currently in its final stages of construction by GECAD, on behalf of VRA. The location will afford OP a multitude of benefits with respect to shared infrastructure (between OP and TT1PP) for key common services such as:

- Water supply
- Water treatment
- Light crude oil (LCO) storage
- Fuel treatment
- Centralized control room
- Security services
- Canteen services for staff

To this end, a Heads of Terms has been signed between TOPL and VRA, however the CFSA needs to be finalised.

Subject to the terms and conditions of the PPA in respect of fuel procurement, VRA will be responsible (as agent to the off-taker), under the CFSA, to procure and supply fuel to the fuel delivery point. It should be noted that OP will be constructed to operate on a tri-fuel system (LCO, natural gas and diesel). LCO will be utilised by OP to the extent that natural gas is unavailable from the West African Gas Pipeline. The following should be noted with respect to the supply of fuel:

- Supply of Gas
    - Prior to the COD upon OP's request, the Offtaker shall supply and deliver or procure the supply and delivery of gas for the testing and commissioning of the OP Plant. The cost of gas delivered by the Offtaker shall be borne by the Offtaker.
    - On and from the COD until the end of the PPA term, the Offtaker shall procure at its cost gas and shall supply and deliver to OP at the gas delivery point all gas necessary for the OP Plant to generate electrical energy to the extent that the OP Plant is dispatched in accordance with Dispatch Instructions issued from time to time as provided in the PPA.
    - The Offtaker shall ensure that gas delivered shall be made available to OP on a continuous and reliable basis, in sufficient quantities and in conformity with the gas supply specification at the gas delivery point. OP may at any time conduct a test to verify the quality of gas delivered hereunder.

- Supply of Light Crude Oil (LCO)
    - Prior to the COD upon OP's request, the Offtaker shall supply and deliver or procure the supply and delivery of LCO for the testing and commissioning of the OP Plant. The cost of LCO delivered by the Offtaker shall be borne by the Offtaker.
    - On and from the COD until the end of the PPA term, the Offtaker shall procure at its cost LCO and shall supply and deliver to OP at the LCO delivery point all LCO necessary for the OP Plant to generate electrical energy to the extent that the OP Plant is dispatched in accordance with dispatch instructions issued from time to time as provided hereunder, in the following circumstances:
        - gas is not available to OP at the gas delivery point;
        - the minimum pressure and/or quality of gas at the gas delivery point are not in conformity with the gas supply specification;
        - for regular and functional testing of the fuel oil system within the plant; or

- gas is being made available to OP at the gas delivery point but not taken by OP due to outages in the gas supply system within the plant.

4.7 Long Term Service Agreement

A Contractual Services Agreement will be entered into between OP and a reputable supplier to address the maintenance requirements for the main power plant equipment (the gas turbine, gas turbine auxiliaries, and the generator).

The CSA will stipulate requirements for the supply of new and repaired spare parts for the Main Power Generation equipment to maintain the highest possible availability of the Main Power Generation equipment. In addition, the provision of specific on site services will be required to perform outages (planned and un-planned) on the gas turbine and generator equipment. Under the CSA, the supplier will be required to provide guarantees for the output, heat rate and emission levels of the gas turbine and associated generator.

5. FINANCIAL ANALYSIS

5.1 Financial Model Analysis

The bankers' Base Case model is based on the indicative term sheets from the DFI lending group, made up of FMO, Emerging Africa Infrastructure Fund and the African Development Bank.

The Base Case has a Debt: Equity ratio of **80:20** with the Total Project Cost being **US$ 128.9m**. Hence there is **US$ 102.9m of debt** and **US$ 26.0m equity** respectively.

GECAD is a 51% shareholder in TOPL with expressions of interest sought on the remaining 49%. Summary pages of the Base Case model as well as various sensitivities run are attached as Annexure 4.

The Lender's requirement is that there needs to be a minimum Debt Service Cover Ratio (DSCR) of 1.4 during the life of the Project. In addition, a Debt Service Reserve Account needs to be built up which represents 6 months worth of debt service

As noted earlier, the sources and uses of funds can be illustrated as below:

Sources

Equity

	Share %	**US$m**
Equity	15%	19.9
Shareholder's Loans	5%	6.1
Total Equity	**20%**	**26.0**

Debt

	Share %	**US$m**	**Tenor incl. Construction**	**Debt Payback**	**Interest Rate**	**Grace Period**
FMO/EAIF	57%	72.9	15 years	14 years	9.7%	1 year
AfDB	23%	30.0	15 years	14 years	9.7%	1 year
Total Debt	**80%**	**90.2**				
TOTAL FUNDING REQD		**128.9**				

Uses of Funds

Development Costs	***16.0***
Financial Fee	0.3
Legal Fee	0.9
Technical Fee	0.9
Development Cost	5.8
Permitting and Environmental Assessment	0.5
External Infrastructure	0.3
Development Fee	6.5
Operational Insurance	0.1
Construction Insurance	0.6
Financing Costs	***5.0***
Financial Project Fee	0.5
Debt Raising Fee	-
Equity Raising Fee	0.2
Lender's Front end fee and Appraisal Fee	1.6
Lenders Advisors	1.2
Bridge Finance Costs	1.5
EPC Costs (breakdown in Section 3E)	***94.2***
DSRA Allocation	7.5
Working Capital Allocation	0.5
Debt Commitment Fees	0.4
Interest During Construction	5.4
TOTAL PROJECT COST	**128.9**

5.2 Financing Plan

A financing plan has been formulated but ultimately depends on the Debt: Equity ratio agreed for the Project. We have considered the following 3 scenarios, with the resultant Debt: Equity amounts.

	80: 20 D:E (Base)	**75:25 D: E**	**70:30 D:E**
Equity (US$)	25.9m	32.1m	38.2m
Debt (US$)	102.9m	96.5m	90.2m
Total Funding Reqd	**128.9m**	**128.6m**	**128.3m**

Financing of the debt and equity is handled separately below.

5.3 Loan Finance

The Base Case model requires long term debt financing of US$ 102.9m. This is expected to be provided by FMO, Emerging Africa Infrastructure Fund and the African Development Bank.

FMO and Emerging Africa Infrastructure Fund will provide a total of US$ 72.9m and the African Development Bank the remaining US$ 30m. The banks are scheduled to carry out their appraisal mission in July 2008 and are on track to meet the September 2008 deadline for Financial Closure.

The indicative terms of the loan financing are as follows:

Borrower	Tema Osonor Plant Limited
Mandated Lenders	FMO, Emerging Africa Infrastructure Fund, African Development Bank
Facility	Senior Term Loan Facility
Amount	FMO US$ 27.5m; EAIF US$ 27.5m, AfDB US$ 30m*
Interest Rate (floating)	4.25% plus 6 month US LIBOR
Interest Rate (fixed)	4.25% plus 5.40% (9.65%)
Termination Date	15 years from financial closure
Currency	US Dollars

*Please note that this was based on the early indicative total loan financing amount of US$ 85m.

5.4 Equity Finance

Depending on the final Project Debt: Equity ratio agreed, various scenarios currently exist for the equity requirement and provision hereof. From the above table, the equity amounts needed range from US$ 25.9m (20 percent equity) to US$ 38.2m (30 percent equity).

GECAD will take up 51% of the total equity requirement with the remaining 49% requested as part of this equity information memorandum.

The equity return applicable on this Project ranges from **17% to 19.4%** depending on the primary source of fuel i.e. LCO or gas.

The summary pages of the Bankers' base case financial model, using LCO and natural gas, is attached as Annexure 4.

6. RISK ANALYSIS

This section presents a risk analysis of the Project. The challenge to the Project promoters/developers is to ensure minimisation of risk, by putting in place credible, reliable and internationally acceptable risk mitigation measures.

6.1 Risk Analysis – Pre Completion

Risk	Description of Risk	Relevant Document	Mitigation
a) Site Location	Feasibility of building facility on chosen site	Conceptual Design Feasibility Report	Site chosen for (1) nearness to TT1PP, (2) an available supply of LCO and natural gas through the WAGP outlet.
b) Government legislation	Obtaining necessary licences and support	PPA EPC Contract	Government to support the project. Changes in tariff in case of changes in Government legislation. PPA and Government guarantee to be in place.
c) Delay by TOPL	Payment to EPC Contractor for construction delays. Payment to MOE of LDs for delayed power supply.	EPC Contracts PPA	Potential extension of construction period to be sought from MOE and the EPC contractor. Insurance coverage to be arranged.
d) Delay by Contractor	Liability and payment for delays	EPC Contract PPA	Ensure that EPCA penalties are in line with PPA penalties payable by TOPL. TOPL will seek MOE extension.
e) Currency Risk /Exchange rate fluctuations	Additional costs of construction and debt service due to	EPC Contract Loan Agreement(s)	Contract documents (EPC and Loan Agreement(s)) to be denominated in the same currency.

	changes in currency exchange rates		Insurance against currency fluctuations. Interest Capitalisation
f) Taxes	Liability for payment of taxes	EPC Contract	OP to deduct Withholding Tax from EPC Contractor payments and remit to tax Authorities. OP to ensure that EPC Contractor not liable to collect and pay VAT.
g) Import Duties	Liability for payment of import duties	EPC Contract	OP to ensure that EPC Contractor is not liable to pay import duties and VAT on all imported equipment and materials.
h) Safety of Personnel and Equipment	Liability of OP against claims for injuries or death of personnel, & damage or theft of equipment and materials.	EPC Contract	OP to ensure that Contractor maintains adequate insurance with OP as co-insured.

6.2 Risk Analysis – Post Completion & Operational Period

Risk	Description of Risk	Relevant Document	Mitigation
a) Demand	Demand levels too low to generate expected income.	PPA	TOPL to ensure that contracted "Available Capacity" is maintained.
b) Late payment by MOE	Cash flow problems (working capital) Reduced Debt Service Capacity	PPA	Ensure that interest payable on delayed payment by MOE is in line with loan agreements and any other delay costs.
c) Price variations under Changes in law.	Potential cost escalations due to changes in	PPA	Ensure that MOE negotiates and pays supplemental charge

Risk	Description of Risk	Relevant Document	Mitigation
	law.		payments in accordance with PPA. Invoke provisions of Government Guarantees.
d) Non-payment by MOE	Cash flow problems (working capital) Reduced Debt Service Capacity	PPA	Termination as result of MOE event of default in accordance with terms of PPA..
e) Scheduled maintenance	Inability to perform scheduled maintenance.	O&M Contract PPA	OP to ensure adherence to maintenance programmes agreed with MOE.
f) Unscheduled maintenance	Unexpected loss of income. Inability to perform un-scheduled maintenance.	O&M Contract PPA	OP to ensure annual contracted availability is sufficient to cover periods of unscheduled maintenance.
g) Emergency maintenance	Unexpected loss of income. Inability to perform un-scheduled maintenance.	O&M Contract PPA	OP to ensure annual contracted availability is sufficient to cover periods of emergency maintenance.
h) Fuel supply	Insufficient fuel supply with resultant reduction in generation levels.	PPA CFSA	OP to ensure back-up supply of fuel oil. Fuel supply is a pass through cost for OP.
i) Currency Risk / Exchange rate fluctuations	Additional costs of operation, maintenance and debt service due to changes in currency exchange rates	O&M Contract Loan Agreement(s)	Contract documents (O&M and Loan Agreement(s)) to be denominated in the same currency. Insurance against currency fluctuations.
j) Inflation risk	Increases in O&M costs.	PPA	Payments to OP are indexed by "Foreign

Risk	Description of Risk	Relevant Document	Mitigation
			Inflation Factor" and "Local Inflation Factor".
k) Liability for shortfall in contracted generation levels.	Loss of Income. Potential penalties.	PPA O&M Contract EPC Contract	OP to ensure capable experienced O&M operator. OP to ensure EPC warranties are valid for two years.
l) Quality of electricity	Loss of Income. Potential penalties.	PPA O&M Contract EPC Contract	OP to ensure capable experienced O&M operator. OP to ensure EPC warranties are valid for two years.
m) Fuel adjustment costs	Increase in cost of fuel.	PPA CFSA	Fuel cost is a pass through cost for OP.
Performance Risks			
a) Performance of the facility.	Loss of Income. Potential penalties.	PPA O&M Contract EPC Contract	OP to ensure capable experienced O&M operator. OP to ensure EPC warranties are valid for two years.
b) Operating permits	Inability to obtain operating permit from the authorities	PPA.	Ensure that PPA gives OP (or its contractor) the authority to operate the plant. Ensure that the Government guarantees assistance of Operating permits required.
c) Maintenance & overhaul	Loss of Income. Potential penalties.	PPA O&M Contract EPC Contract	OP to ensure capable experienced O&M operator. OP to ensure EPC warranties are valid for two years.
d) Warranties	Increase in operational and maintenance costs due to insufficient warranties.	EPC Contract O&M Contract	OP to ensure that warranties provided by the equipment vendors are sufficient. OP to ensure that operation and

Risk	Description of Risk	Relevant Document	Mitigation
			maintenance of equipment is in line with warranty requirements.
e) Force Majeure conditions	Potential loss of income due to low or zero generation levels.	PPA CFSA O&M contract	OP to ensure that payments continue to be made by MOE during a Force Majeure event in line with the PPA. OP to ensure that CFSA and O&M contracts have back-to-back Force Majeure Clauses with the PPA.
f) Site ownership	Possible Eviction	Land Sublease Agreement	OP to ensure that the lease is valid for at least 25 years and that the Certificate of Occupancy is valid for the same period..
g) Disputes	Increase in legal costs. Potential negotiation deadlocks.	PPA	OP to ensure that PPA allows for disputes to be resolved (1) by Mutual discussion, (2) by "Expert"(in case of technical dispute), (3) by Arbitration.
Funding/Finance Risks			
a) Interest rate	Additional interest costs due to increase in Interest Rate.	Loan Agreement	OP to ensure that loans are at a fixed interest rate throughout the repayment period, thus minimising risk.
b) Currency Risk / Exchange rate fluctuations	Additional costs of operation, maintenance and debt service due to changes in currency exchange rates	O&M Contract Loan Agreement(s)	Contract documents (O&M and Loan Agreement(s)) to be denominated in the same currency. Insurance against currency fluctuations.
c) EPC Contract Amount.	Inability to complete	EPC Contract	OP to ensure Contractor will provide performance

Risk	Description of Risk	Relevant Document	Mitigation
	construction of plant within the agreed contract amount.		guarantee to perform the project for the amount quoted.
d) Default by contractor)	Inability to complete construction of plant.	EPC contract. Performance guarantee.	OP to ensure that Performance Guarantee is adequate.
e) Revenues	Inability of MOE to pay for power dispatched	PPA	OP to ensure that the payments by MOE are covered by Government Guarantee and Political Risk guarantee. Standby L/C from MOE to be sought.
f) Disputes	Increase in legal costs. Potential negotiation deadlocks.	PPA	OP to ensure that PPA allows for disputes to be resolved (1) by Mutual discussion, (2) by "Expert"(in case of technical dispute), (3) by Arbitration.

Annexure 1

Ghanaian Electricity Sector

The provision of electricity in Ghana is the responsibility of three companies. These companies are:

- The Volta River Authority (VRA), which is responsible for generation;
- The Ghana Grid Company (GGC), which is responsible for transmission; and
- The Electricity Company of Ghana (ECG) which is responsible for distribution.

In 2006, the electricity demand on the Ghanaian system peaked at about 1393 MW. At present, the power sector in Ghana has a total installed capacity of approximately 1866 MW. This capacity is comprised of a mix of thermal and hydroelectric plant.

There are currently two hydroelectric plants in operation, namely Akosombo (1020 MW) and Kpong (160 MW), which account for approximately 63 per cent of the total installed capacity in the country. There are also three thermal power plants in operation, namely Takoradi 1 (330 MW), Takoradi 2 (220 MW) and Emergency Diesel units totalling (136 MW), which account for the remaining 37 per cent of total installed capacity.

Electricity is transmitted at 161 kV, whilst distribution is carried out at lower voltages. The transmission network comprises of a 161 kV interconnected network serving loads in southern Ghana and 161 kV radial networks from Kumasi substation extending to the northern part of the country. The transmission network has interconnections with the neighbouring countries of Cote d'Ivoire, Togo and Benin.

Biomass is Ghana's most important energy resource in terms of endowment and utilisation. However, the second most important energy resource is hydroelectric power. Due to its geographic location, Ghana is also well endowed with renewable energy resources such as wind and solar power. There have also been indications of potentially significant gas and oil resources. Construction of the West African Gas Pipeline (WAGP) is now complete but the off-take points and gas reception stations in Ghana are yet to be commissioned. It is understood that the WAGP was expected to be put into service in late 2008.

In recent years, Ghana has been experiencing an energy crisis. This crisis is, in part, due to an over-reliance upon hydroelectric power. The power system is dominated by hydroelectric generation. Although energy production from hydroelectric plant is deemed to be 'low cost' and environmentally friendly, the potential for variability in energy output from this source of generation is extremely high. Hydroelectric energy output is highly dependent upon the inflow of water into the plant reservoirs and storage capacities. Unfortunately in Ghana, there is considerable annual variability of water inflow to the Akosombo and Kpong hydroelectric plants. It should also be noted that there have been a number of droughts experienced, which have lasted for sustained periods of time. Although these droughts can be partially negated through regulation of water levels using the

lakes' relatively large storage capacities, it is widely accepted that water levels are in decline.

With significant load growth forecasted and a determination to avoid energy crisis' in the future, probable capacity additions in Ghana should be from thermal plant, to supplement the existing and committed hydro development. The availability of natural gas via the introduction of the WAGP would support this trend.

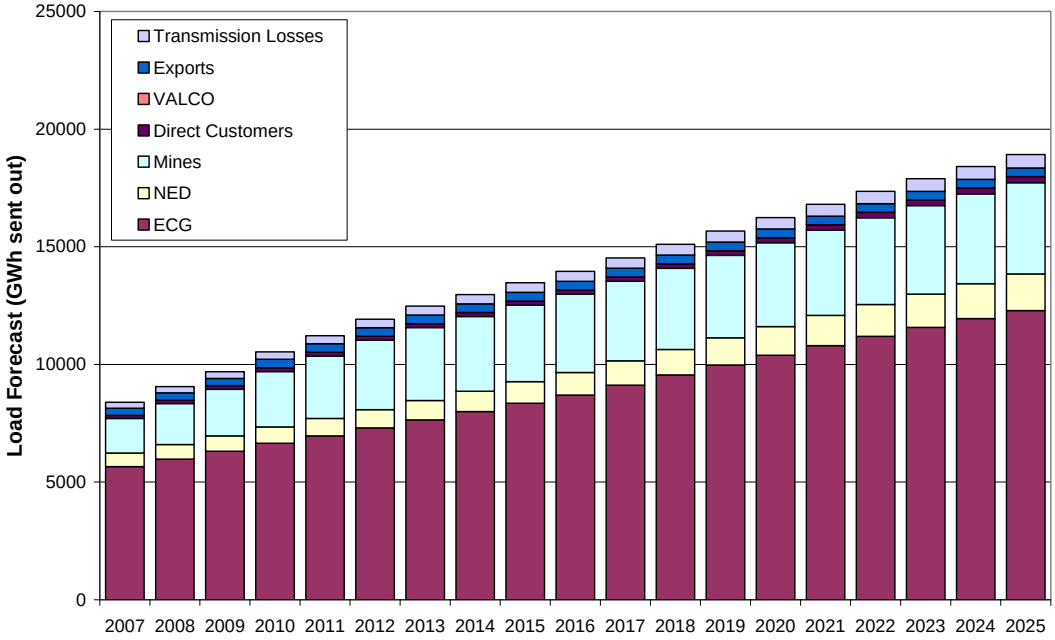
Load forecast

In this Section we present an overview on the forecasted level of electricity demand growth in Ghana over the period to 2025. A full review of the assumed electricity demand forecast for Ghana can be found in the PB Report for VRA entitled, 'Feasibility Study for 300 MW Tema Thermal Power Plant' (November 2007) and the Famel Engineering Ltd report entitled, 'Tema Osonor Power Project: Feasibility Study Report' (December 2007).

The methodology, assumptions and derivation of the load forecast presented in this Section is discussed in detail in the reports outlined above.

Figure 3.1 and Table 3.1 summarise the base total sales forecast for the years 2007 to 2025. The base case total sales forecast increases from about 8100 GWh in 2007 to about 18400 GWh in 2025 (an increase of 127 per cent) at an average annual growth rate of 4.6 per cent.

Figure 3.1: Summary of the total sales forecast (GWh)

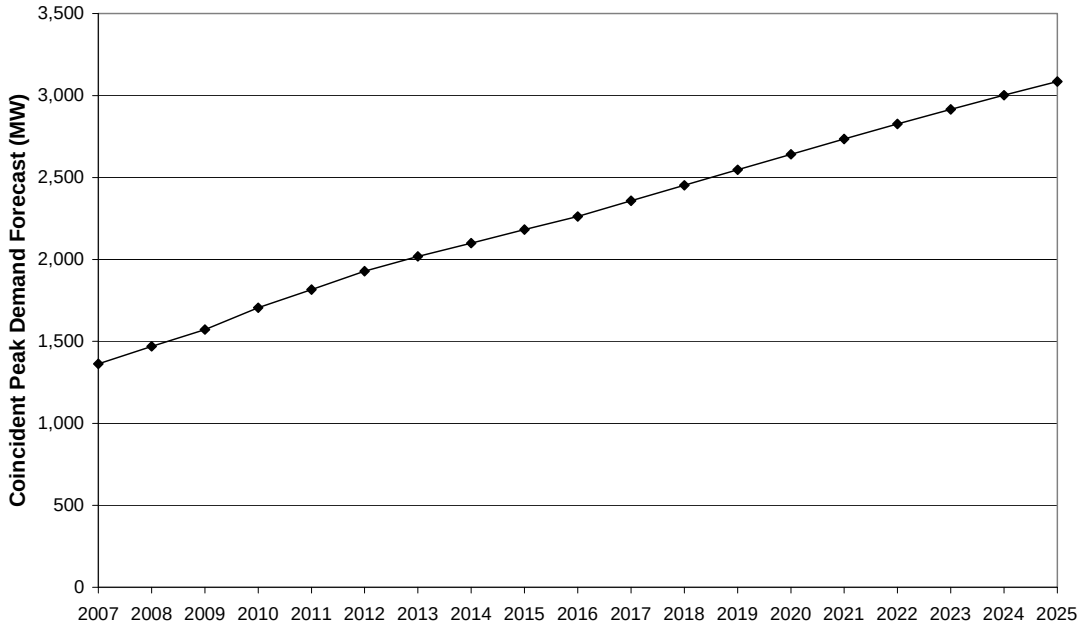


Transmission losses are assumed to remain at 3 per cent of generation for the entire period to 2025. Distribution losses are included in the sales forecasts for ECG and NED. As the forecast is made at the sent out generation level, no allowance has been made for changes in power station auxiliaries. The forecast energy losses are included for the respective forecasts in Table 11.5 and are simply added to the sales forecast to derive the sent out generation forecasts. Total generation (energy) requirements by 2025 are forecast to be about 19000 GWh.

Owing to the different load factors applicable to the various components of total VRA sales, we have estimated the components of peak demand through reference to the recorded historical average load factors. The exception to this is for the Exports sector for which we employ a 100 per cent load factor, consistent with the existing VRA/CEB contract sales volume. Appropriate coincidence factors have been applied to derive the forecast of coincident peak annual demand shown in Figure 3.2.

Coincident peak demand is forecast to increase in two phases from about 1350 MW in 2007 to about 1900 MW in 2012 and then to about 3100 MW by 2025. The average annual growth rate over this period is 4.6 per cent.

Figure 3.2: Forecast of coincident peak demand (MW)

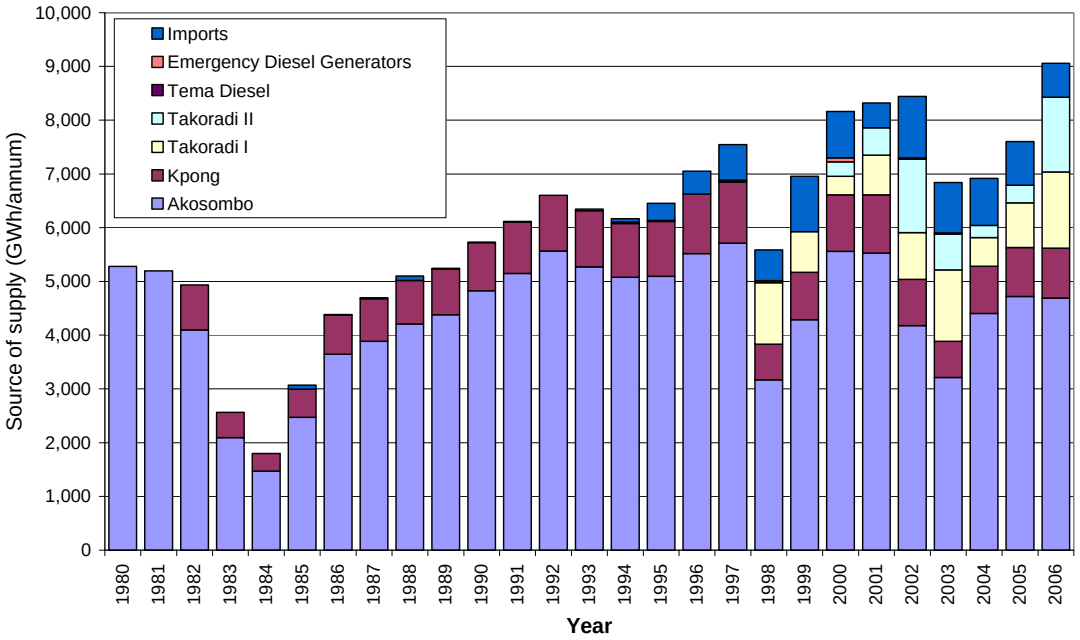


Existing plant

The electricity supply sector in Ghana has historically, and continues to be, dominated by hydro-electric power plants at Akosombo and Kpong. More recently, these have been complemented by the addition of the two thermal plants at Takoradi.

Figure 3.3 shows electricity generation from the different sources in Ghana between 1980 and 2006. The chart shows the significant role that hydro-electric generation from Akosombo and Kpong has played over this period. Until 1998, with the introduction of the Takoradi I plant, 100 per cent of electricity generation in Ghana came from hydroelectric sources. The country's dependence on hydro generation is shown dramatically by the droughts in 1983, 1984 and 1998. Although thermal generation and imported power have reduced the reliance on hydro generation, this resource still supplied about 62 per cent of total demand in Ghana in 2006.

Figure 3.3: Sources of electricity generation in Ghana



The capacity of existing and committed generating plant in Ghana is set out in Table 3.1.

The total capacity of existing generating plant, 1866 MW, compares with a maximum VRA system demand for 2006 of 1393 MW. This provides a theoretical reserve margin of 34 per cent, or 24 per cent excluding the emergency diesel plant. This reserve is misleading however, because the capacity at Akosombo and at Kpong is sensitive to the available head in the respective reservoirs. In this study we employ, for all hydro plant, a mean annual capacity value equal to 85 per cent of the installed capacity.

These existing and committed generating plants are described in more detail in the sub-sections below.

Table 3.1: Existing (and Committed) Generating Capacity

Plant	Type	Installed	Capacity (MW_{net})	Configuration
Existing Plant				
Akosombo	Hydro-electric	1965-2006	1020	6 x 170 MW
Kpong	Hydro-electric	1981	160	4 x 40 MW
Takoradi 1	CCGT	1997-2000	330	3 x 110 MW
Takoradi 2	OCGT	2000	220	2 x 110 MW
Emergency diesel	Mobile diesel	2007	136	
Total Existing			**1866**	
Committed Plant				
New Tema	OCGT	(2008)	110	1 x 110 MW
Mines Plant	OCGT	(2008)	80	2 x 40 MW

Osagyefo Barge	OCGT	(2009)	125	2 x 62.5 MW
Takoradi 2 CCGT Conversion	STEAM	(2009)	110	1 x 100 MW
Bui	Hydro-electric	(2013)	400	3 x 133 MW
Total Committed			**825**	

Akosombo and Kpong hydro-electric plants

The electricity generation system in Ghana has been and still is dominated by the Akosombo hydro-electric power station on the Volta River below Volta Lake. The Lake, created by the Akosombo dam, is the world's largest man-made lake (in terms of surface area). It was built in conjunction with the development of the Volta Aluminium Company (VALCO) smelter in Tema. The six units were commissioned between 1965 and 1972, providing a total capacity of 912 MW at a time when the peak demand of the country was only about 100 MW (not including VALCO). Akosombo has provided Ghana with decades of ample hydro-electric generation.

The power plant at Akasombo has been rehabilitated and modernised and on completion of the work in 2006 the generation capacity was increased by 130 MW, from 912 MW to 1020 MW.

The Kpong hydro-electric power station is about 20 km downstream of Akosombo. Kpong was constructed in 1981 with an installed capacity of 160 MW. Though the reservoir formed by the Kpong project is large, the operating range is small. This means that Kpong is principally operated as a run-of-river plant, dependent on releases from Akosombo. The restricted operating range means that generation at Kpong must be matched closely with releases from Akosombo. In addition, the tailwater channel at Kpong is shallow and the tailwater level rises when all units operate so that net head and output is reduced. Typically Kpong can generate about a fifth of the generation from Akosombo in any hydrological year.

The long-term average inflow to Volta Lake is about 1200 m^3/s. This allows the Akosombo station (together with the Kpong station downstream of it) to generate an average of 5855 GWh a year. However, there is high annual variability: the maximum recorded annual inflow (3049 m^3/s) is 10 times higher than the minimum (288 m^3/s). In addition, there have historically been long periods of consecutive years of drought.

Volta Lake has enough active storage to hold about 2½ years of average inflow. This storage can be used to manage the annual variability of inflows. With the dependency that the country as a whole has on Akosombo, annual discharges must be managed prudently to avoid depleting the storage in case of a prolonged drought. At the same time, spilling of water during a prolonged period of floods is undesirable. As a result, very low reservoir levels and very high reservoir levels are avoided where possible.

Thermal plant added to the generation system in the last few years is able to complement the hydro generation and take up some of the short-fall of hydro-electric generation in periods of prolonged drought. This allows VRA to manage the reservoir less conservatively and to gain greater benefits in the long-run, in particular

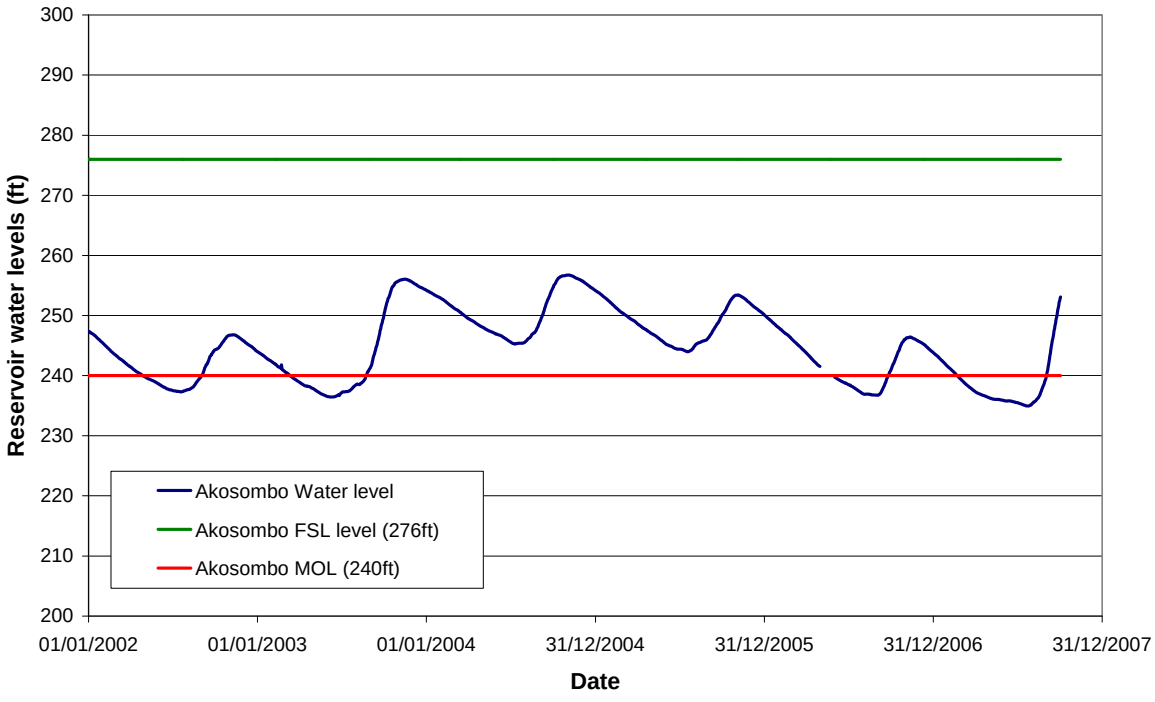
by allowing the reservoir level to fall to lower levels, thus reducing the amount of spill encountered in prolonged floods.

The operation of the Akosombo and Kpong reservoirs is determined for each year in November, after the bulk of the annual inflows. The operation for the year ahead is derived partly as a result of rule curves developed from the modelling of reservoir operation, and partly in response to medium-term commitments (such as the supply to VALCO) weighed up against expected availability of other plant on the system.

Statistical analysis of the variation in generation leads to the estimation of the 'firm' (ie reliable) generation which can be achieved in 19 out of 20 years. With this probability, VRA has estimated that the firm generation of Akosombo and Kpong combined is 4800 GWh a year with an average generation of 5855 GWh a year. Nevertheless owing to draught in recent years, VRA has been obliged to draw down Lake Volta below the level corresponding to firm energy, such that VRA plan on producing only 3370 GWh from Akosombo and Kpong in 2007, as compared with the firm energy value of 4800 GWh. Additionally, as a consequence of low levels, the available capacity is reduced to 280 MW at Akosombo (only two units in operation) and 70 MW at Kpong (again, from two units).

Figure 3.4 shows the level of Volta Lake since the start of 2002. This shows that in recent years there have been sustained periods where the water level has been below the minimum operating level (MOL) of the reservoir and this confirms the current energy crisis in the country.

Figure 3.4: Historical water levels of the Volta Lake



Takoradi 1 and 2 thermal power plants

The Takoradi Thermal Power Station (TTPS) is located at Aboadze, 17 kilometres east of Sekondi Takoradi in the Western Region of Ghana. The Power Station, which started operation in 1997 was initiated by VRA to complement the hydro-electric plant at Akosombo and Kpong.

TAKORADI 1

The Takoradi 1 power station is a 330 MW (2 x 110 MW GT + 1 x 110 MW ST) CCGT plant located at Aboadze. The plant can operate in two modes, namely Simple Cycle and Combined Cycle. The primary fuel used for power generation is Light Crude Oil (LCO) which is normally received from ocean tankers via a Single Point Mooring (SPM), connected to the plant by 4.5 km of undersea pipeline and stored in four 29 500 m^3 capacity storage tanks. The secondary fuel on site - Distillate Fuel Oil (DFO) is normally used for start-up and shutdown as it is less volatile.

When the WAGP is commissioned (expected to be in late 2008), the Takoradi complex will switch to gas. Indeed, the Takoradi complex has been identified as the anchor customer for the WAGP.

Water for use in the power plant is obtained either from Ghana Water Company Ltd or from the Reverse Osmosis (RO) plant and stored in a reservoir with a storage capacity of 9000 m^3, 50 per cent of which is reserved for fire fighting. The RO plant can produce 1135 m^3 of freshwater a day from sea water. It is used to supplement water supply from Ghana Water Company Ltd. Make-up water for steam generation is obtained from the Water Treatment Plant (Demin Plant).

TAKORADI 2

The Takoradi 2 comprises 2 x 110 MW GT plant. It shares some infrastructure facilities with Takoradi 1 and is to be developed to the same CCGT arrangement as Takoradi 1 as soon as possible; by the addition of HRSGs and a 110MW ST. A commissioning date of 2009 is indicated. The Takoradi 2 plant is jointly owned by VRA and CMS Generation of Michigan through the Takoradi International Company (TICO).

Caterpillar emergency gensets (136 MW)

In the years since 1997, the level of Volta Lake has been relatively low for various reasons (principally a year of draw-down coincided with low inflows), and national demand exceeded the ability to supply. There has been a series of arrangements for short-term cover by means of the provision of emergency generation plant. At the present time arrangements are being completed for the provision of 136 MW of emergency diesel generation plant in the form of mobile Caterpillar units. This plant would be phased out when permanent new gas turbine and CCGT plant is in place. We envisage that this plant will be available for service until the end of 2012.

Committed plant and plant currently under construction

Committed plant and plant under construction, as shown earlier in Table 3.1, will add 825 MW of generating capacity in the period to end 2012.

New Tema

A thermal power plant is being developed at the Tema substation site. The project involves a 126 MW_{ISO} gas turbine and generator package together with auxiliary equipment as well as the commissioning of the plant with all requisite balance of

plant equipment (plant auxiliaries, fuel supply and electro-mechanical equipment). Commercial operation is now expected mid-2008.

It may be possible to convert the existing OCGT unit into a CCGT unit with the same GT, HRSG and ST configuration as the existing CCGT units at Takoradi. This potential conversion has been be considered as a candidate plant option.

Mines Plant

An 80 MW 'reserve' plant is being developed and funded by a number of mining companies to help meet the current generation deficit and to serve as a reserve plant for their use. The plant is scheduled to be operational by mid-2007. We assume that it will burn gas from the WAGP.

This plant will be part of the portfolio of generating plants that will be made available for dispatch.

Osagyefo Barge

The Osagyefo Barge was constructed in 1999 and delivered to Ghana in 2002 and has been moored in a pond at Effasu since 2005. The 125 MW plant comprises two modern 62.5 MW open cycle gas turbines. The Barge has not been operated since its arrival in the country. We understand, however, that a project to assess the condition of the Barge has recently been completed, that a new IPP has been established and that a PPA was signed in July 2007. It is now expected that the Barge will be made operational in 2008. We also assume that the Barge plant will be operated on LCO.

Bui Hydro-electric

The Bui hydro-electric scheme is located near the border with The Ivory Coast on the Black Volta River about 400 km inland.

The project was studied to full feasibility level by Coyne & Bellier in 1995. The study recommended developing the scheme as a 400 MW (3 x 133 MW) hydro-electric power station generating an average of 1000 GWh per year (28 per cent capacity factor). Construction is expected to take 6 years. The new reservoir will encroach into The Ivory Coast.

Coyne & Bellier have estimated the cost of the 400 MW project to be US$ 708 million (US$ 1770 /kW) including interest during construction calculated at a rate of 12 per cent per annum.

We understand that construction of the scheme is at an advanced stage and that it is expected to be available for service in 2012/2013 (we assume beginning of 2013 for this study).

Supply and demand balance

Figures 3.5 and 3.6 present the energy and capacity balances for Ghana based on the base case demand forecast and the existing and committed generating plant discussed above. Figure 3.5 assumes that the firm hydro energy for the combined schemes at Akosombo and Kpong to be 4800 GWh per year.

An overall plant factor of 85 per cent has been assumed for the thermal plants at Takoradi. The Takoradi 2 open cycle units are assumed to be converted to combined cycle operation in 2009, adding another 110 MW to the installed capacity.

The emergency diesel units are also assumed to have a plant capacity factor of 85 per cent. These units are assumed to be available for 5 years, up to and including the year 2011.

The new Tema 110 MW OCGT unit is assumed to enter service in 2008, and the 125 MW Osagyefo Barge plant in 2009. Both plants are assumed to be capable of operation at a plant capacity factor of 85 per cent.

The 400 MW Bui scheme is expected to commence operation in 2013. It will provide a firm energy contribution of 894 GWh per year.

The mines plant (80 MW) is assumed to be available from 2008, and to be able to operate at an annual plant capacity factor up to 85 per cent.

The charts indicate that surplus energy and capacity is expected to be sustained up to 2011 but power and energy deficits appear in 2012 indicating the need to install additional generating capacity by then. By 2025, an energy deficit of about 6000 GWh is forecast. A similar picture is shown in Figure 3.6 where the capacity deficit would be about 900 MW were no additional power plants commissioned. The total new capacity required by the end of the study period must be greater than this value however if the forecast system demand is to be met reliably.

Figure 3.5: Energy balance for Ghana

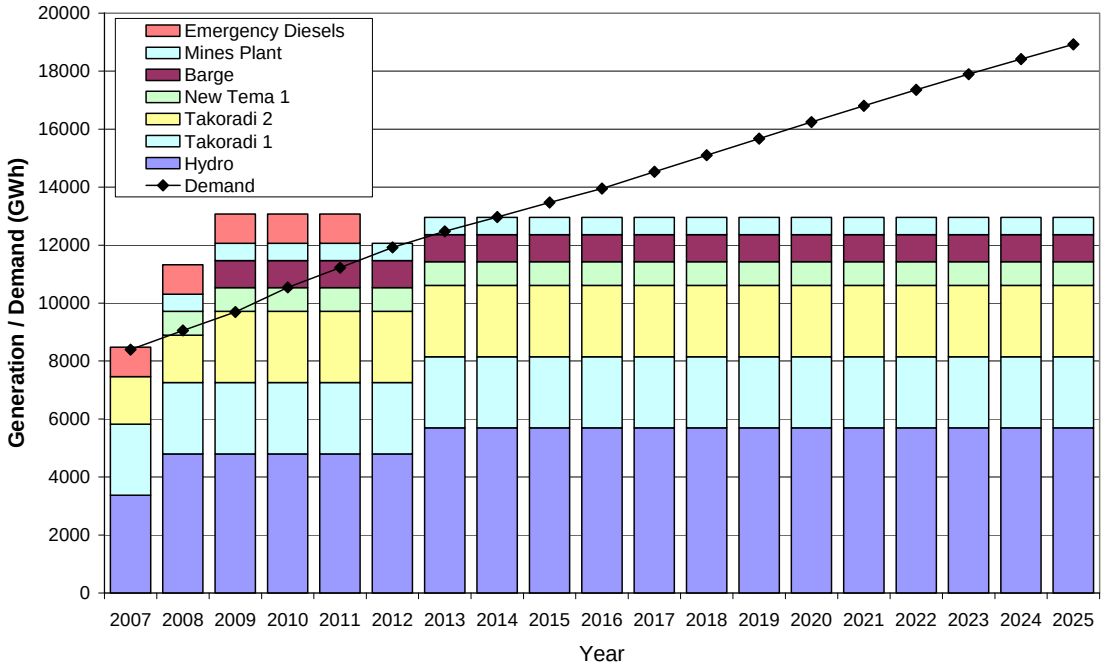
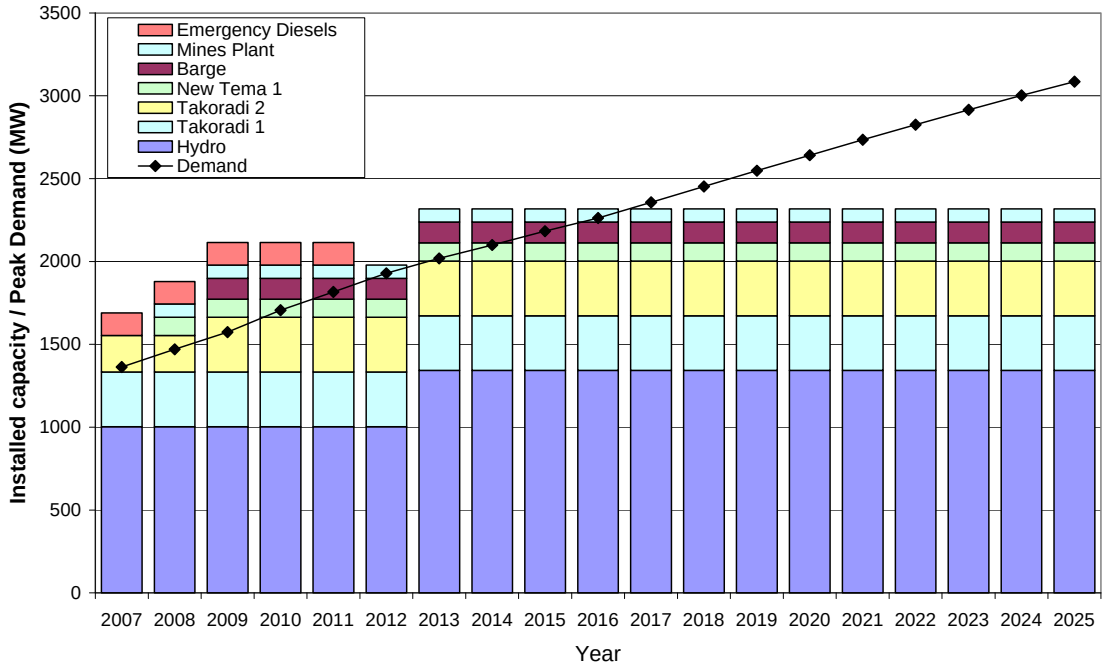


Figure 3.6: Capacity balance for Ghana



It is obvious from the supply demand balance analysis above that the Ghanaian electricity system will require significant investment in the future, particularly from 2011/2012 onwards. With the current energy crisis gripping the nation (due, in part, to an over-reliance on hydroelectric power and declining rainfalls) it is apparent that thermal plant has an important role to play in helping Ghana meet its energy needs in the future.

Annexure 2

Ghana – Political & Economic History

INTRODUCTION

Land Area	238,537 km^2
Population (2006 est.)	21 million
Growth Rate (2005 est.)	2.0% per annum
Official Language	English
Time Zone	GMT
GDP (2004 est.)	US$ 39.4 billion
GDP Growth Rate (2005.)	5.9% per annum
Agriculture	40% of GDP
Industry	28% of GDP
Services	32% of GDP

Ghana is situated on the Gulf of Guinea in West Africa and covers an area of 238,537 $km^{2.}$ It is bordered to the west by Cote d'Ivoire, to the east by Togo, to the north by Burkina Faso and to the south by the Gulf of Guinea, which is part of the Atlantic Ocean.

Ghana has a population of approximately 21 million people who predominantly inhabit the southern half of the country. The capital is Accra, a coastal city with a population of approximately 2.5 million. The other major cities in Ghana are Kumasi, which is in the centre of the country and Tema and Takoradi, which are coastal ports.

POLITICAL HISTORY OF GHANA

Ghana gained independence from Britain in 1957 and became a Republic in 1960 under the leadership of Dr. Kwame Nkrumah. In 1966, his government was overthrown in a coup by Gen. E.K Kotoka. This coup started a period of general instability, during which a series of military and civilian governments followed each other until 1981 when Flt. Lt. Jerry Rawlings took power as leader of the Provisional National Defence Council. In 1992, Ghana adopted a new constitution based on the US model. Elections were held in the same year and Flt. Lt. Rawlings (retired) was elected for a four-year term and subsequently re-elected for a second four-year term in 1996.

On January 2001, Ghana crossed a significant landmark. For the first time in Ghana's history an elected President smoothly handed over the reins of government

to another constitutionally elected President, J. A. Kufuor. Ghana continues to enjoy peace and stability, and the new NPP Government is pursuing policies to establish a golden age of business in Ghana to be driven mainly by the private sector. President Kufour was re-elected as President in 2004 for another 4 year term ending in 2008.

Ghana is a member of the following international organisations:

- The United Nations (and its specialised agencies)
- The African Development Bank
- The World Bank
- The International Monetary Fund
- The African Union
- The Economic Community of West African States
- The Commonwealth
- The World Trade Organisation

Ghana maintains good relations with major industrialised countries including the United Kingdom, United States of America, Japan, Germany, and Netherlands, which are its main trading partners.

ECONOMIC HISTORY OF GHANA

At independence in 1957, Ghana had an economy driven by high cocoa prices, and was leading many of her West African neighbours in prosperity and development. Twenty-five years later in 1982, the economy was in significant decline. Interventionist economic policies, a decline in international cocoa prices, natural disasters and the effect of oil price shocks all contributed to the decline. Realising the need for a radical response to the country's economic malaise, the Government with the support of the IMF and World Bank launched the Economic Recovery Programme (ERP) in 1983.

The key elements of Ghana's economic and financial reform strategy have been:

- A realignment of relative prices to encourage productive activities and exports and strengthening of economic incentives;
- A progressive shift from direct control and intervention by the Government toward greater reliance on market forces;
- The early restoration of fiscal and monetary discipline;
- The rehabilitation of the economic and social infrastructure; and
- The undertaking of structural and institutional reforms to enhance the efficiency of the economy and encourage the expansion of private savings and investment.

The success of the ERP is evident from the improvement in economic performance since its commencement.

- Inflation fell from 116% in 1983 to 10% in 1992 and fluctuated between 20-70% between the period 1992 – 2000.
- Between 1983 and 2000 GDP grew by an annual average of 4.5%, domestic investments increased to 14.8% of GDP

In February 2001, Ghana opted for the enhanced Highly Indebted Poor Country (HTOPL) initiative of the Bretton Woods Institutions and accelerated the preparation of the Ghana Poverty Reduction Strategy (GPRS) and reached a decision point on February 2, 2002. The HTOPL initiative is expected to reduce Ghana's debt service payments by an amount of US$215 million per annum between 2002 and 2011. The Government expects to utilise 20% of the savings from the debt payments to reduce domestic debt and the remaining 80% for poverty reduction programmes.

The 2007 budget seeks to consolidate macro-economic stability while seeking to reduce poverty for Ghanaians within the framework of the Ghana Poverty Reduction Strategy (GPRS II). Specific macro-economic targets include:

- A real GDP growth rate of at least 6%;
- Achieve a year end inflation target of between 7% to 9% and average inflation of 8.8%
- A domestic primary budget surplus of 2.0% of GDP;
- An overall budget deficit equivalent to 2.1% of GDP; and
- The rebuilding of gross official reserve holdings equivalent to 4 months of imports of good and services.

GHANA'S INVESTMENT CLIMATE

The Government of Ghana enacted a new investment code in 1994, the Ghana Investment Promotion Centre Act of 1994 (Act 478) (the "GTOPL Act") to replace the Investment Code of 1985 (PNDCL 116). The GTOPL Act provides many incentives and benefits to facilitate and encourage inward direct investment. It also created a new government agency, the Ghana Investment Promotion Centre which has two primary goals, i.e. to:

- Encourage and promote investment in the Ghanaian Economy; and
- Co-ordinate and monitor all investment activities under Act 478

The GTOPL Act of 1994 provides for a single Government agency to handle investment promotion including the identification of declared priority areas for investments, applicable incentives and benefits, dispute settlement procedures, guarantees for the investor and the investment. The GTOPL Act defines the respective obligations of the host country and the investor, and the conditions of approval.

Incentives available under the GTOPL Act include:

- location incentives in the form of tax relief;
- accelerated tax depreciation and loss carry over;
- exemption from personal remittance quota for the expatriate personnel; and

- exemption from the payment of Selective Alien Employment tax.

Guarantees available under the Act include:

- guaranteed transferability of profits, dividends, royalties, directors fees and capital in the event of sale or liquidation of the approved enterprise;
- guarantee against expropriation of the enterprise; and
- guarantee against being forced to cede any interest in the enterprise.

OTHER INVESTMENT RELATED INFORMATION

Ghana is a member of the Multilateral Investment Guarantee Agency ("MIGA"). MIGA provides various insurance products to offset non-commercial risks. These risks include transfer risks, expropriation, contract breach by host government and war risks.

Ghana has Investment Promotion and Protection Agreements in place with the following countries: United Kingdom, Netherlands, Romania, China, Germany, France, Switzerland, Italy, Bulgaria and Denmark.

OVERVIEW OF THE GHANAIAN CONSTITUTION AND LEGAL SYSTEM

Introduction

The laws of Ghana comprise: the Constitution; parliamentary and other enactments; orders, rules and regulations (for example, legislative instruments); and common law (including equity and customary law, i.e. laws which are by custom applicable to particular communities in Ghana).

The Constitution

The Constitution, which became effective on 7th January 1993, is the supreme law of Ghana and enshrines a number of fundamental human rights and freedoms, for example, personal liberty, non-discrimination, freedom of expression and concepts of natural justice.

The Constitution also provides that Ghana's political and economic objectives are to be democratic, dedicated to freedom and justice and to maximise economic development through, inter alia, foreign investment.

The Executive

The President of Ghana occupies the offices of the head of state, head of government and commander-in-chief of the armed forces. In determining government policy, the President is assisted by the Cabinet, which consists of the President, Vice President and between 10 and 19 Ministers of State, as well as by non-Cabinet ministers and other senior advisers in the office of the President. The

President is also advised in relation to legislative matters by a Council of State, which comprises a mix of presidential appointees, representatives from the different regions of Ghana and former holders of high office.

The Legislature

Legislative authority in Ghana vests in Parliament. Decisions are reached by simple majority vote, subject to a quorum of at least half the members of Parliament being present. The power of Parliament to make laws is exercised by passing the relevant bill and obtaining Presidential assent. The Constitution requires the publication of a bill in the official Government Gazette at least 14 days before its introduction in Parliament. The bill then passes first through a committee stage, then consideration and approval by Parliament, and finally Presidential assent. At the end of this process the bill becomes law followed by publication in the Gazette.

The Judiciary

The Judiciary is separate and independent from the President, the Legislature and the Executive. It is subject only to the terms of the Constitution and consists of:

- the superior Courts of Judicature comprising the Supreme Court, the Court of Appeal, the High Court and Regional Tribunals; and
- such lower courts or tribunals as Parliament establishes.

The Supreme Court is the highest court of appeal and is not bound to follow the decisions of any other court. However, normally it will treat its own previous decisions as binding. The Court of Appeal has jurisdiction to hear appeals from judgments or orders of the High Court and Regional Tribunals. The High Court also hears appeals, in addition to having original jurisdiction. The decisions of the Court of Appeal and the High Court are in turn binding on lower courts.

The common law of Ghana has many similarities to English common law. Although the decisions of the English courts do not bind Ghanaian courts, they are of persuasive value and are often followed by the Superior Courts in Ghana in the absence of a Ghanaian precedent.

Annexure 3

EIA Summary

TEMA OSONOR THERMAL PLANT

Objective

The purpose of the plant is to assist the Government of Ghana (GoG) to reduce the generation deficit in the country and alleviate the current energy crisis.

Environmental Permitting

In pursuance of the Environmental Protection Agency Act, 490 of 1994, Section 2 (i) and the Environmental Assessment Regulations, LI 1652 of 1999, the TOPL prepared an Environmental Impact Assessment (EIA) Report as part of the conditions stipulated by the Ghana EPA for the granting of an Environmental Permit.

Environmental and Social Impact Identification/Mitigation Measures

Both negative and positive impacts from the project activities are described.

Anticipated Negative Impacts/Mitigation Measures

- There will be some unavoidable minor disruption to traffic flow when major plant components {i.e., generators, transformers) are delivered to the plant site during the construction phase. / **Such major plant component deliveries will be scheduled for weekends which coincides with low traffic from port to site**

- The potential for vehicle accidents and injury also exists / **Speed limit notices to be displayed and enforced by security. Violators will be immediately sacked from project site**

- The influx of both skilled and unskilled labour from outside the Tema and Ashaiman areas could highten the prevalence of diseases such as HIV/AIDS. / **Induction for workforce to include HIV/AIDS awareness creation; in addition TOPL will seek opportunity to sponsor other HIV/AIDS programmes by either GoG or NGOs.**

Identified Positive Project Impacts

Employment Generation

- Local construction work force of approximately 150 - 200 will be employed during construction.

- During the construction phase, the project will provide temporary jobs to unskilled labourers in the Tema- Ashaiman areas.

Poverty reduction/improvement of quality of life

- The quality of life of otherwise unemployed youth will be enhanced through the salaries to be paid them, reduce pressure on their families for provision of basic human needs, and hence reducing the poverty levels in the local economy.

- Most workers will live at home and be bused to the site; hence a negligibly low pressure will be put on housing needs, medical services and schools in Tema and Ashaiman.

- Skilled labour such as masons, carpenters, steel benders, electricians etc from other nearby localities such as Kpone, Dawhenya and Afienya will be employed.

Gender and Women's issues

- The number of women employed on the project will change with the progress of the construction works. Between 10 and 20 women are presently serving in various capacities on the project. These include areas such as project management, administration, secretarial, civil inspectorate and laboratory technician positions.

- It is anticipated that the project will also provide opportunities for women food vendors who will engage in the business of selling food and other items to the workers at the satellite market that will develop in the project area.

Operations Phase Impacts / Mitigation

The most important impact of the plant during operation is that due to stack emissions and their impact on the ambient environment.

- A dispersion modeling was therefore carried out to determine the contribution to ground level concentrations of NO_x, and SO_2, and also to predict the point of maximum plant emission outfall.

- Continuous Emissions Monitoring System being procured for installation to measure real time emissions

- Water Injection technology incorporated into plant design to control atmospheric emissions

- Ambient environmental monitoring equipment being procured for assessment of concentrations of PM10, NOx, SO2, TSP

- Offshore training arranged for some operations staff on these equipment and their operations philosophy, logics and data processing.

The modeling results show that NO_x and SO_2 emissions will be in compliance with both the Ghana EPA and World Bank's allowable limits.
For NO_x, plant emissions will be 30% and 20% below the respective World Bank guidelines for gas and oil firing respectively. SO_2 emissions will also be in compliance based on firing LCO of 0.2% sulphur content.

Similarly, the predicted ground level concentrations of both nitrogen oxides and sulphur dioxide will be in full compliance with the Ghanaian and World Bank Guidelines

Annex 1 Compliance of Plant Emissions with Allowable limits

Pollutant	**Predicted Plant Emission (mg/Nm^3)**		**World Bank Emission Guidelines (mg/Nm^3)**
	Gas Firing	**LCO Firing**	
NO_x (gas)	86	-	125
NO_x (oil)	-	133	165
SO_2	9	42	2000

Annex 2 Baseline Ambient Air Quality Monitoring Results

Parameter	Ground Level Concentrations (µg/m3		Ghana EPA Guideline Limits
	Location 1	Location 2	
TSP	241.0	205.0	230
PM10	58.1	56.0	70
SO2	116.0	114.0	900
NO2	bdl	bdl	400
CO (mg/m3)	2.8	2.8	100

* Appendix 1 Ghana EPA Ambient Air Quality Guidelines (Maximum Ground Level Concentrations) for Industrial Areas

Location 1 West of site (where MRPP construction offices arepresently located)
Location 2 South west of site close to pipeline linking TOR and VRA TT1PP site
TSP Total Suspended Particulate
PM10 Particulate Matter of less than 10 microns diameter
bdl below detection limit

Annexure 4

Financial Model Summary Pages