ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT REPORT

EXECUTIVE SUMMARY

Dibamba Power Project
88MW Thermal Power Plant
& 90kV Transmission Line

CAMEROON

MARCH 2008
# ABBREVIATIONS

<table>
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<th>Abbreviation</th>
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<tr>
<td>ARSEL</td>
<td>Agence de regulation du secteur de l’électricité</td>
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<td>EIA</td>
<td>Environmental Impact Assessment</td>
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<td>EMF</td>
<td>Electromagnetic Fields</td>
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<td>EMP</td>
<td>Environmental Management Plan</td>
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<td>ESIA</td>
<td>Environmental and Social Impact Assessment</td>
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<td>HFO</td>
<td>Heavy Fuel Oil</td>
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<td>ICNIRP</td>
<td>International Commission on Non-Ionising Radiation Protection</td>
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<td>IFC</td>
<td>International Finance Corporation</td>
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<td>NGOs</td>
<td>Non Governmental Organisations</td>
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<td>NIS</td>
<td>National Institute of Statistics</td>
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<td>PPA</td>
<td>Power Purchasing Agreement</td>
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<td>RAP</td>
<td>Resettlement Action Plan</td>
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<td>SIA</td>
<td>Social Impact Assessment</td>
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<td>SIG</td>
<td>Southern Interconnected Grid</td>
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<td>SMP</td>
<td>Social Management Plan</td>
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<td>STI</td>
<td>Sexually Transmitted Infection</td>
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1. INTRODUCTION

AES Sonel, the national power utility company in Cameroon, is currently developing the Dibamba Power Project in order to meet the requirements of electricity generation in Cameroon and to reduce the occurrence of temporary electricity cuts when electricity demand is high (load shedding).

The Project will be located approximately 20 km to the east of Douala in the Littoral Province. The Dibamba Power Project comprises the construction of a 88 MW power plant fuelled with Heavy Fuel Oil (HFO) and the erection of a 90 kV transmission line between the plant and the existing Ngodi-Bekoko 90 kV substation at Bekoko 2 km to the west of the plant site. The Heavy Fuel Oil will be transported by road from the Limbe Oil Refinery located approximately 120 km west of Dibamba.

The Dibamba Power Project will be owned by AES Corporation and the Government of Cameroon through a subsidiary called the Kribi Power Development Company (KPDC). All the electricity produced will be delivered to the Southern Interconnected Grid (SIG) and sold to AES Sonel through a Tolling Agreement.

The ESIA reports have been prepared in accordance with legislation of Cameroon and internationally recognised guidance and standards as adopted by the World Bank, International Financial Corporation (IFC) and African Development Bank. The Dibamba Power Project is classed as a Category B Project under the IFC Project Categories and Category 1 under African Development Bank guidelines.

Potential Impacts were identified from critical analysis of the proposed construction and operation of the power plant in relation to the environment setting.

Mitigation measures include proposed programs or processes implemented to eliminate or minimise the potential impacts identified for each system studied. Mitigation options include preventive engineering implemented during the design phase of the project, ongoing and planned programs to eliminate or minimise impacts during the construction of the project, and monitoring plans to evaluate the success of the mitigation. An evaluation of the level of predicted impacts that will remain after the implementation of all proposed mitigation measures has also been undertaken. The nature of the predicted impact is described and its significance determined by reference to appropriate standards or guidelines.

2. PROJECT DESCRIPTION AND JUSTIFICATION

2.1 PROJECT DESCRIPTION

The Dibamba Thermal Power Project comprises of the following components:

• The construction of a 88 MW power plant fuelled with heavy fuel oil (HFO) at the site in Yassa village; and

• The construction of energy transmission facilities, including:

  (i) A step-up substation at the plant site (11 to 90 kV) at the plant site; and

  (ii) A 1.8 km 90 kV double circuit transmission line between the plant and a connection to existing 90 kV transmission lines which run to Ngodi-Bekoko substation at Bekoko.

The power plant equipment is being provided by Wärtsilä whilst the substation and transmission lines EPC contractor is still to be approved.
2.1.1 The Power Station

The Site

The proposed power station site at Yassa is located close to the main Douala-Edéa road, in the Douala III subdivision. The plant itself will occupy 4 hectares (ha) within an overall area of approximately 7.7 ha, which will allow the development of the construction compound for the project and act as a buffer of land to best reduce the potential impacts. An office building, welfare facilities, workshops and stores will also be constructed at the plant site. The land on site is gently sloping to the south east and varies in height from approximately 45 to 57 m above sea level. The site is predominantly agricultural plantings, old fallow (covered with pioneer vegetation), and regenerating secondary scrub but no true forest or trees of significant size. There are no buildings or structures on the site. A stream, which flows throughout the year, flows to the east of the plant site. Effluent from a soap factory, immediately north of the plant site, is a source for this stream. The stream is used by local inhabitants as a water supply.

Power Station Equipment

The power plant will involve the installation of eight 11 MW engines (total output 88 MW). The engines will be grouped in two sets of four and housed in separate power houses. The eight generators will have individual emission stacks grouped into two sets of four. The stacks will be 40 m tall. The plant will burn heavy fuel oil (HFO) as the main source, supplied by road tankers from the oil refinery at Limbe, approximately 120 km away. Approximately 12 road tankers are anticipated per day during peak operating conditions of the plant. On-site storage tank capacity for HFO is based on running the plant for 14 days at full capacity.

Step-up Substation

A step-up substation equipped with 11/90 kV power transformers will be installed to enable power to be exported from the site via a new 90 kV transmission line, connecting to an existing 90 kV line which runs to the Ngodi-Bekoko substation at Bekoko. At the Ngodi-Bekoko substation at Bekoko, new 90 kV bays will be added to connect the new line to the existing grid. No new land take is required here as sufficient space is available within the existing substation site.

2.1.2 The Transmission Line

The transmission line will be approximately 1.8 km in length. The line will be constructed within a corridor (wayleave), which will be a total width of 30 m, i.e. 15 m each side of the line axis. The new transmission line will follow an east to west orientation running parallel to the main Douala-Edéa road, on its south side. From leaving the power station the route runs alongside a dirt track, the route subsequently doglegs north to avoid residential properties where it continues west where it crosses the main road to the south of Yassa junction. Access to the majority of the line corridor will therefore be easily undertaken from minor trackways and the main road. Predominantly the selected route passes through subsistence agriculture, fallow land, and regenerating secondary scrub. Fallow areas are generally covered with pioneer vegetation. The area is sparsely inhabited, and this route was selected to avoid, as much as possible, crossing the residences in the village.

Construction Phase

The construction phase for the whole project will be approximately 15 months, over two phases. Firstly, preparation of the site, installation of all ancillary equipment and structures, transmission line and four generators, anticipated to be complete by mid 2008. Secondly, installation of a further four generators, anticipated by early 2009. During the construction phase employment levels will vary but are anticipated to peak at around 480 workers. These will range from manual labourers, through
electrical, mechanical and civil technicians and engineers, to site managers. For the construction phase all main plant and equipment will be imported via the port at Douala, and transported to the site by the Douala-Edéa road. Cement and other manufactured construction materials will be sourced from Douala.

Operational Phase

During operation of the power station approximately 34 specialised staff, mainly engineers and technicians will be employed to ensure the power station operates 24 hours/day. Non-specialised staff include security personnel and cleaners and will be employed locally. Douala is only 20 km west of the site and therefore no staff housing will be provided at the plant site.

Wayleave Management

Managing vegetation in the wayleave will be an important operational phase activity. The following are important issues:

- In the wayleave vegetation will not exceed 2m in height;
- Management and clearing of vegetation will take place on an annual basis;
- Burning of vegetation will not be permitted; and
- No areas will be entirely stripped of vegetation as this will lead to soil erosion.

During the operational phase, growing of low-level crops and grazing by stock will be permitted at the risk of the farmer and AES Sonel will reserve the right to clear the land as required for the safety of the project.

Decommissioning

The design life of the plant is 25 years whilst the transmission line has a typical lifespan of 50 years. The electricity infrastructure of Cameroon is dominated by the Southern Interconnected Grid (SIG). There is also an independent northern grid and a significant number of off-grid remote generating stations supplying power to major townships. Within the SIG, power is mostly produced at hydro facilities, which currently supply approximately 90% of the demand. The SIG also has six thermal plants that provide additional power. This provides system security and is available for peak demand.

2.2 PROJECT JUSTIFICATION

Various schemes to satisfy the long-term demand for power are under consideration by the Government. However, demand for power is increasing at a rate of approximately 5% per year for the public sector and low water levels and flow rates are putting additional strain on the already overburdened electricity system. The 150 MW Kribi Power Plant, currently scheduled for commissioning in early 2010, is proposed to help meet the growing need. However, the 88 MW Dibamba Thermal Power Project is proposed for emergency peaking and back-up capacity to alleviate load shedding in the dry season caused by (i) growing demand; (ii) insufficient thermal capacity to enable optimal water resource management; and (iii) delays in the construction of the Kribi gas-fired power project.

3. LEGAL AND ADMINISTRATIVE FRAMEWORK

The ESIA has identified the relevant Cameroonian statutory requirements, regulations, permits and licences required for the development to proceed. The key EIA legislation is Decree No. 2005/0577 of

In addition, where appropriate, due reference is made to international standards in order to establish the regulatory framework within which this ESIA for the project has been undertaken. The relevant international environmental and social agreements to which the country is a party are also identified.

The relevant institutions involved in the implementation and monitoring of environment law in Cameroon are:

- **ARSEL (Agence de régulation du secteur de l’électricité)** – authority responsible for regulation of the energy sector;
- **The Inter-Ministerial Committee of Environment (ICE)** which is under the responsibility of the Ministry of Environment and Nature Protection;
- **Consultative national commission of environment and sustainable development**;
- **The Minister in charge of Energy and Water Resources**; and

In addition, other ministries of relevance include: the Ministry of Agriculture and Rural Development, Ministry of Transport (MINT), which is responsible for the transportation of people and goods by sea, air and land; the Ministry of Culture; the Ministry of Housing and Urban Development; the Ministry of Public Works; the Ministry of Territorial Planning and Development; and the Ministry of Forestry and Wildlife.

To satisfy the requirements of Cameroonian permitting process, it is acknowledged that AES Sonel envisages financial support from the World Bank Group and the African Development Bank (AfDB). Consequently, ESIA report has been prepared with reference to the AfDB, World Bank and International Finance Corporation (IFC) guidance.

In addition, the following documents and policies which have been referred to in the preparation of this ESIA include:

- IFC’s 1998 Procedure for Environmental and Social Review Projects;
- IFC’s Policy on Social and Environmental Sustainability (30th April 2006);
- IFC’s Performance Standards on Social and Environmental Sustainability (30th April 2006);
- IFC’s Policy on Disclosure of Information (30th April 2006);
- World Bank Pollution Prevention and Abatement Handbook (1998);
- World Bank OP 4.01 Environmental Assessment (1999);
- African Development Bank (AfDB) Integrated Environmental and Social Assessment Guidelines;
- AfDB Environmental and Social Assessment Procedures for Public Sector Operations (ESAP); and

4. DESCRIPTION OF THE PROJECT ENVIRONMENT

4.1 Topography
The project area is primarily within the lowland hills with a rural landscape of disturbed agricultural land, fallow and shrub habitats. The topography is one of low rolling hills or hillocks and shallow valleys. The plant site lies at approximately 45m to 57m above sea level whilst the 1.8km transmission line is generally 31 - 55m above sea level. Land clearance, associated with village activities (e.g. agriculture), is present along the transmission line route. There is little natural forest vegetation remaining.
4.2 Climate
The entire project is located in the equatorial region of Cameroon, largely characterised by primary and secondary forests, with average temperatures of about 28°C and humidity between 60 and 100%. The site and transmission line corridor has a high average annual rainfall of approximately 4000 mm.

4.3 Geology and Soils
Soils are poor with low pH values, poor nutrient status and low cation exchange capacities with relatively high permeabilities. Due to this poor nutrient status, soils need artificial fertiliser if permanent farming is to be practised. Land use capability is therefore low.

4.4 Hydrology and Hydrogeology
The hydrology of the area is dominated by the Dibamba River approximately 2km east of the project area within the Kambo River Basin. Due to the relatively high rainfall in the region (4,000mm peaking in May and October) and low lying topography an extensive network of small tributary streams and rivers exists discharging to the main channels.

4.5 Land use
Land use, both within the plant site area and along the transmission line corridor, is subsistence agriculture, fallow ground and regenerating secondary scrub. Fallow areas are generally covered with pioneer vegetation and have a low conservation value. Sensitive plants and most trees have been destroyed by the ‘slash and burn’ agricultural system.

4.6 Flora and Fauna
There are no true forests or trees of significant size within the project area. Fallow areas are generally covered with pioneer vegetation and have a low conservation value. Sensitive plants have generally been destroyed by slash and burn agricultural systems. Perennial crops like Pineapple, Avocado, Papaw, Palm Oil, Macabo, Manioc, Potato, Yam, Dolè, Groundnut, Banana and Plantain are grown by the local farmers.

Those species recorded (81 in total) generally have very large distribution in Africa. The four vulnerable species are Rauvolfia vomitoria, Pentadiplandra brazzeana, Senna alata and Alstonia boonei and all are medicinal plants.

The bird species recorded during the survey are mainly characteristic of agricultural areas and secondary growth, and are common and widespread both locally and in West Africa.

No mammals were recorded during the survey, and the mammal community is likely to be restricted to small rodents.

4.7 Archaeology and Culture Heritage
The survey identified three zones containing archaeological remains dating from the prehistoric period. In particular, the presence of ceramics buried up to 1.50 m below ground level may indicate an early settlement buried at the site. It is not known at present whether the remains are likely to be of local, regional, or national value.

4.8 Socio-economic Framework
The project area is located in the Littoral Province. The Littoral Province, made of four divisions (Moungo, Nkam, Sanaga-Maritime and Wouri), has a total surface area of 20,248 km², and a population estimated in 2003 at 2,140,880 inhabitants (estimations by NIS) with a density of 106 inhabitants per km². The main economic activities of the rural populations in the province are palm oil, banana, tea, cocoa and coffee production and fishing. Douala is the main economic capital of the country. The project is located within the Douala III Subdivision in the Douala Urban Council. Douala III is known for being the industrial section of Douala.
5. PROJECT ALTERNATIVES

5.1 PLANT ALTERNATIVES

Studies of alternative options for providing the load requirements were carried out in 2006 and 2007 by AES Sonel. These studies considered alternatives to locations, plant types, fuels, transmission line route and cabling. The conclusion of the study was that a thermal power plant located at Dibamba and equipped with eight 18V46 Wartsila engines fuelled with HFO 180 supplied from Limbe was the most economic, environmentally and socially viable option.

5.2 PLANT SITE

Eight sites were assessed with respect to real estate, environmental constraints (particularly noise and air quality), interconnection, site access (equipment unloading, fuel and personnel access), fuel delivery and storage, and water availability. The conclusion of the survey was that Dibamba was the preferred site and the best option as it was near to the Nogodi-Bekoko Substation.

5.3 TRANSMISSION LINE

The route of the transmission line was also assessed. Deviations of the route were considered with reference to existing houses, plantations and farmland to ensure that the route selected minimised disruption.

6. POTENTIAL IMPACTS AND MITIGATION MEASURES

6.1 AIR QUALITY

Air quality is generally good in the rural areas of the proposed power station. Sources of emissions are the nearby Douala-Edéa main road and domestic emissions. Due to the low volumes of traffic and limited housing in the area both sources are regarded as moderate and insignificant contributors, respectively, in terms of effects on baseline air quality. The transmission line crosses mainly rural land. Domestic emissions are unlikely to be significant due to there being only scattered residences in the vicinity. There is one existing industrial development in the vicinity of the proposed power plant, the Savonnerie Azur soap factory, which is adjacent to the site directly to the north.

A 3-month monitoring survey using diffusion tubes, commencing in November 2007, to measure background levels of Nitrogen Dioxide (NO2) and Sulphur Dioxide (SO2), and ozone (O3). The results of the survey will be incorporated into the ESIA. In the absence of local background data, data from a typical rural site 120 km to the south was utilised from 2006. Results showed that current levels of NO2 and SO2 are far below World Bank guideline values and ozone levels are typical of equatorial latitudes. Overall, baseline air quality in the vicinity of the proposed plant site and transmission line route can be considered to be good.

During the construction phase the potential impacts on air quality, for both the plant site and the transmission line are (i) dust generation from on-site activities, and (ii) vehicle exhaust emissions. Dust generation has a nuisance value and may present a health risk. However these effects are easily mitigated and impacts were assessed as being adverse of short duration and not significant.

During the operational phase, the potential impact is associated with emissions from the power plant. The impacts were fully modelled using air dispersion software and were assessed as being long-term and adverse, but of minor significance. World Bank Air Quality Guideline Values will be met.

A variety of mitigation measures will be adopted to minimise dust generation. These will be included in the Environmental Management Plan (EMP), which will ensure the measures are implemented.
6.2 NOISE
During the day, the dominant noise sources include traffic, noise produced by the existing soap factory, and insect noise.

Potential noise impacts from the Dibamba Power Plant will be from traffic and site activity during the construction phase and the small increase in traffic volumes, corona discharge (the noise generated by high voltage lines), and from the power transformers and engines during the operational phase. Traffic noise for both phases is assessed as being insignificant. The noise generated by high voltage lines is affected by the actual voltage and climatic conditions. In wet conditions audible noise levels increase however overall impacts will be insignificant.

Mitigation measures for the construction phase include:

- Regular maintenance of plant and equipment;
- Cutting, grinding, etc will take place in an enclosed space;
- Noisy operations will be sited maximum distances from sensitive receptors; and
- Controlling and limiting traffic movements around sites.

All noise generated in the construction phase is short-term and of minor significance.

Mitigation measures have been devised to protect local residents. These include construction of a noise bund (earth or similar), or stepping of the site, to attenuate noise at off site receptors. Silencing systems will also be fitted to the top of the stacks to reduce noise generated at this elevated level.

Predicted levels as a result of certain operational circumstances of the power station exceed WHO recommended guidelines at the closest receptor location. However, comparison with the existing measured levels indicates that current levels in this location exceed both the WHO guidelines and operational predictions. Given the predicted cumulative impact with the neighbouring soap factory resulting in an increase of 1dB, the impact of operational noise is considered negligible.

6.3 TRANSPORT
Potential traffic impacts from the power project include increased road traffic and increased safety risks.

During the construction phase traffic will be generated from a series of activities including, site clearance, construction of access road, installation of plant and equipment, and construction of the transmission line.

The traffic flow during the operational phase is very low and will have no significant impact on the environment.

Proposed mitigation measures will deal the potential problem of congestion and risk of accidents, include route management, such as route selection, hours of use; planned convoys; staff transport; driver training; vehicle maintenance; signage and consultation.

In summary, the main effects of the project will only occur during the peak construction phase and during peak hours. The overall impact is therefore predicted to be insignificant. During operation, a small number of workers and HGVs are associated with operating the power plant and no impacts are predicted to occur.
6.4 WATER RESOURCES
The Dibamba River lies too far from the site to be impacted. Generally the ground conditions allow a degree of rainfall infiltration and probably account for the general lack of locally-sourced surface water features in the plant site area. The soap factory, to the north of the site, was observed to produce an effluent stream which is channelled northwards, downhill to the main Douala-Edéa road. The stream was observed to function as an informal local water supply to a number of dwellings alongside. In the wider area the majority of inhabitants draw their water from a local borehole source. There is no information regarding the presence of an aquifer although it has been assumed that one exists within the area of the site.

During construction potable water will not be available locally and must be brought in by tanker. Non-potable water, required during construction, will be sourced from on-site boreholes. During operation of the plant and staffing facilities, including potable water, water from the boreholes will be treated and utilised.

Mitigation measures to minimise the potential contamination of surrounding watercourses and groundwater are identified and included within the Environmental Management Plan framework.

Overall, the potential impact upon groundwater resources, both in terms of resource availability and quality, has greater significance than for surface water. This is largely due to the absence of any local surface water receptor which could easily be linked to the power plant development (pathway). The overall assessment of impact has concluded that the majority of effects are minor or insignificant. No significant impacts are expected as a consequence of the transmission line construction or operation.

6.5 LANDSCAPE AND VISUAL
The project does not involve any major remodelling of the landscape, the main impacts on the landscape character being only the introduction of an additional transmission line adjacent to the existing road corridor and the construction of the plant. The plant site is not an entirely new form of development within the existing setting with the soap factory located immediately to the north of the plant site.

The route selection for the transmission line has been modified, where practical, to provide the maximum separation distance to existing residences so as to reduce visual intrusion as well as avoid property and cultivated land. At the plant site, the location of the actual power plant within the overall plant site has been selected to maximise, where possible the separation distance to the properties in the area and the main road, and enables a vegetation belt to re-establish during operation. Bunding and stepping of the site is also being considered to reduce visual impacts.

Mitigation includes allowing re-vegetation on site in the disused areas and painting of the stacks regularly the same or similar colour as the sky. Landscape and visual impacts are assessed as long-term and adverse but of minor significance.

6.6 LAND USE
The primary impacts on land use are associated with the need for land take from the plant site and the clearance of vegetation form the plant site and the transmission line corridor. Impacts arise in both construction and operational phases and most changes will be permanent in nature.

Good on-site management in the construction phase will assist in minimising the amount of disruption to local land users. With regard to the operational phase, compensation for loss of land use will be negotiated. Another method of mitigation is to allow continuation of agriculture within the wayleave on conditional terms and in compliance with strict vegetation management guidelines. However this would be at the risk of AES Sonel needing access to the line and for maintenance for safety reasons. As land use capability within the project area is low, population density and therefore pressure on land resources is also low impacts on land use is therefore considered to be insignificant and long-term.
6.7 FLORA AND FAUNA
Potential impacts on the flora and fauna are:

- Permanent loss of existing habitats and related biodiversity due to land clearance for construction;
- Loss or alteration of habitat types due to clearance for the transmission line wayleave;
- Habitat severance due to clearance of the 30m wayleave; and
- Disturbance of wildlife and potential increase in road kills, etc. due to project construction and operation activities.

The proposed mitigation measures are therefore based on minimising the area of land take, utilising already disturbed areas (e.g. existing road and wayleave corridor), vegetation management (retention of vegetation in wayleave to 2m height where practicable), control of noise during construction and at the plant site during operation, and vehicle speeds.

Whilst the development will result in the loss and alteration of this habitat, and has the potential to cause disturbance to wildlife, the overall area of impact is relatively low and due to the current level of disturbance within the area, overall impacts are minor.

6.8 SOILS
The primary impacts on soils arise from existing contamination associated with the soap factory to the north. Secondary impacts can also arise from the disturbance of soils and vegetation, leading to erosion. Spillage of oils and other potentially polluting substances during construction and operation may also lead to ground contamination.

During construction the volumes of fuels and oils on-site will be relatively low as bulk storage is not required. The main potential impact of the project involves bulk storage of HFO, LFO, transferring and processing of fuel-oil at the power station during its operation. However, control systems for bulk fuel-oil storage and handling are in common use throughout the world and other AES Sonel power stations and if correctly managed are effective at preventing spillage to the environment. Spillage or leakage may cause localised soil and / or groundwater contamination; the clean-up or remediation is dependent upon the quantity involved and the future uses of the area, these will be detailed in the EMP. In addition basic measures such as placing tanks / or drums within concrete bunds or containment of any stored materials so as to stop direct discharge to the environment should be implemented. The overall impacts arising from the project due to soil and / or groundwater contamination will be reduced such that the impacts are not significant.

6.9 CULTURAL HERITAGE
No sites of cultural and/or spiritual significance were identified on or in the immediate vicinity of the site. There are no national legally protected cultural heritage areas/buildings on the site and in the surrounding areas.

Primarily potential impacts will only be associated with the construction of the power station, principally through site levelling and foundation excavations.

In order to confirm the presence or absence of deposits of regional or higher archaeological value, further monitoring surveys should be undertaken to confirm the presence of such deposits. It is considered that further investigation works can be undertaken in parallel with commencement of works provided appropriate on-site best practice measures are implemented. Mitigated impacts will be long term, adverse but not significant.
6.10 WASTE
Potential impacts on waste arisings will be associated with:

- Vegetation waste from site clearance;
- Spoil from groundworks, including site levelling, landscaping, backfilling;
- Construction wastes, including excess materials, temporary structures and staff wastes (domestic and sewage);
- Operational waste arisings - sludge and water from oily water treatment, water from the site drainage system; domestic waste; sewage waste; and commercial office wastes;
- Vegetation from wayleave management; and
- Decommissioning wastes.

Mitigation measures will require the planning and management of materials during construction, operation and decommissioning to reduce the volume and types of waste arising, and to promote the waste hierarchy (reduce, reuse, recycle, recover, landfill). A waste management plan should be drawn up and implemented for each phase.

7. SOCIAL IMPACT ASSESSMENT

7.1 POPULATION AND DEMOGRAPHICS
The project area is located in the Littoral Province. Eighty-two per cent of the Littoral’s population are urban dwellers. The majority of the urban population can be found in Douala City. This population is very young with the average age being 21.9 years and 50% of the population is under 15 years old.

Independent of the SIA and in line with Cameroonian legislation, a full land and property census was undertaken by the Compensation Commission (in November 2007) established by the Littoral Divisional Officers, as specified by the Public Utility Decrees signed by the Minister of State Property and Land Tenure for the project (in November 2007). Initial findings of the census indicate the following are within land take required by the project and will therefore need to be resettled:

- 54 crop fields (belonging to 47 individuals);
- 3 Buildings (one place of residence, one property under construction and one disused timber storage facility);
- 0 graves; and
- 25 titled lands (12 belonging to 10 individuals and 13 belonging to 6 companies/associations)

There are no households at the plant site and only 3 properties in the vicinity of the wayleave, which will be directly affected. Up to 47 households will lose access to the land they currently farm that is within the project area and 2 households will lose their houses and one business will lose its storage infrastructure.

Land requisition along the corridor of the transmission line is potentially the most important social impact on the local population and demographics. With requisition of land there are a number of potential impacts:

1 The corresponding number of households will be confirmed during the Resettlement Action Plan stage.
• Associated resettlement;
• Conflict with host populations; and
• Loss of cultural property.

In addition, the project will also potentially be affected by in-migration.

The key mitigation measure to minimise the impact of the project on the population is project design and the location of the plant and the transmission line in uninhabited areas. Seven alternative plant sites were reviewed and the preferred land-based site was chosen to minimise the need for resettlement. The transmission line route was also selected to avoid residential properties as far as possible.

For the 3 residences requiring resettlement, it will be mitigated by a Resettlement Action Plan (RAP) that will be drafted in compliance with requirements of the World Bank Operating Policy 4.12 and IFC Performance Standard 5. Resettlement will be completed before physical works begin on the plant or transmission line. With the implementation of the RAP the impact for land requisition and resettlement are assessed as adverse, long-term and minor. Should resettlement be to more productive land the impact will be beneficial.

In-migration will primarily be in the construction phase when there will be a maximum of 480 employees required of which approximately ten percent are expected to be sourced locally. Impacts may be STIs HIV/AIDs etc. Sensitisation of the local communities and contract workers about safe sex and general behaviour should minimise negative impacts. However, this short-term influx of up to 480 people is assessed as adverse and significant.

7.2 ECONOMIC ENVIRONMENT

The project area is characterised by moderate to severe poverty. Many people in the area lived by subsistence farming or informal sporadic roadside business activities. The main sources of income in the project area were, in descending order of importance, informal sector (48%) of which agriculture was 34% and commerce 14%, the formal sector provided 33% of the main employment in various forms from drivers to working in the government and AES Sonel to construction workers such as carpenter and builders. 19% of the members of the household were unemployed.

The key negative impacts on the economic environment are the loss of land and compensation discrepancy through land right disputes. These tend to be short-term effects and can, with proper management, be adequately mitigated. However the project has potentially significant longer-term positive impacts relating to increased national power supply and associated regional economic benefits plus local economic effects from both shorter term and long term increases in employment and trade.

To mitigate the adverse impacts the process for compensation will be provided within the RAP. Compensation will be undertaken with reference to the World Bank OP 4.12 and IFC Performance Standard 5 guidelines and will focus on providing full and appropriate redress for any economic loss suffered by the project affected people.

Overall, the impacts will be positive during a limited period of time on the local population despite some minor negative impacts that can be mitigated through good compensation strategies and information and sensitisation campaigns. At the national level, the impacts will be positive during a longer period.

7.3 SOCIAL SERVICES AND INFRASTRUCTURE

There are a number of primary schools in the Douala III subdivision but very few in Yassa village itself. None are understood to be currently located within the land required for the project. Literacy in
the project area is also high, which was supported by the findings of the household survey undertaken. The most common health facilities used by the local population were the Leproseries of Dibamba, Health Centre of Barcelone, Health Centre of Ndogpassi, Health Centre of Japoma and Health Centre of Oyack, however most of the interviewed households identified the local hospital as their local treatment centre.

The Yassa village has access to the main primary road (tarred) that connects the Littoral Province to the South province as well as many other secondary untarred roads which connect it to the other villages. However, as very few people own or have access to private cars or motorbikes, the roads are used mainly for walking or ‘hitching a ride’ to Douala or Edéa.

The main source of water in the project area is boreholes followed by a tap in the yard, well in the yard, and tap in the house. There are several borehole locations identified by the local population, including a Sawawa borehole, MAG borehole, community borehole, and other company boreholes.

Communication via radio is the main source of information in the project area. In addition, the majority of households surveyed had mobile phones.

A certain level of household wealth has been demonstrated as 48% of the properties have electricity whilst 49% can afford petroleum as a fuel source.

The key potential impact on the social infrastructure is pressure on health services. In addition, there may be more minor impacts on the local education, communication and electricity services. With regard to health services, the construction phase is when there is potential to put considerable strain on the local medical services. In mitigation, the Contractor will be required to provide additional basic medical services, such as an on-site health post. During the operational life of the project, staff numbers will be approximately 40 and all of these will live in towns where existing facilities can accommodate their medical needs. Effective mitigation will also involve good sensitisation about sexually transmitted diseases and HIV/AIDS.

In addition, there may be more minor impacts on education, electricity and communication services. It is concluded that the potential for large numbers of school-age children moving into the area is low as the construction phase will be a short-term operation and the operational phase will only employ 40 people full-time. The impact on existing educational services will therefore be insignificant. The impact on communications will be neutral to positive. There may be an indirect positive impact if the project generates income and more people are able to afford mobile phones. Similarly with electricity, increased local income generated by the project would mean that more people could be expected to afford to pay for electricity. However overall additional long-term employment is relatively low and therefore major increases in access to local services is unlikely.

7.4 ELECTROMAGNETIC FIELDS – COMMUNITY HEALTH

This section of the ESIA deals with the potential issue of electro-magnetic fields (EMF) and their impact on community health.

Electric and magnetic fields are present wherever electricity is used. For the last twenty years it has been widely debated if these fields are damaging to human health. There is a range of divergent views, but the balance of scientific evidence to date suggests that Electromagnetic Fields (EMFs) do not cause disease. However, international organisations such as the International Commission on Non-Ionising Radiation Protection (ICNIRP) and independent states have set guidelines on exposure limits on EMFs to minimise the potential for shocks and interference with the body’s nervous system.

For the purposes of this study a comprehensive literature review was undertaken of the most relevant and up to date information on this topic. From this the potential for impacts to arise from the proposed power transmission line were assessed.
There are no specific, physical mitigation measures proposed to offset potential impacts from EMF effects. However, EMF levels will be within recognised international limits below or close to the line. The line will however be within a wayleave where no residential properties, or any built development, will be permitted. For the current design this will result in the nearest that any property can come to the line being approximately 15 m.

**8. ENVIRONMENTAL HAZARD MANAGEMENT**

Increased risk to road users is related to the increase in volume of traffic and the route the haulage takes. As noted above, limited options exist for altering either of these. Therefore the main measures to be implemented to reduce accident risk are as follows:

- **Driver Training** – Education for drivers to increase awareness of sensitive areas, identified in the Route Management plans. In addition, sub-contractors will be required to assess the competence of each driver and brief them on the following: daily vehicle checks; tyre changing; understanding vehicles’ operating limits; vehicle care (revving engine, safe breaking); what to do in the case of an accident; reporting defects; securing loads.

- **Health and Safety** – Implement appropriate driver safety procedures including limiting hours of working, ensuring no alcohol or other substances are consumed prior to or during shifts. An information board with site safety information will be displayed on-site, including contact details of first-aiders on-site;

- **Vehicle Maintenance** – Vehicles will be maintained to ensure breaks, lights and warning signals are fully functioning;

- **Signage Strategy** – Signage to be erected on the main road leading up to the site access and to provide advanced warning to site traffic and other motorists. A prescribed speed limit will also be in force on the access road. Road markings will be in accordance with relevant Cameroon standards;

- **Consultation** – Presentation to local villagers to inform them of the increased traffic and duration of works. Consideration should also be given to undertaking an educational presentation at local schools to reinforce the messages of traffic awareness and site safety; and

- **Emergency Response** – A plan will be developed addressing all eventualities including, for example, fire, explosion, collapse of structure, serious injuries, spillage of chemicals and exposure to toxic substances.

**Construction**

During Construction phase, poor control of on-site sanitary facilities for workers may result in human waste being discharged to streams with a resultant increased risk of illness within communities using streams as drinking water sources. Dust generation has a nuisance value and may present a health risk.

Where oils and chemicals are stored or used during the construction phase of the project, the potential for spillages to occur leading to soil contamination exists. Where this occurs this can present a health hazard.

Where the power plant site is impacted by spills or leaks from the soap factory, construction workers could potentially be exposed to contaminated soil, groundwater or dust. As a minimum, construction workers should be supplied with appropriate personal protective equipment (PPE) such as safety boots, hard hats, chemical-resistant gloves and dust masks.

During the operational phase, the main risk during the operational phase is from a potential spill from the bulk diesel fuel storage required to provide fuel supply.

Electric and magnetic fields are present wherever electricity is used. For the last twenty years it has been widely debated if these fields are damaging to human health.

Growing of low-level crops and grazing by stock will be permitted at the risk of the farmer and AES Sonel will reserve the right to clear the land as required for the safety of the project.

During the decommissioning activities, the post closure all sources of potential pollution will be removed and no further risk of impacts on groundwater quality will exist.
9. MONITORING PROGRAM

The full EMP will provide a detailed monitoring programme, which is essential to ensure the project achieves its operating standards. However, it is equally essential that the data collected is accurate and reliable. Protocols will therefore be developed to control this monitoring. These will include the following:
• Sampling methods;
• Sampling location and frequency;
• Equipment types and calibration;
• Data recording and logging;
• Routine audits.
Where off-site laboratories are to be used, these will be checked to ensure appropriate standards are achieved.
A summary of monitoring requirements for the project is listed below:

For Construction Phase:
• AES regular inspection and audits
• AES audits of maintenance record and visual inspection of vehicles
• Review complaints regarding noise via SMP liaison system
• AES Sonel to keep track on accident data and respond in an appropriate manner ensure the risk is reduced
• Design checks and on site monitoring during construction
• Monitor on site water use
• AES regular review of compliance of operations
• Daily inspection of oil bunds and separator
• Quarterly noise monitoring at sensitive sites for first year and if complaints received.
• Undertaken Bi-annual surveys to ensure vegetation is not in excess of 2m

For Operational Phase
• AES regular inspection and audits
• Continuous in stack monitoring for air emissions
• Three month ambient air quality monitoring once the plant is fully operational in same positions as the baseline monitoring
• AES regular review of compliance of operations
• AES Sonel to keep track on accident data and respond in an appropriate manner ensure the risk is reduced
• Design check and monitoring during construction
• Monitor on site water use
• AES regular inspections to ensure system is in full working order
• Repainting buildings every two years as a minimum
• Bi-annual surveys to ensure vegetation is not in excess of 2m
• Weekly inspections during dry season. Daily during rainy season to ensure bund does not get full of rain water
• Daily inspection of oil bunds and separator
• Quarterly noise monitoring at sensitive sites for first year and if complaints received.

For Decommissioning
• Design checks and monitoring during construction
• Monitor on site water use
• AES regular inspection and audits
• AES regular review of compliance of operations
• AES Sonel to keep track on accident data and respond in an appropriate manner ensure the risk is reduced
• Weekly inspections during dry season. Daily during rainy season to ensure bund does not get full of rain water
• Daily inspection of oil bunds and separator

10. SOCIAL MANAGEMENT PLAN

In line with international practice a framework Social Management Plan (SMP) is presented within the ESIA. This framework document includes an outline of the monitoring and management required for the smooth running of the project. The elements of the SMP include:

• Social Policy;
• Project Review;
• Social Standards and Quality Objectives;
• Register of Social Impacts; and
• Mitigation and Implementation.

Prior to the start of any work on site, a detailed SMP will be drawn up.

11. PUBLIC CONSULTATIONS

The consultation process for the Dibamba Power Project follows World Bank, International Finance Corporation (IFC) and African Development Bank guidelines. Consultations were be initiated as early as possible, during the preparation of the EIA. In addition, the project sponsor consulted throughout project implementation, as necessary to address ESIA related issues. The draft ESIA report provided prior to consultation and in a form and language that are understandable and accessible to the groups being consulted, including local NGOs.

An additional fundamental requirement in World Bank/IFC/ AfDB policies on resettlement (land acquisition and compensation) is a framework for public consultation, participation, and the establishment of a process to redress the grievances of affected people. Consultation with the affected population and with officials of local government, civil society and other representatives of the affected population is essential for gaining a comprehensive understanding of the types and degree of adverse effects. This has been undertaken for Dibamba Power Project by working through the local political structures and protocols.

Emphasis is placed on the engagement of local stakeholders, namely people who are likely to experience the day-to-day impacts of a proposed project. On a practical level, the sponsor has to ensure that:

• All stakeholders have access to project information;
• The information provided can be understood;
• The locations for consultation are accessible to all who want to attend; and
• Measures are put in place which ensure that vulnerable or minority groups are consulted.
DIBAMBA POWER PROJECT

PROJECT LOCATION PLAN