

WEST AFRICAN POWER POOL
SYSTEME D'ECHANGES D'ENERGIE ELECTRIQUE OUEST AFRICAIN

General Secretariat / Secrétariat Général



CONSOLIDATED ENGLISH EXECUTIVE SUMMARY

*on the MAN (Côte d'Ivoire) - SANNEQUILLE (LIBERIA) - NZÉRÉKORE (GUINEA) - BUCHANAN (LIBERIA) -
MONROVIA (LIBERIA) - BUMBUNA (SIERRA LEONE) - LINSAN (GUINEA) INTERCONNECTION PROJECT*



CONSOLIDATED EXECUTIVE SUMMARY

December 2011



1. Introduction/Background

1.1. Overview of the Proposed Project

The West African Power Pool (WAPP) organization was established by the highest decision making body of ECOWAS, the Authority of Heads of State and Government of Member States, as a mechanism and institutional framework for integrating the national power systems of ECOWAS member countries. The objective of the WAPP is to establish a regional electricity market in West Africa through the judicious development and realization of key priority infrastructure that would permit the accessibility to economic energy resources, to all member states of the ECOWAS and help meet the energy needs of the ECOWAS citizenry by providing least cost reliable and sustainable electricity supply for economic development.

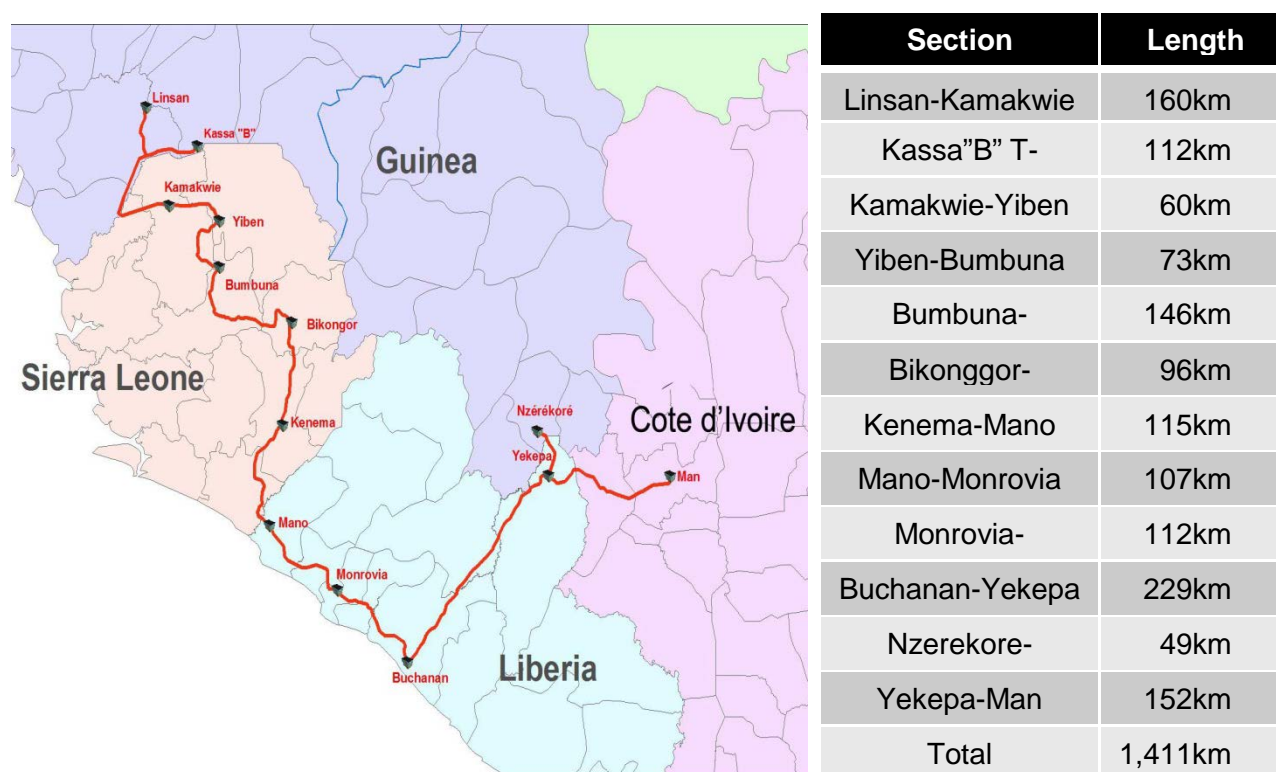
The Implementation Strategy of WAPP is based on developing complementary and mutually reinforcing infrastructure sub-programs, which when realized, will result in an integrated electricity system and market in West Africa.

Prominent among the infrastructure sub-programs to be developed is the WAPP Cote d'Ivoire – Liberia – Sierra Leone – Guinea Redevelopment Subprogram that aims to integrate the post-conflict countries of Liberia, Sierra Leone and Guinea into the WAPP regional electricity market. The situations in the three countries require that their energy supply capacities be urgently augmented and reinforced. The development of the Bumbuna hydro power plant in Sierra Leone, the development of hydropower resources in Guinea and the re-development of the Mount Coffee hydro power plant in Liberia in addition to utilization of gas-generated electricity from Cote d'Ivoire will permit the exchange of low cost power between Cote d'Ivoire, Liberia, Sierra Leone and Guinea. This power exchange will however require a high capacity transmission interconnection from Côte d'Ivoire to Guinea through Sierra Leone and Liberia. Accordingly, the WAPP Secretariat, the Société d'Opération Ivoirienne d'Electricité (SOPIE) of Côte d'Ivoire, the Electricité de Guinée (EDG) of Guinea, the Liberia Electricity Corporation (LEC) of Liberia and the National Power Authority (NPA) of Sierra Leone are undertaking a project that will comprise the construction of a high voltage transmission line from Man (Côte d'Ivoire) to Linsan (Guinea), through Yekepa (Liberia), Buchanan (Liberia), Monrovia (Liberia), Nzérékoré (Guinea) and Bumbuna (Sierra Leone), with associated high voltage substations. This project, which would greatly facilitate the power exchanges among the countries in the West African sub-region, is known as the Côte d'Ivoire – Liberia - Sierra Leone - Guinea Interconnection Project. The project, which would be executed in Côte d'Ivoire, Guinea, Sierra Leone and Liberia, will result in the following:

- Construction of approximately 1,411 km of high voltage transmission line
- Extension of a new high voltage substation in Man (Côte d'Ivoire)
- Construction of a new high voltage substation in Yekepa (Liberia)
- Construction of a new high voltage substation in Nzérékoré (Guinea)
- Construction of a new high voltage substation in Buchanan (Liberia)
- Construction of a new high voltage substation in Monrovia (Liberia)

- Construction of a new high voltage substation in Mano (Liberia)
- Construction of a new high voltage substation in Kenema (Sierra Leone)
- Construction of a new high voltage substation in Bikongor (Sierra Leone)
- Construction of a new high voltage substation in Bumbuna (Sierra Leone)
- Construction of a new high voltage substation in Yiben (Sierra Leone)
- Construction of a new high voltage substation in Kamakwie (Sierra Leone)
- Construction of a new high voltage substation in Linsan (Guinea)

Figure 1 Transmission Line route of the proposed Project



With funding from the EU-Africa Infrastructure Trust Fund through the European Investment Bank (EIB) and the Kreditanstalt für Wiederaufbau (KfW), the Korean Electric Power Corporation (KEPCO) was contracted on September 8th, 2008 to implement consulting services that included the following:

- Line Route Study:
 - Study and determination of line route and substation locations;
 - Undertake detailed survey and profiling of line route and substations;
 - Drafting and preparation of maps and drawings.

- Environmental and Social Impact Assessment (ESIA):
 - Study of Existing Environment;
 - Identification & Assessment of Potential Environmental Impacts;
 - Identification of Mitigation Measures;
 - Conduct Public Consultations;
 - Preparation of an Environmental & Social Management Plan (ESMP) and a Resettlement Action Plan (RAP).

The proposed Project has to meet the environmental requirements of the rules and regulations governing the protection of the environment in the four countries.

This ESIA evaluates and presents the environmental impacts that are expected to result from construction and operation of the proposed Project, and in accordance with the related guidelines from World Bank, AfDB, EIB and KfW, the ESIA identifies alternatives in the proposed Project that could avoid or minimize significant environmental impacts associated with the proposed Project. It presents recommended mitigation measures that for the environmental impacts identified. These measures are taken to ensure that environmentally sound practices are adhered to in order to safeguard the safety and health of all categories of people within the project area. In addition, the environmental monitoring and evaluation program herein is developed to determine the constant monitoring and evaluation the impacts of the project on the biological, physical socio-economic and cultural environments within the project area.

It is in this light that this ESIA (Environmental and Social Impacts Assessment) is prepared in order for the WAPP project to ensure the sustainable or wise use of the natural resources in pursuance of social and economic development within the ecosystem's renewal and re-supply process. Also the intent of this ESIA is to inform the public and meet the needs of permitting agencies that are considering the proposed Project. The proposed Project is described briefly below and in detail the Project Description of the ESIA.

The content of the ESIA reflects relevant input received from government officials, agencies, nongovernmental organizations, and concerned members of the public during the ESIA study.

The ESIA highlights the most important environmental issues such as the environmental mitigation measures that take into consideration the minimization of potential adverse environmental impacts and the maximization of beneficial impacts that associated with the implementation of the project, these measures are taken to ensure that environmentally sound practices are adhered to in order to safeguard the safety and health of all categories of people within the project area.

In addition, the environmental monitoring and evaluation program herein is developed to determine the constant monitoring and evaluation the impacts of the project on the biological, physical socio-economic and cultural environments within the project area.

This action will ensure the environmental conformity of the project with the environmental rules and regulations of the Republic of Sierra Leone, Cote d'Ivoire, Liberia and Guinea.

1.2. Sierra Leone Background

Sierra Leone was engulfed in a series of civil war between 1991 and 2002 with some sense of civil authority re-established in 1999. Prior to the commencement of the Civil wars, the economy of the Country was supported primarily by mineral exports of rutile, diamonds and bauxite as well as the coffee, cacao and timber industries in the agricultural sector. The civil war and political instability have led to a drastic decline of local production and the whole economy as well as the destruction of infrastructure including the electricity supply system. The recovery of economic activity is on track following the re-establishment of civil authority. An essential and critical requirement for the success of economic recovery activities is the availability of electricity. During the period of civil disorder the country's physical infrastructure, particularly electricity, suffered from lack of maintenance and in cases abandonment. The net result is that Sierra Leone now has a severely limited electricity service. Public supply is unreliable and many individuals and entities undertake self-generation to secure electricity supplies. The services obtained through self-generation are particularly costly. Predictably large sections of the populace have been unable to buy their own generators and so only a very limited part of society has access to electricity supply. The situation in Sierra Leone requires that energy supply capacities be urgently augmented and reinforced.

With the implementation of the West African Power Pool (WAPP) CLSG Interconnection Project, which is expected to foster power exchanges among the countries in the West African sub-region, a high capacity transmission interconnection line from Côte d'Ivoire to Guinea through Sierra Leone and Liberia will be required. This interconnection line will also be in line with the adopted WAPP Master Plan. The implementation of the Man-Yekepa-Nzérékore -Buchanan-Monrovia-Bumbuna-Linsan interconnection project (the proposed Project) will also further reinforce the interconnection of "Zone A" and "Zone B" of the WAPP through Côte d'Ivoire, thereby increasing opportunities for trade and the establishment of a regional power market.

The Sierra Leone section of the project comprises the construction of five (5) substations and 530km of 225kV transmission line. The project will be carried out within a Right of Way (RoW) of 40 m that will span seven districts namely, Pujehun, Kenema, Kono, Tonkolili, Koinadugu, bombili and Kambia for a distance of about 530km. The transmission line will enter Sierra Leone territory, crossing the Mano and Moa Rivers, through Bombohun, (after Mano on the Liberian border with Sierra Leone) in the Soro Gbema Chiefdom, Pujehun District in the South, follow the existing road network from Potoru, Barri Chiefdom, to enter Kenema Town, the Provincial

Headquarter Town in the east of the country. In this section the proposed line route avoids the Gola Forest and other sensitive areas. One substation (Kenema substation) will be constructed in Gofor, 2 km to Kenema on the Potoru – Kenema Highway. From Kenemasubstation, the transmission line continues to the north to enter Bikongor substation in the Nimiyama Chiefdom, Kono District. From Nimiyama Chiefdom it will go through Jaiama Nimikoro and then follow the existing road to Bumbuna, Kalansogoia Chiefdom. One substation (Bikongor substation) will be constructed in Ndoyorgbo 2 km from Jaiama Nimikoro along the existing road to Bumbuna. Another substation (Bumbuna substation) will be constructed in a town called Kabaray, 2 km to Bumbuna Town. From Bumbuna Town (Town of the Bumbuna Hydroelectric Plant), the line will enter Fadugu, Kasunko Chiefdom. Another substation (Yiben subsation) will be constructed at Kathadougbu Road, 1 km east of Fadugu. From Fadugu, the line will continue to enter Kamakwei, Sella Limba Chiefdom. In Sella Limba Chiefdom, another substation (Kamakwei substation) will be constructed 4 km from Kamakwei in a town called Kathirie, and the line detours the Outamba-Kilimni National Park to the south and crosses the Great Scarcies River to enter Guinea territory.

1.3. Liberia Background

The Republic of Liberia was engulfed in a series of civil war between 1989 and 2003 when finally civil authority was re-established. Prior to the commencement of the Civil wars, the economy of the Country was supported primarily by mining of iron ore and diamonds as well as timber industries.

The West African Power Pool (WAPP) therefore will help the Liberian economy by providing needed power at a time major users of electric power are presently investing in the Liberian economy.

The Liberia section of the proposed Project comprises the construction of four (4) substations and 532km of 225kV transmission lines. One substation in Sannequille town, one in Buchanan, one to be located at Mount Coffee in Monrovia and the other one to be located near Mambo Town in Grand Cape Mount County. The construction of the substations and high tension electric transmission lines from Yekepa to Mano River run across the entire length and breadth of Liberia. The line passes through seven (7) administrative subdivisions in Liberia (Nimba, Bong, Bassa, Margibi, Montserrado, Bomi and Grand Cape Mount Counties) within a narrow corridor of 40 m.

1.4. Guinea Background

Guinea, in West Africa on the Atlantic, is also bordered by Guinea-Bissau, Senegal, Mali, Côte d'Ivoire, Liberia, and Sierra Leone. The country consists of a coastal plain, a mountainous region, a savanna interior, and a forest area in the Guinea Highlands. The highest peak is

Mount Nimba at 5,748 ft (1,752 m).

Guinea achieved independence on Oct. 2, 1958, and became an independent state with Sékou Touré as president.

Guinea has had ongoing difficulties with its neighbor, Liberia which was embroiled in a long civil war during the 1990s and again in 2000-2003. The influences from the neighboring countries and political instability have led to a drastic decline of local production and the whole economy as well as the destruction of infrastructure including the electricity supply system

Policy Sector Development adopted by ECOWAS aims to remedy this situation by the interconnection of the different networks to remote areas from the power generating countries such as Côte d'Ivoire, Nigeria and Ghana. It is in this context that the proposed Cote d'Ivoire - Liberia - Sierra Leone - Guinea interconnection project which is a lot of the vast West African interconnection projects.

The project involves the construction of a 12km long high voltage line between the Yekepa (Liberia) and N'Zérékoré, and 221km long transmission line between Kamakwie (Sierra Leone) to Linsan through Moussaya and Madina Oula, too, involves the construction of a transformer station in N'Zérékoré and Linsan. The total length of Cote d'Ivoire – Liberia - Sierra Leone - Guinea interconnection line is approximately 1,411km and the Guinea section is 233 km.

The plateau of Lower Guinea is a thick sandstone formation that covers the granitic basement. Water erosion has carved deep gorges and valleys in the sandstone. Found in the plains cut by the valleys of the river and its tributaries Kolenté breastplates lateritic (bowé) also of Tertiary origin located in the highlands. The figure shows the geographic features of the project area as a whole. The Yekepa (Liberia) - Nzérékoré (Guinea) section is a mountainous area of height around 500m~1100m. Linsan to Kamakwie in Sierra Leone is a savanna area under 50m height and hilly and swamp area. Hydromorphic vast plains form the typical landscape, crossed by many rivers such as Kollenté, Biankonko, Kagbelén, Monkito River. They occupy more than half the size of the study area. These low plains contain primarily hydromorphic (lowlands).

Guinea's terrain and its impressive collection of rivers give it enormous hydroelectric potential. More than 120 suitable sites have been identified over the years. The total installed power capacity of EDG is 226.4 MW, which comprise 56% from hydro power and 44% from thermal power. In addition to the power plants of the EDG, independent producers provide an installed capacity estimated at 160 MW, which comes from the mining companies and the other producers. The cumulative hydropower potential in Guinea is estimated at a capacity of about 6.1 GW, for an estimated annually guaranteed energy supply of 19,000 GWh. To date, less than 3% of this potential has been developed.

In spite of large potential in hydro energy, the electrification rate and electricity consumption per capita are respectively 21% and 130kWh.

| Line length / Substations in Guinea Covered by the Project | Area of Influence of Potential Electrification | Average Density of Population(inhabitants/ km ²) |
|--|--|--|
| 233km / 2 Substaions | 628km ² | 38.6 |

Within the implementation of the interconnection project, construction of 233 km high voltage transmission line and 2 substations will provide opportunities for rural electrification. Considering the average density of population of Guinea (38.6 inhabitants/km²) and the assumption that the residents located within the radius of 10km of substations could get benefit of electrification from the Project, the area covered by 2 substations is approximately 628 km².

Then it gives the number of potential beneficiary of electrification generated by the Project implementation, 19,150 persons [19,150=628*38.6*(1-0.21)] excluding the rate of persons who access electricity already (21%).

Supply of adequate and reliable electric power supply will improve security, good governance, development of industries as well as the quality of local communities

1.5. Cote d'Ivoire Background

As part of the implementation of its priority projects, the Secretariat of the West African Power Pool (WAPP), decided the project of constructing the 225 kV power line between the City of Man of Cote d'Ivoire and the border of Liberia through the town of Danane in Cote d'Ivoire.

Liberia, Sierra Leone and Guinea were engulfed directly or indirectly in a series of civil war between 1991 and 2002. Prior to the Civil wars, the economy of the Countries was supported primarily by mineral exports such as rutile, diamonds, iron and bauxite as well as the coffee, cacao and timber. The civil war and political instability within these countries have led to a sharp decline of local production and the whole economy as well as the destruction of infrastructure including the power network. The recovery of economic activity is on track following the re-establishment of civil authority. An essential and critical requirement for the successful economic recovery is related to supply electricity. During the period of civil disorder the country's infrastructure, particularly electricity is suffered from lack of maintenance and in cases abandonment.

With the implementation of the West African Power Pool (WAPP) CLSG Interconnection Project, which is expected to foster power exchanges among the countries in the West African sub-region, a high capacity transmission interconnection line from Côte d'Ivoire to Guinea through Sierra Leone and Liberia will be required. This interconnection line will also be in line with the adopted WAPP Master Plan. The implementation of the Man – Yekepa - Nzérékore – Buchanan – Monrovia – Bumbuna - Linsan interconnection project (the proposed Project) will also further

reinforce the interconnection of "Zone A" and "Zone B" of the WAPP through Côte d'Ivoire, thereby increasing opportunities for trade and the establishment of a regional power market.

The Cote d'Ivoire section of the project comprises the extension of the existing Man substation and construction of 116 km of 225kV transmission line up to the Liberian border

The work to be undertaken to ensure the transit of energy consists of three (3) main entities that are:

- General earthworks (Clearing and felling of trees) to open the corridor through fields, woodlands, lowlands and opening access roads.
- Excavation for the installation of metal tetrapod lattice pylons of average height of about 20 meters on armament with footings minimum ground 5 X 5 meters. These towers are the most visible part of the line.
- Installing a transmission system is consisting of three air (3) phase conductors protected by a ground wire that will be installed on the top of the towers from the ground to the party about 20 meters higher and the lower part of about 8 meters.

This new line is close to "High Voltage" and "Medium Voltage" lines from the BUYO dam or leading to TOUBA, DANANE and ODIENNE.

The line crosses several rivers such as DAIN, GNON, KO, GBLI, ISSONEU, KEGBEU (AP10), BAN, TIAN, and KOHIBA N'zo. Between AP7 and AP8, there is Cavally River and MOUAN river is located near the border of Liberia.

The Glaw and ZREUGOUALE mountains (AP9 - AP10) and the mountain chains punctuate the corridor.

The Sacred sites in the line route were: the sacred forest of the BIGOUIN village (AP1-AP2) and sacred water to Mahapleu.

And there are many lowlands and there are some heavily forest areas as it was reported in the initial state of the environment.

Given these obstacles, the following changes were made of the route:

- Modification of the position of the AP2 so that the direction AP1-AP2 does not pass through the sacred forest of the village of BIGOUIN;
- About 40 meters of the draft line route between AP2 and AP3 was moved to avoid the superposition of the line AP2 - AP3 on the existing MV line;
- Altering the position of the AP3 because of the moving above
- Changing the direction AP3 - AP4 because of the changeover of the position of AP3;

- Shift the position of AP6 to adopt the optimal position relative to the deflection of the city of SANGOUINE and the existing HV line going to DANANE
- Shift the position of AP6 to avoid the Project ADB-West area

The existing 90kV line passes from 225kV Man substation to 90kV Danane Substation. In this section, the CLSG transmission line will run in parallel with the existing line to minimize the environmental impacts and to raise the efficiency of maintenance and operation. The distance from the axis of the existing line shall not be less than 50 m, to avoid dangerous approaches of conductors and minimize line-to-line electrical induction.

2. Institutional Framework

The related organizations for this proposed Project each have a unique jurisdiction and subsequently unique objectives, or purpose and need. Therefore, the statement of objectives or purpose and need for the electricity companies and the Environmental Protection Agencies (EPA), related Ministries are described in detail below.

2.1. WAPP

As per the decision by ECOWAS, WAPP's purpose and need for the approval and implementation of the proposed Project is to meet the urgent augmentation and reinforcement of the infrastructure within Liberia, Sierra Leone, and Guinea connecting with the Cote d'Ivoire transmission network. This Redevelopment Subprogram is to integrate the post-conflict countries of Liberia, Sierra Leone, and Guinea as a WAPP regional electricity market. WAPP has two primary aspects, as follows:

- 1) Provide electricity connection to Liberia, Sierra Leone, and Guinea by connecting with the existing Man substation (Cote d'Ivoire).
- 2) Utilization of the Bumbuna hydro power plant (Sierra Leone), and the re-development of the Mount Coffee hydro power plant (Liberia), and the hydro power resources in Guinea in addition to utilization of gas-generated electricity from Cote d'Ivoire

2.2. Environmental Protection Agency (EPA)

The primary purpose and objectives of the EPAs in approving the proposed Project is to protect the environmental sensitive areas within each country, and to minimize the adverse impacts to the protected areas by the proposed project and complying with the environmental and socio-economic guidelines. The EPAs in Sierra Leone is the SL-EPA; in Liberia is EPA; in Guinea is BGEEE; in Cote d'Ivoire is *ANDE*.

2.2.1. MAFFS in Sierra Leone

The purpose and need for action by the MAFFS (Ministry of Agriculture and Forestry and Food Security) in Sierra Leone is to respond to WAPP and NPA's request for a special use authorization to construct the proposed Project on agricultural area and on the forest and ensure the Project is in compliance with the Land Management Plan (Forest Plan). The objectives are to minimize adverse impacts on agricultural lands and the forest to minimize adverse impacts to forest management activities.

2.2.2. MOA and FDA in Liberia:

The purpose and need for action by the MOA (Ministry of Agriculture) and FDA (Forestry Development Authority) is to respond to WAPP and LEC's request for a special use authorization to construct the proposed Project on agricultural area and on the forest and ensure the proposed Project is in compliance with the Land Management Plan (Forest Plan). The purposes (objectives) are to minimize adverse impacts on agricultural lands and the forest to minimize adverse impacts to forest management activities.

2.2.3. MEEF in Guinea

The primary purpose and objectives of MEEF (*Ministère de l'Environnement et des eaux et Forêt*) in Guinea is approving the proposed Project and to protect the environmentally sensitive areas within country and to manage minimizing the adverse impacts to the protected areas by the proposed project by reviewing this ESIA reports in depth complying with the environmental and socio-economic guidelines.

The implementation of the National Environmental Action Plan (PNAE) of 1994 was particularly affected by institutional instability. This institution has undergone changes and developments so as to adapt to national and international requirements for environmental management. In accordance with the Rules of Administration, Ministère de l'Environnement et des eaux et Forêt (MEEF), has structures and administrative units, including national management and related services and structures that are decentralized regional inspectorates and prefectural branches.

Institutional monitoring of the ESIA in view of the environmental protection agency in Guinea is the responsibility of the Ministère de l'Environnement et des eaux et Forêt (MEEF) through the Bureau Guinéen des Etudes et Evaluation Environnemental (BGEEE). The BGEEE is responsible for coordinating the design and development policies, strategies and programs of the Department of Environment and ensure monitoring and evaluation. For this purpose it is charged, among other to ensure the implementation of the Guinean ESIA process; encourage the taking into account the environmental dimension into projects and sector development programs through a supervisory role of Environmental impact studies and social analysis and advice on issues ESIA development projects; to monitor the implementation of the Environmental and Social Management Plan (ESMP) from the ESIA projects.

2.2.4. Institutional and regulatory framework in Cote d'Ivoire

National institutions for the implementation of the policy environment are the responsibility of the Ministère de l'Environnement, des Eaux et Forêts. These main structures and institutions are Direction de la Qualité de l'Environnement (DQE), Direction des Politiques et Stratégies de l'Environnement (DPSE), Direction de la Protection de la Nature (DNP), Direction des Technologies Environnementales (DTE), Centre Ivoirien Antipollution (CIAPOL), Office Ivoirien des Parcs et Réserves (OIPR), Société de Développement des Forêts (SODEFOR) and Agence

Nationale de l'Environnement (ANDE). In this project, the structures are directly involved ANDE, CIAPOL and OIPR. More detailed descriptions of these institutions are presented in the Table below

Furthermore, compared with specificity of each project submitted to ESIA, structures and technical institutions from other departments are concerned. Under this project, subject to the ESIA, the institutions involved are:

- Ministère des Mines et de l'Energie
- Ministère de la Construction, de l'Urbanisme et de l'Habitat
- Ministère de la Santé et de l'Hygiène publique,
- le Ministère de l'Agriculture,
- le Ministère de l'Intérieur : les collectivités territoriales (Préfectures, S/Préfectures, Conseils Généraux, Communes),
- les Associations de protection de l'environnement (APE).

It should be noted that this project concerns primarily the head of Ministère des Mines et de l'énergie.

Table 1 National institutions involved in ESIA

| Institutions | Description |
|--------------|---|
| ANDE | ANDE is a single point for issuing environmental permits called in removes Ivory, Environmental Compliance Certificate (ECC). Agence Nationale de l'Environnement (ANDE) was established by Decree No. 97-393 of 09 July 19, 1997 with the mission and responsibilities, inter alia, i) ensuring the inclusion of environmental concerns in projects and programs development, and ii) to implement the procedure for impact studies and assessment of the environmental impact of macroeconomic policies. The jurisdiction of ANDE in this project focuses on i) the preparation of Terms of Reference for the ESIA, ii) the evaluation report of the ESIA, iii) Monitoring Plan Environmental and Social Management (ESMP), iv) monitoring of environmental compliance activities of the RAC by conducting environmental audits. |
| CIAPOL | CIAPOL is in charge of monitoring the level of pollution of waters (lakes, sea and freshwater) soil and air. In addition, through its Sub / Branch Classified Installations Inspectorate (S / IDRL) CIAPOL also ensures the implementation and technical compliance to be prescribed by the order of authorization to operate for a better consideration of environmental protection. CIAPOL is the lead agency in the area of all discharges of pollutants into the wild in Cote d'Ivoire. To this end, the Society of Marine Pollution Response and cons Lagunaire (CIPOMAR) within CIAPOL, manages the spills. In addition, CIAPOL's obligation to implement the plan POLLUMAR, National Plan of emergency oil spill. |

| Institutions | Description |
|--|--|
| SODEFOR | The state gave SODEFOR status of state-owned company by Decree No. 9 3-2 06 Feb. 3 1993 to ease the operation of this public institution. The company aims to "participate in developing and implementing government policy regarding enrichment of the national forest, development of forest production, recovery of forest products, preservation areas forest. " |
| OIPR | OIPR is in charge of implementing the guidelines of the Programme Management Framework Areas Protected. Missions OIPR were defined by Article 2 0 of Law No. 2-10 2 February 2000 concerning the creation, management and funding of national parks and nature reserves. She is responsible for the management of land assets, the exercise of administrative and judicial police, the implementation of a sustainable management policy by promoting activities legally permitted according to the legal nature of the park or reserve considered and its peripheral area, where appropriate, coordinating or conducting studies for the creation, expansion, or a park, reserve or its surrounding areas, the information, education and communication. |
| The Ministry of Mines and Energy | Department's mission is the definition of research policy and mining and energy development and exploitation of resources beneath the ground. This Ministry also ensures the implementation and monitoring of government policy in the fields of minerals and hydrocarbons. This mission is broken down in the functioning of different directions and specific structures. The electricity sector is responsible for the project has experienced many institutional reforms. It consists so far of the following actors: - The State of Ivory Coast, for the definition of the sector's general policy - The Directorate General of Electricity; - The Asset Management Company of Electricity Sector (SOGÉPA) - The Corporation Operation Ivory Electricity (SOPIE); - The NRA sector of Electricity (ANARE)-Ivorian Electricity Company(CIE); - Company Ivorian Electricity Production (CIPREL) - AZITO Energy. The electricity sector is the main consumer of natural gas produced by companies CNR, and FOXTROT AFREN. |
| Interior Ministry | This era of the Interior Ministerial Department is concerned with the protection of the environment because of the involvement of local governments and communities that are attached. The electric interconnection project will involve local authorities in the town of Man and Danane. |
| The Ministry of Health and Public Hygiene | The era of the Health Directorate of the Ministry of Health is interested in the potential nuisance of Hygiene and power lines on the health of populations in the area of project influence. |
| The Ministry of Agriculture | National Land Programme and the Programme National Rural land management and Rural Development are interested in the plan for compensation and resettlement populations found in the air influence the project |
| Department of Construction and Urban and Housing | The Department will be interested in the final route of the line to be considered in the design programs to connect communities in the region to the grid. |

2.3. Approval Process of the ESIA

This ESIA has been prepared by the KEPCO in compliance with WAPP, EPAs and the funding agencies requirements.

Because the proposed transmission line would pass beside the several environmental sensitive areas managed by the MAFFS and being watched by the international environmental groups, the project would also require an environmental permit from the EPA for the portion of the project within a 40 meter-wide easement across forest and agriculture area. The EPA's proposed action is to respond to the scoping report through the issuance of the approval of the scoping report. This action triggers certain legal and policy frameworks such as National Environmental Policy, Environment Protection Agency Act, Environmental Impact Assessment Procedure, Forest Act, and Forestry Regulations. In addition, the proposed Project would include issuing one or more temporary Use for any ground disturbing activities on each region that would occur during construction activities and would be located outside the proposed 40m ROW.

Therefore, this ESIA presents the environmental and social impacts of the proposed Project and alternatives in comparative form, defining the issues and providing a clear basis for choice by decision-makers and the public. The ESIA discloses the environmental impacts expected to result from the construction and operation of the proposed Project and mitigation measures, which if adopted by the utilities or other responsible agencies, could avoid or minimize significant environmental effects. In accordance with WB and the other funding agency guidelines, the ESIA also evaluates alternatives to the proposed Project that could avoid or minimize the significant environmental effects. The ESIA provides a comparison of the environmental effects of the proposed Project and the alternatives, and identifies the Environmentally Alternative per the funding agencies requirements.

The purpose of the ESIA is to inform the public and deciding officials on the environmental setting and impacts of the proposed Project and alternatives. The ESIA will be used by the relevant authorities in conducting the proceeding to determine whether to grant the proposed Project and by the Environmental Protect Agency to determine whether or not to issue an approval on the Environmental & Social Impacts Assessment report. This Executive Summary provides an overview of the proposed Project and alternatives considered, and the environmental findings and mitigation measures of the ESIA.

3. Summary of Public Involvement Activities

To date, there have been extensive public participation efforts on the proposed Project. These activities are summarized below:

- The EPA scoping process for the proposed Project began with the NPA's issuance of the Scoping report of the ESIA on October 19, 2009.
- During the site survey, the consultant held several public consultation meetings to collect and to receive opinions, as well as to provide an opportunity for the public to provide input on alternatives to the project and potential mitigation measures including members of the public, government and public agencies, and organizations and private companies.

3.1. Methodology of the Public Consultation

The communities predicted to be affected by the proposed project were identified with the help of the relevant County Assemblies, the Survey Consultants and from field work carried out to identify the communities.

Various stakeholders were consulted during the preparation of the ESIA. These include local communities, city authorities, environmental specialists, county authorities and others. The project received high degree of acceptability in that implementation of the line will boost local economy due to the availability of electricity hence more exposure and increased benefits as more people would receive power through the line and in a way increase economic opportunities.

Some of the concerns were however raised, and these include the followings:

- The contractors to employ people around their respective surrounding villages.
- The contractors to consider replacing trees which will be destroyed during construction.
- Electricity to be provided at an affordable rate

3.2. Areas of Controversy and Issues to be Resolved

A discussion of areas of controversy included, as well as identification of issues that need to be resolved. These may include issues raised by other agencies and the public during the public consultation process, as well as issues realized during the environmental analysis process. Various issues of concern were expressed at public consultation meetings for the proposed Project.

Some areas of controversy that were raised during the public consultation process include the following:

- Potential impacts to private property, including general aesthetics and property value;
- Potential health impacts due to the generation of new electric and magnetic fields (EMFs);
- Construction-related concerns such as land disturbance, noise, and air quality impacts;
- Biological resources, including wildlife corridors and sensitive species;
- Geology and soil conditions such as potential erosion and compaction; and
- Various other concerns related to environmental issue areas including traffic, public services, and utilities.

Many of the areas of controversy and issues identified in the list above would be resolved through the implementation of applicable mitigation measures, which are summarized in ESIA of each country.

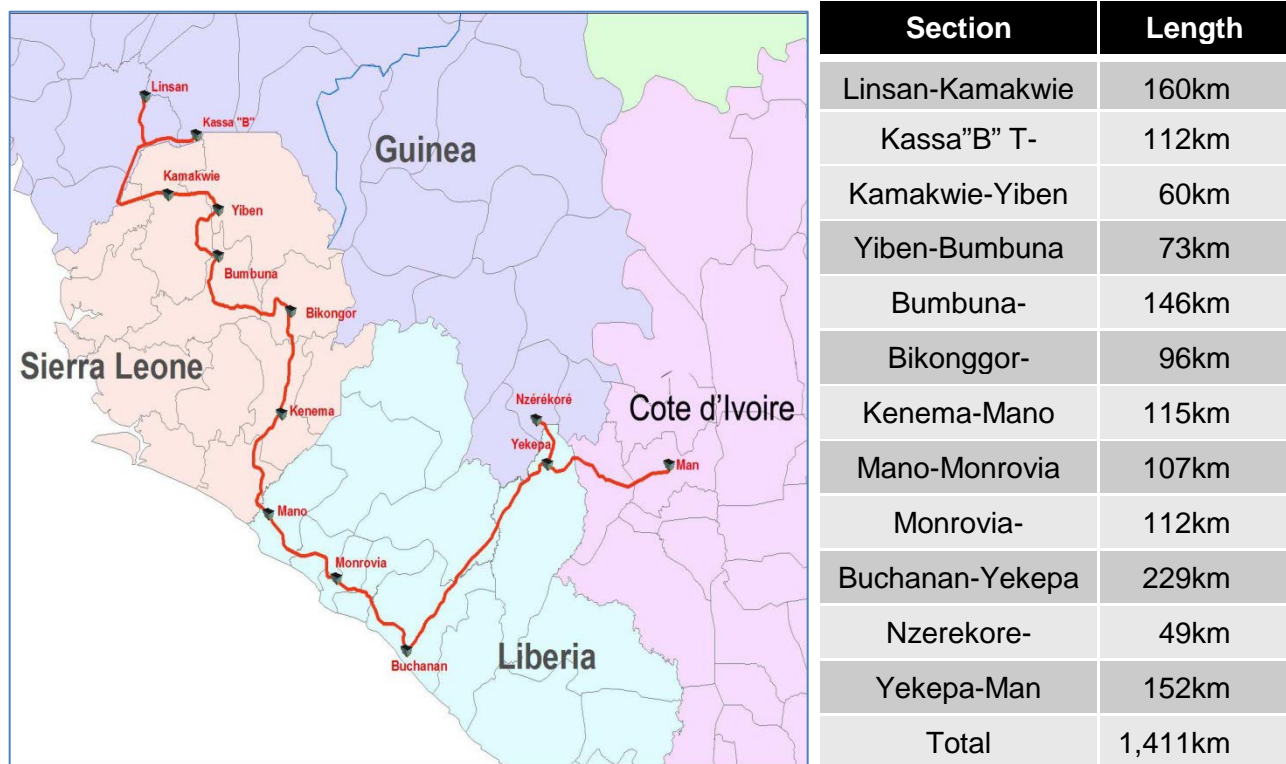
4. Description of Proposed Project and Project Alternatives

This summary provides a physical description of the proposed Project and alternatives.

4.1. Proposed Project

The proposed Project would involve the construction of a new 1,411km 225kV transmission line and its associated substations between MAN Substation in Cote d'Ivoire and new LINSAN Substation in Guinea. Figure 1 provides details of the proposed Project's major components (along with the Project alternatives).

Figure 2 Transmission Line route of the proposed project

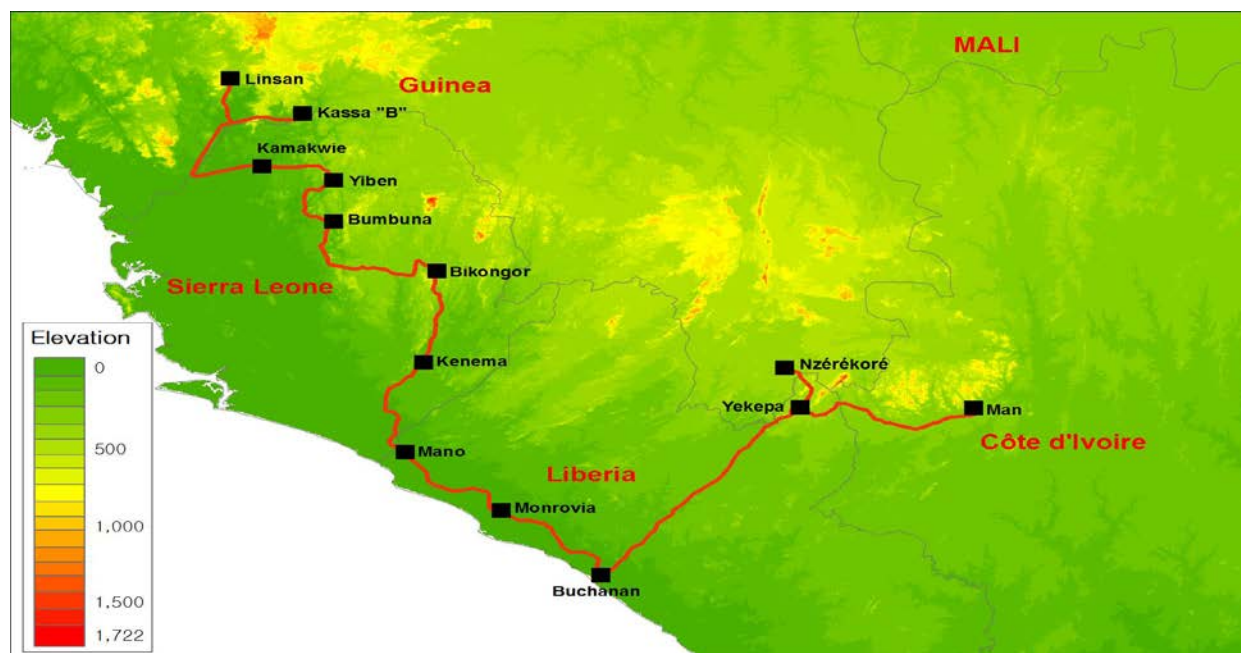


4.2. Location/Proposed Route

The total length of Cote d'Ivoire – Liberia - Sierra Leone - Guinea interconnection line is approximately 1,411km. The entire geography of interconnection line is mountainous except the Buchanan to Mano coastal area in Liberia. Specially, the section, Linsan in Guinea to Bikonggor in Sierra Leone, is hard to access the existing road. Figure 2 presents the geographic features in entire project area. The Man (Cote d'Ivoire) –Yekepa (Liberia) - Nzérékoré (Guinea) section is a mountainous area of height around 500m~1100m. Buchanan to Mano in Liberia is flat area under 50m height and some swamp and rubber farms are in this area. The Saint John River, which is over 600m width, and several other rivers exist in this section. Kenema to Kamakwie in

Sierra Leone is hilly area. This section is hard to access the existing roads with transmission line route. This section has several big rivers (Moa, Sewa rivers etc.) over 400~600m width.

Figure 3 Geographic Features of the Project Area



4.3. Project Alternatives

Initially, nine (9) alternative line routes for the 3 environmentally sensitive areas (Hotspots) in Sierra Leone section; and eight (8) alternative line routes for the 3 Hotspots in Liberia section were developed. These alternatives were identified by the consultant in its line route study report; suggested by the Funding Agencies, Power utility company and public and government agencies during the study or developed by the ESIA consulting team.

A comprehensive screening analysis was employed to focus on alternatives that would be capable of meeting most of the proposed Project objectives/purpose and need, considered feasible, and would avoid or substantially lessen any significant effects of the proposed Project. Below is a brief description of each of these Hotspots and analysis of alternative line routes. The hotspots in Sierra Leone are: Gola Forest, Nimini Hills Forest Reserve and Outamba-Kilimi National Park; and the hotspots in Liberia are: Nimba Nature Reserve, Gbedin Wetlands and proposed Lake Piso Multiple Protected Area.

- **Gola Forest**

The Funding Agencies recommended investigating another option in Gola Forest to avoid as it is one of the environmentally sensitive areas. Also, the Executive Director of Conservation

Society of Sierra Leone indicated that all the segments of Gola Forest would be linked and transboundary park between Sierra Leone and Liberia would be established.

Alternative Option 1 is proposed in order to avoid all the current segments of Gola Foest as well as future transboundary Park, which will be established between Sierra Leone and Liberia. It also ensures that Tiwai Island and Kambui Hills are avoided with a minimum distance of 2.2km and 1.8km respectively. So, Alternative Option 1 is the most preferable line route among all the alternatives.

- **Nimini Hills Forest Reserve**

The Funding Agencies mentioned that there is an area where the line route will have to avoid or moved further away: Nimini Hills Forest Reserve.

Alternative Option 1 was made to avoid the Nimini Hills Forest Reserve to the north because it is ecologically sensitive areas as mentioned by Funding Agencies. Alternative Option 1 is the most preferable line route among all the alternatives as it is possible to avoid the Nimini Hills Forest Reserve.

- **Outamba-Kilimi National Park**

The Funding Agencies and STEWARD (Sustainable and Thriving Environments for West Africa Regional Development) Program Coordinator indicated that Outamba-Kilimi National park is one of the environmentally sensitive areas and there is a possibility that the separated two forests, Outamba and Kilimi Forest would be joined together.

Alternative Option 1 was composed to detour the Outamba-Kilimi National Park to the south. It includes the construction of 114km transmission line in the vicinity of the Outamna-Kilimi National Park. This option is longer than the previous line in this section. However, it is more preferable line route to previous line, as it is possible to avoid the Outamba-Kilimi National Park keeping a distance of at least 1.5km.'

- **Nimba Nature Reserve**

The Funding Agencies recommended that the transmission Line should be located more to the south away from the nature reserve, since this whole area is a global biodiversity hotspot as determined by the biodiversity studies carried out by Arcelor Mittal. Also they recommended that the Yéképa Substation should be located more to the south closer to the mines and the iron-ore concentrator, in between the mines and Sannequille town, which are both load centers to avoid the Nimba Nature Reserve;

In order to minimize the adverse impact on these protected areas, a buffer was taken when considering the Alternative Option 1. So, the previous transmission line and proposed Yekepa substation were adjusted to move further southwest to avoid the Nimba Nature Reserve.

- **Gbedin Wetland.**

The Funding Agencies recommended that the proposed line route should be moved further from the proposed Ramsar site, the Gbedin wetland.

In Alternative Option 1, the location of selected line route near the Gbedin wetland area, proposed as RAMSAR site, was adjusted to be located further away from the sensitive area. This alternative would relocate most of the towers further west-north.

- **Proposed Lake Piso Multiple Protected Area.**

The previous line route does not pass through the Lake Piso itself and is stood 5.8km away from the lake. However, according to the future plan of FDA of Liberia, the wider area surrounding the Lake Piso will be designated as a multiple protected area. In that case, previously selected line will pass through 35km of that protected area.

Alternative Option 2 has merit that it will go through the hilly area making the construction and maintenance of transmission line easier than the other options. Therefore, Alternative Option 2 is considered most preferable line route in this area.

5. Impact assessment

Although the line route is 1,411 km long, the actually area affected by the transmission line project is relatively small. Eleven (11) substations will be built each in a small area of 200m x 200m. These should be built on flat well drained land, thus no major topographical changes will occur; the land used will invariably have been used for cultivation. The land in the tower footprint will not be usable, however as there is some flexibility for the tower location no major topographical changes will occur. Thus the proposed transmission line project will impact minimally on the environment in most cases.

This section summarizes the environmental impacts and mitigation measures for the proposed Project. The impacts and mitigation measures discussed in this section are described in full detail in Section 5 of the each country's ESIA reports. In accordance with the Funding Agencies' policy and guidelines, the impact assessment methodology considers the existing regulatory setting, direct and indirect effects of the Project, any potential growth-inducing impacts, and cumulative impacts

This section presents a summary of the environmental impacts and applicable mitigation measures in Section 3.2; Summary of Impacts to proposed line route corridor in Section 3.3; summary of indirect effects of the proposed Project and alternatives in Section 3.4; a summary of cumulative impacts for the proposed Project and alternatives in Section 3.5..

5.1. Impact assessment methodology

The impact assessment methodology used for this project consists of five major steps:

Step 1: Identification and description of project activities and their interaction with environmental media;

Step 2: Comprehensive preliminary identification of potential impacts;

Step 3: Screening or comparative assessment of impact importance, identification of impacts that are likely to be significant (i.e. identification of focus areas for further study) through application of a basic set of impact significance criteria to the preliminary information available about each impact;

Step 4: Detailed assessment of the identified focus area impacts characterization techniques, quantification of impacts to the extent possible and rigorous qualitative characterization of impacts that cannot be quantified; and

Step 5: Final assessment of the severity levels of impacts through application of the results of the rigorous quantitative and qualitative characterization of impacts developed in Step 4 to a set of objective impact severity criteria; identification of impact warranting mitigation.

5.2. Summary of Impacts to Proposed Line Route Corridor

Implementation of either the proposed Project or any of its action alternatives would involve both temporary and permanent land disturbances on the proposed line route corridor. Permanent land disturbances due to the tower election (25m² per tower) and the placement of substations (40,000m² per substation) would be approximately 0.23km². Permanent land take due to the tower election (25m² per tower) and the placement of substations (40,000m² per substation) would be approximately 0.2km². For the rest of the RoW, new or improved access and spur roads would be taken temporarily during the construction or operation stage.

The main potential impacts, which require mitigation measures, have been identified for the proposed project. These are loss of land, destruction of buildings, other structures and crops, noise pollution, waste management, water pollution, impacts on flora and fauna, public safety and health, occupational safety and health issues and socio-economic/socio-cultural issues.

5.3. Summary of Indirect impacts

In accordance with the World Bank guideline (Environmental Assessment Sourcebook), “indirect impacts” may include any effects that would be caused by the proposed action but which occur later in time or farther in distance from the action. Analysis of the direct and indirect impacts of the proposed Project and alternatives is provided for each environmental issue in Table 4. The proposed Project is expected to cause indirect impacts in the following environmental issue areas:

- Hydrology and Water Quality
- Socioeconomics
- Land Use and Public Recreation
- Utilities

The proposed Project and alternatives would result primarily in direct effects to the other environmental issue areas, including Air Quality; Biological Resources; Cultural Resources; Geology, Visual Intrusion, Soils; Noise; Public Health and Safety; Public Services; Traffic and Transportation. To the degree that the transmission project inhibits aggressive firefighting, greater impacts could result from wild and fires, such as larger fires potentially causing destruction of biological resources and cultural resources, and leading to greater soil erosion after fire events.

Indirect effects may be represented by a variety of potential impacts, projects, or actions, including growth-inducing effects such as residential and commercial development, and infrastructure and public works projects, among others.

5.4. Summary of Cumulative Impacts

Cumulative impacts refer to the impact on the environment which results from the incremental impact of the Project when added to other past, present and reasonably foreseeable future actions. The relevant projects along our proposed RoW are described below.

The increase in regional growth in each of the four countries may indirectly contribute to potential cumulative impacts in the proposed Project area. An increase in population growth directly affects the demand for jobs and housing, which may increase the number of planned development and improvement projects, such as public service facilities or transportation system expansions in Sierra Leone. Substantial population or employment increases near the area of the proposed Project also substantially increase the population potentially exposed to an accident or other hazard.

5.4.1. Cumulative Impact in Sierra Leone

Table 2 Infrastructure Development Projects in the Sierra Leone Project Area

| Project Type | Project Name |
|-------------------|---|
| Electricity | Global Trading Group (GTG) 15MW and Income Electrix Ltd (IEL) 12MW. G.T.G |
| Electricity | 16 MW thermal plants to be installed at Blackhall Road Power Station. |
| Electricity | 33 kV transmission line and the rehabilitation of selected 11 kV networks in the Western Area. |
| Electricity | Makali (120 KW) Hydro plant in the Tonkolili District and Charlotte (2.0 MW) in the Western Area |
| Electricity | The rural electrification and the reinforcement of the medium and low voltage networks in the Western Area. |
| Electricity | The distribution improvement project Phase I and II |
| Electricity | Emergency rehabilitation of the Western Area transmission and distribution |
| Electricity | Large scale Diamond Mining operated by the Koidu Holdings Ltd. at Koidu, Tankor, Yengema and Tongo in the Kono district |
| Mining | Small Scale Diamond Mining operated by the Milestone Sierra Leone Ltd at Tefeya, Sandor Chiefdom in the Kono District. |
| Road Construction | The reconstruction of the Kenema and Pendembu road |
| Road Construction | Construction of railroad from Bumbuna to Pepel for transportation of iron ore |

5.4.2. Cumulative Impact Liberia

Table 3 Infrastructure Development Projects in the Liberia Project Area

| Project Type | Project Name | Implementing Agencies | Status |
|--------------|---------------------------------------|--|---------|
| Road | Liberia Road Asset Management Project | Infrastructure Implementation Unit (IIU) | Planned |
| Road | Ganta-Zwedru-Fish Town- | Infrastructure | Planned |

| Project Type | Project Name | Implementing Agencies | Status |
|----------------------|--|---|---------|
| | Harper Road Construction | Implementation Unit (IIU) | |
| Road | Ganta-Yekepa Road Construction Project | Arcelor Mittal | Ongoing |
| Road | Urban and Rural Infrastructure Rehabilitation Project(URIRP) | Infrastructure Implementation Unit (IIU) | Ongoing |
| Electrification | WAPP Cross Border Project | LEC | Ongoing |
| Mining | Mining Development Project | Arcelor Mittal and other private mining company | Planned |
| Waste Management | Emergency Monrovia Urban Sanitation Project (EMUS) | Monrovia City Corporation (MCC) | Planned |
| Water and Sanitation | Liberia Water Sewerage Corporation | Liberia Water Sewerage Corporation | Planned |

5.4.3. Cumulative Impact Guinea

Information on past, present and those that are reasonably foreseeable in the near future route of the line have been collected from relevant authorities such as the Ministry of Construction and Electricité de Guinée(EDG). However, no information regarding past, present and reasonably foreseeable and that is close (10 km from the RoW) of drawing the line there.

Due to the nature of a proposed transmission line, the changes will be very localized. The project will provide electric power to be transmitted to remote distances, and the strongest impact will come from the change in lifestyle resulting from social development.

Whereas the influence of the alignment of the selected line is mostly outside the urban area and goes along the existing road, it is likely that the cumulative impacts of the project are minimal.

5.4.4. Cumulative Impact Cote d'Ivoire

A “cumulative impact” is the impact on the environment which results from the incremental impact of the Project when added to other past, present, and reasonably foreseeable future actions.

The process of cumulative environmental change can arise from any of the following types of events:

- Single large events, i.e. a large project;
- Multiple interrelated events, i.e. road projects within a region; and
- Catastrophic sudden events, i.e. a major landslide into a river system.

These can generate additive, multiplicative or synergetic effects, which can then result in damage to the function of one or several eco-system.

Information on other past, present, and reasonably foreseeable future projects near the line route has been collected from relevant authorities such as the Ministry of Construction, Ministry of Interior and the Société d'Opération Ivoirienne d'électricité (SOPIE).

These are the information of other past, present, and reasonably foreseeable future projects near (within 10km of the RoW) the line route:

➤ **OTHER PROJECTS OF DEVELOPMENT OF REGIONS OF MAN AND DANANE**

The departments of Man and Danane are subject to a number of development projects. Information was collected from various sources such as sectoral ministries (Planning and Development, Agriculture, Mining and Energy, Economic Infrastructure, Interior).

One can cite two types of projects:

- Major regional development projects,
 - Development projects of local governments.
- Electrification projects: a project to electrify 23 new sub-prefectures of the Great-West region was launched (developed in the chapter Project description)
- Major regional development projects include:
- ADB WEST Project: Launched in 1998, it was reactivated a few years and this project aims to settle the local population by agricultural intensification (rice) and food security;
 - Extension of the Autonomous Port of San Pedro and improved land links with neighboring countries (Guinea, Mali and Burkina Faso), whose component-binding Danané Frontier Guinea (95 km) launched in 2010 will develop trade and cultural relations between socioeconomic Côte d'Ivoire and Guinea;
 - The proposed construction of a landfill in Man, launched in 2010, aims to improve the safety of the City of Man;
 - Proposed development of rice production in regions of the 18 mountains and Upper Cavally launched in 2008;
 - Rural Electrification Project in the region of Man launched in 2010, relates electrification from 23 localities in the region;
 - The proposed operation of iron ore of Mount Klao by Tata Steel;
 - The proposed operation of nickel ore by the Canadian CNR.
- Development projects of local concern the education sector and health sector in the two

councils Man and Danane.

- Department of Man
 - Education Development Project / General Council: Cost 390.2 million FCFA, Period: 2009 - 2012;
 - Draft Health and Social Development / General Council: Cost 320.9 million FCFA, Period: 2009 - 2012;
 - Infrastructure Development Project / General Council: Cost 1 436 600 000 FCFA, Period: 2009 - 2012;
 - Development project production and trade: Cost 38.5 million FCFA, Period: 2010 to 2012.
- Department of Danane
 - Infrastructure Development Project / Common Danané: Cost FCFA 55 million, Period: 2010 to 2012.

After all, in the area of direct influence of the project, there is no mining activity.

Because of the nature of a transmission line project the changes will be very localized. The project will allow electric power to be transmitted from distances far away, and the biggest impacts will come from the change of lifestyle resulting from social development.

Considering that surrounding circumstances of the selected line route is mostly out of town area and is going along the existing road, cumulative impacts causing from the project is minimal.

However, it is recommended that further investigation on foreseeable future projects will be necessary to mitigate potential cumulative impacts.

6. Summary of Mitigation Measures

The Consultant held public consultations with communities affected by the project as well as meetings with members of the stake holders to insure that necessary procedures were put in place to mitigate impacts. Mitigations differ according to the different phases of the project.

During the pre-constructional phase a detailed list of all potential project-affected persons was compiled for the purposes of the payment of fair, adequate and prompt compensation.

During constructional phase adequate and regular maintenance of machinery and the avoidance (as much as possible) of constructional activities in the vicinity of local communities at night will minimize noise nuisance impacts on the local communities. Daytime noise levels are not expected to be a nuisance. The management of waste in the work camp and the construction sites have been planned to exert minimum adverse effects on the environment. The SPC will carry out the monitoring of such parameters as noise, water quality, socio-economic issues and occupational safety and health issues.

The proponent acknowledges that the proposed investment in the transmission line project would be worthless if the safety, health and welfare of the employees are not safeguarded. Management will therefore do its utmost to ensure that safety, health and welfare provisions.

The use of personal protective equipment will be strictly enforced in order to protect workers and prevent accidents. In addition the SPC will ensure the provision of, among others, a first aid box, drinking water and sanitary facilities at the construction sites and the health and welfare of all employees engaged on the project by providing clinic, doctor and ambulance in the work camp with the responsibilities of the Contractors.

During operational phase regular maintenance of the line route will be needed. This will include removing potential hazards from RoW, measures and regulations related to dangerous substances (Transformer oils), security, fire, noise, birds, and extreme weather. The substations shall be fenced and provided with technical and security personnel for operation and security purposes.

During the decommissioning phase the towers, cables and substations will be dismantled and removed; the materials should be reused or recycled as much as possible, in addition all concrete and steel debris should be removed from the site. During the decommissioning stage, the negative impacts that may result from decommissioning activities will need to be mitigated; these will be similar to the construction phase. The activities in this phase will be similar to project construction activities, and the timeframe and deconstruction workload is expected to be similar to that of the construction phase. After the structures and their foundations have been removed the area should be re-vegetated, where farming may be resumed without restriction except tall trees.

Table 4 Summary of Impacts and Mitigation Measures and Monitoring

| Project Activity | Potential Impacts | Location | Proposed Mitigation | Net Effects | Monitoring |
|----------------------------------|--|--|---|---|--|
| Line route survey & Design | Impact on potential sensitive ecological and inhabited area | Entire RoW | Adequate selection of RoW by avoiding these areas with detailed line route survey during the design stage | Negligible | Monitoring and Identifying the potential sensitive ecological or inhabited areas located along the RoW |
| Line route survey & Construction | Loss of crops | Almost entire RoW & access tracks | Prompt, fair compensation payment | Negligible | During construction & operation |
| Construction | Loss of structures | Certain parts of line route | Prompt, fair compensation payment for resettlement | Removal from historical/ancestral roots | Monitoring during construction & operation to ensure all PAPs are adequately and fairly catered for |
| Construction | Loss of land | Entire RoW & access tracks | Prompt, fair compensation payment | Removal from historical/ancestral roots | Monitoring during construction & operation to ensure all PAPs are adequately and fairly catered for |
| Construction | Noise impacts | Communities and settlements close to RoW | Avoidance (as much as possible) of work at night | Minor disturbance during daytime | Ambient noise levels shall be measured once every week in communities close to RoW |
| Construction | Air quality | Communities and settlements close to RoW | Spray the exposed soil surfaces of the tower corridor track as and when needed | Negligible | Monitoring – none |
| Construction | Potential soil erosion | Entire RoW & access tracks | Limit land clearance to minimum area required and early revegetation | Negligible | Monitor land clearance |
| Construction & operation | Public safety 1. Open excavations 2. Potential electrocution 3. Potential collapse of towers 4. Others | Entire RoW & access tracks | Tower base excavations in or near settlements or farms will be clearly marked and made inaccessible to the public. All towers will be clearly marked with a red inscription on white background - “ DANGER – 225,000 Volts ” to warn off trespassers, etc. | Negligible | Routine inspections of towers during operational phase |
| Construction & operation | Flora and Fauna | Entire RoW & access tracks | Limit clearance of vegetation | Negligible | Monitored carefully to ensure that the minimum area requirements are not exceeded |
| Construction & operation | Occupational safety and health | Entire RoW & access tracks | Provision of personal protective equipment at construction | Negligible | Availability and use of protective equipment |

| Project Activity | Potential Impacts | Location | Proposed Mitigation | Net Effects | Monitoring |
|--------------------------|---|---|---|---|--|
| | | | All work to be done according to Safety Rules and Regulations of SPC as well as the World Bank Group EHS Guidelines of 2007 (General and Electric transmission and Distribution) | | |
| Construction | Impacts on cultural and historical/archaeological sites/items | Cultural/historical/archaeological chance finds | Chance finds to be reported to appropriate authorities as a part of the contractor's contract | Negligible | Areas of chance finds will be monitored and secured in order to be handed over to Museums and Monuments Board. |
| Construction | Public health-STDs/HIV/AIDS | Mainly settlements along RoW | Education of workers to avoid casual sex Supply sufficient quantities of good quality free condoms to workers | Potential single mothers, transmission of STDs/AIDS | Keep close contact with communities during construction to detect incidences of STDs/AIDS |
| Construction | Traffic impacts | Relevant roads indicated in report | Use of traffic wardens to control traffic at road crossings Development of Traffic Control Plan | Negligible | Presence of traffic wardens at all times during construction. Review the contractor's Traffic Control Plan |
| Construction | Water pollution | Rivers indicated in the report | Minimize erosion and manage excavated materials, wastewater from excavations and accidental spillage of oil, fuel and paints | Negligible | Streams close to the site(s) of construction to be sampled and analyzed weekly. During the maintenance phase monitoring will be carried out twice yearly. |
| Construction | Work camp management | Work camp sites | Establish far away from water bodies and settlements Provision of mobile toilet, clinic, doctor and ambulance at work camp sites | Negligible | Distance from each work camp site to nearest water body and settlement. Availability of mobile toilet, clinic, doctor and ambulance; |
| Construction & operation | Solid Waste generation | Entire RoW & access tracks | Trees, tree stumps and wooden containers not to be given out to the local communities as fuel wood. Usable trees and wood from the RoW clearing should be given out to the local communities. Metal wastes to be collected and disposed of appropriately and/or | Negligible | Collection and disposal of solid waste to be monitored |

| Project Activity | Potential Impacts | Location | Proposed Mitigation | Net Effects | Monitoring |
|--------------------------|--|-----------------------|--|-----------------------------|--|
| | | | recycled in consultation with relevant government agencies | | |
| Operation | Effects of rust treatment and painting of towers | Tower locations | Spilt paint to be quickly mopped up with rags and/or sawdust. The used sawdust and rags will be disposed of at appropriate public waste dumping sites. | Negligible | No monitoring |
| Operation | Micro shock from a spark discharge | RoW | Minimized by multiple earthlings | Negligible | Monitor earthing cables |
| Operation | Fire hazards | RoW | Public education on hazards of bush burning | Negligible | Routine patrols to discourage bush burning |
| Construction & operation | Employment generation and incomes | Settlements along RoW | Encourage contractors to engage local labour | Standard of living improved | None |

7. Contractor's obligation on environmental and social matters

Prior to the commencement of construction works, all contractors should be required to prepare their own ESMPs (CESMP). The plan should be included in the bidding documents and in the contractor's contract and spell out environmental targets and objectives as outlined in the ESIA/ESMP and how these could be achieved. The Contractor's ESMP (CESMP) shall include, to the extent practicable, all steps to be taken by the Contractor to protect the environment in accordance with the current provisions of national environmental regulations, the World Bank Groups Environmental Health and Safety General Guidelines and the Environmental, Health and Safety Guidelines for Electric Power Transmission and Distribution, 2007 as well as the ESIA/ESMP for this project. Provision should be made for the disposal of chemical/ hazardous wastes as the local facilities do not exist for hazardous waste disposed. Also, for more complex environmental management aspects, the Contractor needs to prepare and implement Method of Statement which needs to be approved by the Supervising Engineer and the SPC upon request. In this perspective, within 60 days of notification of contract award, the Contractor shall demonstrate an understanding of environmental and social obligations.

In order to ensure adequate implementation of the CESMP and specific Method of Statement, the Contractor needs to employ environmental staff for the proposed Project.

Notwithstanding the Contractor's obligation spelt out above, the Contractor shall, in addition, endeavor to implement all necessary measures to restore the project sites to acceptable standards and abide by environmental performance indicators specified in the ESIA/ESMP to measure progress towards achieving objectives during execution or upon completion of any works. It will be largely based on the ESIA and ESMP include the following information:

- organizational staff with clear identification of the leader (s) responsible (s) of the environment, responsible environmental management of the project and its (their) CV,
- A general description of the methods that the Company proposes to adopt to reduce the impact on the physical and biological environment of each phase of work.
- A description of the actions that will implement the Contractor in each of the following (not exhaustive):

These measures shall include but not limited to the following;

- Minimizing the effect of dust on the surrounding environment resulting from concrete mixing sites, asphalt mixing sites, dispersing coal ashes, vibrating equipment, temporary access roads, etc. to ensure safety, health and the protection of workers and communities living downwind of dust generating activities;
- Ensuring that noise levels emanating from machinery, vehicles and noisy construction activities are kept at a minimum for the safety, health and protection of workers within

the vicinity of high noise levels and communities near rock-blasting areas;

- Ensuring that existing water flow regimes in rivers, streams and other natural or irrigation channels is maintained and/or re-established where they are disrupted due to civil works being carried out;
- Preventing bitumen, oils, lubricants and waste water used/produced during the execution of works from entering into rivers, streams, irrigation channels and other natural water bodies/reservoirs and also ensure that stagnant water in uncovered borrow pits is treated in the best way to avoid creating possible breeding grounds for mosquitoes;
- Preventing and minimizing the impacts of quarrying, earth borrowing, piling and building of temporary construction camps and access roads on the biophysical environment including protected areas and arable lands; local communities and their settlements. In as much as possible restore/rehabilitate all sites to acceptable standards;
- Ensuring that the discovery of ancient heritage(Chance Find Procedure), relics or anything that might or believed to be of archaeological or historical importance during the execution of works is reported to the Museums and Monuments Board in fulfillment of measures aimed at protecting such historical or archaeological resources;
- Discouraging construction workers from engaging in the exploitation of natural resources such as hunting, fishing, and collection of forest products or any other activity that might have a negative impact on the social and economic welfare of the local communities;
- Implementing soil erosion control measures in order to avoid surface run off and prevents siltation, etc.;
- Ensuring that garbage, sanitation and drinking water facilities are provided in construction workers camps;
- Ensuring that in as much as possible, local materials are utilized to avoid importation of foreign material and long distance transportation;
- Ensuring public safety and meeting traffic safety requirements for the operation of moving machinery in order to avoid accidents;
- Discouraging the use of foul or infuriating words on project-affected persons (PAPs) or any other persons seeking information on the project by construction workers. All such persons and grievances should be politely referred to the appropriate authority for redress.
- The overall management of the movement of land that the operation and rehabilitation of borrow areas and quarries (anti-erosive planned redevelopment planned); erosion

- control operations will be scheduled;
- Management of human resources;
- The prevention and mitigation of STDs and HIV / AIDS;
- Communication and information directed to people as well as to local and national authorities;
- Training;
- Conflict management;
- The use of commercial or business environment for local subcontracting;
- Description of the monitoring and control of the Environmental and Social Management Plan of the site. The measures will include the submission of monthly reports to the supervisor. Any significant event or incident should be an immediate report from the company.

This Environmental Management Plan will be submitted for technical approval of the Supervisor, who will share his observations and his decision within 20 days of receipt.

8. Consultations

Consultations were made with some regulatory agencies, local Officials, project-affected persons and local communities prior to the preparation of ESIA. The communities predicted to be affected by the proposed Project were identified and consulted to determine the potential impacts the implementation of the proposed project might have on them.

8.1. Methodology

The communities predicted to be affected by the proposed project were identified with the help of the relevant local Officials, the Survey Consultants and from field work carried out to identify the communities. The survey instruments used were questionnaires prepared prior to the survey. A summary of the survey methodology is discussed below.

A Team comprising the utilities, the survey and environmental consultants carried out very useful consultations with the potential-affected administrative officials and communities along the proposed RoW and the substation sites. The outcomes of such consultations have been incorporated in this report.

Using maps of the proposed transmission line provided by KEPCO and the Environmental Team and surveyors moved from community to community. At the end of each consultation, the names and directions to the substation sites and nearest villages were elicited from the community that had been consulted. This was compared with the list that had already been drawn up to ensure that the survey covered all the affected villages

The consultations started with the normal traditional greetings and exchanges. During these exchanges an interpreter was designated.

After the exchanges and greetings the utility representative informed the gatherings about the proposed project and its objectives. All the details that were likely to inform their reactions were explained to the gatherings. A GIS Tracking Map of the proposed line route was presented to all the gatherings. This graphical presentation made it easy for the locals to understand the project. The villages, invariably, were the first to react to the information. Thereafter with the permission of the villages, the meetings were thrown open for the various reactions of the elders and opinion of leaders.

The socio-economic survey team took the gatherings through the details of potential environmental impacts that had not been covered by the people. Proposed mitigation measures were then put forward and explained. Alternate mitigation measures were discussed and the opinions of the communities sought on the appropriateness of such mitigation.

Majority of the local languages of the project area are verbal and not written; therefore, consultations with project affected people are done in English with an interpreter usually interpreted from English to local dialects. This method of communication is done because majority of the villagers do not understand nor speak English. Also, most of them cannot read

or write their local languages/dialects; they can only speak these dialects. This makes the public consultation process difficult. It is therefore recommended that signed communications be used intensively in order for more villagers to understand what is expected of them.

8.2. Public consultation in Cote d'Ivoire

Under the interconnection project of 225 KV transmission line between Cote d'Ivoire, Liberia, Guinea and Sierra Leone, the research data of the Ivorian was conducted in two periods with the help of two PhD of Sciences Laboratory of Environmental Faculty of Science and Environmental Management at the University of Abobo-Adjame. The first period was to search for information on the Man area, took place from 2 to 11 November 2009. This period was marked by two steps;

- The first stage devoted to discussions with the administrative authorities the project area (including the Secretary General of the Prefecture of Man representing the regional prefect, the prefect of Danane, the sub-prefects of Sangouine and Mahapleu) has delivered their perception and expectation on the project interconnection electrical and also contributed to the successful completion of a series of socio-economic survey on the ground.
- The second stage was devoted to verification points for use in tracing the influence of the high voltage line from the town of Man in Cote d'Ivoire to the Liberian border through the town of Danane. This second phase, which took place from 5 to 9 November 2009, was conducted jointly with the team of surveyors.

The second period was conducted from 13 to 31 May 2010 and was devoted mainly to discussions with the populations of some forty villages in the project area. These interviews in the villages have at first to know the perception of people and secondly to identify their expectations of what electricity interconnection project in their area.

❖ Communities along the line route

| Administration | Name of Village |
|----------------------------------|--|
| Man (Department) | Kongouin; Bigouin; Blolé; Dompleu; Bontongouiné ; Guianlé ; Doupleu (Siapleu ; Tianso ; Pétit Zagoué) |
| Sangouiné(Sub-prefecture) | Koutongouiné 1; Gbangbéguiné; Gouagonopleu ; Zoba1 ; Zoba2 ; Sangouiné; Bloleu; Goba; Kagui; Kampala |
| Mahapleu(Sub-prefecture) | Mahapleu; Issoneu ; Béinleu ; Kangui ; Dropleu ; Blapleu ; Kouyapleu ; Flampleu, Koualé 5 ; Teapleu cavally ; Singouiné |
| Danané(Department) | Sogalé ; Goualeu ; Dongouiné ; Trodélépleu ; Ganhiba, Kohiba, Blékpéaleu ; Sorydougou ; Fiapleu ; Guiapleu 2 ; Guiapleu 1, Kouan-Houlé ; Bampleu ; Gbon-Houyé ; Dropleu 2; Guian-Houlé, Gbéta ; Flampleu 1 ; Flampleu 2 ; Gniglipleu ; |

❖ **Socio-economic information on the villages**

• **Population**

In addition to indigenous Yacouba, the villages in the study area are home to other people ie allochthonous (Wébé, Guéré, Baoulé, Malinké, ..) and populations of West Africa to find the Burkinabé, Malians, Liberians, the Guinéen ...

• **Sacred Sites and Places of Worship**

During the consultation, it is clear that the villages have sacred sites (forests, rivers, mountains and sacred house). Also, these villages have religious buildings (mosques and several churches such as Catholic, Assembly of God, Union of Evangelical Churches and Works Department called UEESO).

• **Economy Village**

Agriculture is the main source of income of people in the study area. The villages are agricultural and cooperatives groups. Farming practiced is traditional type.

• **User access to land**

In the study area, in most villages, the land does not sell. The foreign population in the villages only rent the land for annual crops. Women do not inherit the land. It is reserved for men.

• **Social conditions**

On social conditions, it appears that the water supply of village is by using hydraulic pumps (many of which failed), wells, water points (creek, river ...). All villages in the study area located in the Department of Danane are not electrified. In electrified villages in the department of Man, inadequate street lighting is lacking. Also, the villages have enough funds to cover outages of electrification; as is the case of the village of Boleu where damage to the fuse, the entire population has plunged in the dark. To repair, notability speaking through the Chief Secretary said that the Ivorian Electricity Company(CIE) demand payment of all utility bills, some of which amounted to more than 200 000 FCFA per household.

The presence of primary schools in several villages can provide education for children. The inexistence or the remoteness of the health center does not allow most people to receive health care.

❖ **Opinions and concerns of people on the project**

Although the populations of villages in the study area favor the realization of this project on their land, they nevertheless raise major concerns namely compensation for crops and land, village electrification. The expressions of the village chief of Issoneu Mr. BLA Sahi Charles perfectly summarize the concerns of people in all villages visited, he expressed his concern in these words; "I'm worried because I've got a hectare of plantation. If the project affects, I'm done

because I'm old and there was more than forest. They still give us crumbs and we do not like and does not suit us. For other high voltages, a sum of 400,000 francs CFA that we were promised, only the sum of 150,000 FCFA we received. "

He argues that although the 90kV power line was installed on their land, destroying their plantations (the main source of income), the village Issoneu was not electrified. He claims that this project may lead to poverty of individuals and their families.

❖ **Grievances populations**

With the advent of electricity interconnection project, people want:

- electrification of villages
- participation of youth in the said project
- construction and repair of hydraulic pumps
- Construction of Health Centres and Primary School
- Construction of youth centers
- The reshaping of roads and village tracks
- the libation before the work begins
- help to finance income-generating activities to fight against poverty
- And above compensation for crops and land.

In fact, the electrification rate among the villages consulted is very low. Only 9 of total 48 villages are electrified. They expressed concern that the villages consulted do not have access to power and hoped that the electricity from the proposed project would be made available to the communities. And also they expressed that they raised the concern about the compensation, because they have affected by some other project but they didn't receive adequate consultation and sufficient compensation. They are eager to join the project by the youth of their village during the implementation of the project. All the villages have sacred sites such as river, mountain, tree, house and forest. They asked if any sacred site are affected by the project, sacrifice should be served as a libation such as some amount of money and/or various kinds of animal(ox, ram), cola nut etc. To avoid such kinds of dispute or additional budget, all the line route should not be passed the sacred sites.



8.3. Public consultation in Liberia

❖ **Consultations with the villages**

| Name of Counties | Name of Villages | Date | Remark |
|------------------|------------------|----------|--------|
| Grand Cape Mount | Mambo | Nov-1-09 | |
| | Bona Suah | Nov-5-09 | |
| | Peter Hill | Nov-6-09 | |

| | | | |
|-------------|--------------------------------|-----------|--|
| | Sanjanama, Vonzwahn | Nov-10-09 | |
| Grand Bassa | Kardorpue, Dorwein, Kola Tree | Feb-15-10 | |
| Margibi | Hydro Dirty | Feb-15-10 | |
| Bong | Tarpeh | Feb-16-10 | |
| Montserrado | Frank | Feb-24-10 | |
| Bomi | Dorley-Lah | Nov-10-09 | |
| | Golodee Lansana, Kpormakpor | Jun-20-11 | |
| Nimba | Kahnia, Lugbehyee | Feb-18-10 | |
| | Sannequille, Gbedin, Ganpakpah | Dec-23-10 | |
| | Zotarpa | Dec-24-10 | |
| | Borsonnar, Sopea | Dec-25-10 | |
| | Zorgowee | Jun-26-11 | |
| | Suarkarzue | Jun-27-11 | |
| | Tonwee | Jun-28-11 | |

❖ **Public Consultation with related stakeholders**

| No | Organization | Photos | Date | Remark |
|----|-------------------------------------|--|-----------|--------|
| 1 | Environment Protection Agency (EPA) |  | Dec-28-10 | |
| 2 | Forestry Development Agency (FDA) |  | Dec-28-10 | |

| | | | | |
|---|--|--|------------------------|--|
| 3 | Ministry of Lands, Mines and Energy (MLME) |  | Dec-30-10 Aug-15-11 | |
| 4 | Ministry of Public Works (MPW) |  | Aug-16-11 | |
| 5 | Ministry of Agriculture (MoE) | N/A | Jan-14-11 | |
| 6 | Ministry of Planning and Economic Affairs (MPEA) | N/A | Jan-17-11 | |

8.4. Public consultation in Sierra Leone

Along the line route, several communities were consulted to discuss the general implications of the project on them, particularly their environment, safety, health and welfare. Those are Soro Gbema, Barri and Zimmi Makpele Chiefdoms in the Pujehun District, (border between Sierra Leone and Liberia), the proposed Kenema substation sites, Jaiama Nimikoro Chiefdom, Bumbuna, Fadugu, Kasunko Chiefdom and Kamakwei (Sella Limba Chiefdom) (close to Tambaka Chiefdom – border chiefdom with Guinea) from November 2009.

Community elders presented the following concerns/issues:

- Compensation for land and economic trees;
- Employment opportunities;
- Provision of electricity supply;
- Identification of Project Affected Persons;
- Payment of royalties;
- Time frame for payment of compensation;
- Settlement of disputes over ownership of land and economic trees;
- Commencement of project implementation;
- Provision of social services like schools, health centers and clinics;



- Adherence to the country's laws in implementing the project

| | | | |
|---|--------------------------------|--|--------------------------------|
|  | |  | |
| Village | Zimmi Town | Village | Bamkaor village |
| Date | 23 rd December 2010 | Date | 23 rd December 2010 |
|  | |  | |
| Village | Kamasur village | Village | Kpandembu village |
| Date | 24 th December 2010 | Date | 25 th December 2010 |
|  | |  | |
| Village | Gama village | Village | Barka village |
| Date | 25 th December 2010 | Date | 25 th December 2010 |

| | | | |
|---|--------------------------------|--|--------------------------------|
|  | |  | |
| Village | Nimikor chieftdom | Village | Fenima village |
| Date | 26 th December 2010 | Date | 27 th December 2010 |

Also District and Town Councils whose jurisdiction is expected to traverse by the proposed project were all identified and consulted on the environmental impacts to the communities. The Consultants had consultation meetings with EPA and MAFFS (Ministry of Agriculture, Forestry and Food Security) to share the information of the project and to receive their comments and recommendations for the project.

| | |
|---|--|
|  |  |
| Executive Chairperson of EPA | General Manager of NPA |
|  |  |
| Min. of Local Government, Rural Development and Internal Affairs(11 th January 2011) | Min. of Agriculture, Forestry and Food Security (11 th January 2011) |

| | |
|--|--|
|  |  |
| <p>Min. of Social Welfare, Gender and Children's Affairs(11th January 2011)</p> | <p>Min. of Energy and Water Resources (MEWR) (2nd September 2011)</p> |

8.5. Public consultation in Guinea

Public consultation sessions were held respectively in the District of Sèkhou-Sorya and Dar-es-Salaam for Linsan sector, and N'Zérékoré, Yalenzou, Benzano, Toulemou and Gbèinè Daapa, all under the (CRD of Yalenzou) on the section N'Zérékoré – Yékékpa. These interviews were conducted by two teams of nine members, divided into two sectors.

The first consultation was held on Thursday and Friday of November 5 and 6, 2009 led by Dr. Sedou Moussa Keita, head of mission and the second series was held from 6 to 8 November 2009 led by Kawa.

On November 5, the team of Dr. Keita moderated the discussion face to an audience of nine people, mostly elders and men representing the communities that operate along the power line HT in the Sekou-Sorya District. In Dar-es Salam, the team of experts was faced with seven men from the villages related to the project.

In the section of N'Zérékoré, five interviews were conducted respectively with the sous-prefectures and local villages of N'Zérékoré, Yalenzou, Benzano, Toulemou and Gbèinè Daapa, (all under the Yalenzou CRD) including the youth associations in the villages.

Small numbers of participants attended these meetings because of low rate of population density in this sector. These various public consultations have not only collected in the villages concerned information of a socio-economic communities concerned and for information on the planned construction of power line.

The second round of consultations in the portion N'zérékoré-Yékékpa, took place from 6 to 8 November 2009, with two meetings per day. It is under the supervision of Kawé Gbonimy, firstly with the administrative authorities and community N'Zérékoré and the other part, with communities in some areas of the Rural Community of Development (CRD) of Yalenzou.

In total, there are six consultations, three with the administrative authorities and communities, and other three with communities directly affected by the line route of the interconnection project.

The first three are respectively concerned authorities of the Governorate and N'Zérékoré prefecture, the authorities of the Regional Directorate of the EDG and those of the CRD Yalenzou. The last three were for communities of Benzano, Toulemou and Gbèinè Daapa in the CRD Yalenzou.

In these series of public consultations, participation was structured around a debate discussing the appropriateness, characteristics and objectives of the project. For this, extensive information was given to people related to the objectives and work related to the project. Overall, the project is welcomed with enthusiasm by the communities that provide a great social and economic benefit when it comes real.

| | |
|---|---|
| | |
| <p>Consultation with Sekou-Sorya(Nov 5. 09)</p> | <p>Consultation with Dar-es-Salam(Nov. 6. 09)</p> |
| | |
| <p>Consultation with Laya(Dec.29.10)</p> | <p>Consultation with Linsan(Nov. 21.11)</p> |
| | |

9. Project Affected Persons (PAPs)

Consultations have been held with regulatory agencies, District officers and local communities prior to the preparation of the Scoping Report and the Environmental and Social Impacts Assessment.

The land to be affected by the implementation of the proposed Project has the following categories of land-uses:.

- Agricultural lands with perennial crops
- Agricultural lands with non-perennial crops
- Potential Agricultural (or fallow agricultural lands)
- Residential lands (affecting building / structures and residential plots)

Table 5 TOTAL PAPs FOR ALL COUNTRIES

| Country | PAPs | Dependents | Total | Remarks |
|---------------|--------------|--------------|--------------|---------|
| Cote d'Ivoire | 692 | 3,460 | 4,152 | |
| Liberia | 157 | 994 | 1,151 | |
| Sierra Leone | 414 | 2,898 | 3,312 | |
| Guinea | 112 | 503 | 615 | |
| Total | 1,375 | 7,855 | 9,230 | |

9.1. ESMP and Compensation

In all four countries, for the most part, the line route goes through non-residential government owned land which is in use as farmland. Upon completion of the T-line some farming will be permitted, thus compensation will only be required for perennial crops or annual crops if construction takes place during the growing season.

| Country | ESMP | RAP | Total | Remarks |
|---------------|------------------|------------------|------------------|---------|
| Cote d'Ivoire | 547,671 | 1,645,033 | 2,192,704 | |
| Liberia | 892,840 | 1,132,894 | 2,025,734 | |
| Sierra Leone | 892,160 | 2,508,121 | 3,400,281 | |
| Guinea | 330,790 | 1,866,368 | 2,156,958 | |
| Total | 2,663,461 | 7,152,416 | 9,775,677 | |

9.1.1. Cote d'Ivoire

| No | ITEM | Cost (FCFA) | Cost (USD) |
|----|---|--------------------|----------------|
| 1 | Reforestation | 25 000 000 | 54 782 |
| 2 | Awareness Campagne HIV / AIDS | 24 000 000 | 52 173 |
| 3 | Workshop for institutional capacity building | 5 000 000 | 10 869 |
| 4 | Intervention of NGOs in IEC (Information Education Conseil) | 12 000 000 | 26 086 |
| 5 | Environmental, social monitoring and Audits | 120 000 000 | 260 869 |
| 6 | Monitoring of quality parameters | 17 700 000 | 38 478 |
| 7 | Indirect costs | 48 030 865 | 104 414 |
| | Total | 251 930 865 | 547 671 |

| No | ITEM | Cost (FCFA) | Cost (USD) |
|----|--|--------------------|------------------|
| 1 | Compensation for land | 354 905 040 | 771 532 |
| 2 | Compensation for crops | 169 232 260 | 367 939 |
| 3 | Compensation for building | 35 700 000 | 77 608 |
| 4 | Commission management of complaint and claims | 18 000 000 | 39 130 |
| 5 | Restoration of livelihoods | 83 040 000 | 180 521 |
| 6 | Community Infrastructures | 70 000 000 | 152 173 |
| 7 | Purification and libations rites | 1 840 000 | 4 000 |
| 8 | Compensation related to the opening of access road | 24 000 000 | 52 173 |
| | Total | 756 717 300 | 1 645 033 |

| No | ITEM | Cost (FCFA) | Cost (USD) |
|----|--------------------|----------------------|------------------|
| 1 | PGES Total | 251,930,865 | 547,671 |
| 2 | PAR Total | 756,717,300 | 1,645,033 |
| | Grand Total | 1 008 648 165 | 2 192 704 |

9.1.2. Liberia

○ ESMP Cost

| Activity | No | ITEM | Cost (USD) |
|------------------------|------------------------|--|------------|
| Activities for ESMP | 1 | Review & Disclosure of Environmental Impact Assessment Report | 68,040 |
| | 2 | Audit for RAP and ESMP | 53,200 |
| | 3 | Environmental Monitoring | 441,480 |
| | 4 | Training of environmental management team in house | 32,400 |
| | 5 | Public Health & Safety (including HIV/AIDS Programmes) | 216,720 |
| | 6 | Measuring device for air/water/soil pollution and vehicle, laptop etc. | 81,000 |
| | Total ESMP Cost | | |

○ RAP Cost

| | No | ITEM | Cost (USD) |
|-----------------------|-----------------|---|------------------|
| Compensation | 1 | Compensation for lands | 128,000 |
| | 2 | Compensation for trees | 425,130 |
| | 3 | Compensation for food crops | 438 |
| | 4 | Building/Structures / Houses | 161,050 |
| | 5 | Constructional damage for plants outside of the ROW, inside access road $(=(2+3)*10\%)$ | 42,556 |
| | 6 | Compensation for loss of income $((1+2+4)*10\%)$ | 35,709 |
| | 7 | Add-on amounts for vulnerable project affected persons $(=(1+2+3+4)*5\%)$ | 35,730 |
| | 8 | Professional fees, reimbursement for permits etc $(=(1+2+3+4)*10\%)$ | 71,461 |
| | 9 | Contingency allowances to cater for the effect of probable increases in property values $(=(1+2+3+4)*10\%)$ | 71,461 |
| | Subtotal | | |
| Activities for RAP | 10 | Social action plan, community support | 57,659 |
| | 11 | Livelihood restoration program | 19,701 |
| | 12 | Community infrastructure Program $(=(1+2+3+4)*5\%)$ | 35,730 |
| | 13 | External monitoring and Evaluation | 26,600 |
| | 14 | Purification rites / ceremonies | 7,000 |
| | 15 | Indirect cost $(=(10+11+12+13+14)*10\%)$ | 14,669 |
| | Subtotal | | |
| Total RAP Cost | | | 1,132,894 |

○ Total

| | |
|----------------------------------|------------------|
| Total ESMP & RAP Cost | 2,025,734 |
|----------------------------------|------------------|

9.1.3. Sierra Leone

○ ESMP Cost

| ACTIVITY | No | ITEM | Cost (SLL) | Cost(USD) |
|------------------------|----|--|----------------------|----------------|
| Activities for ESMP | 1 | Review & Disclosure of Environmental Impact Assessment Report | 272,160,000 | 68,040 |
| | 2 | Audit for RAP and ESMP | 212,000,000 | 53,000 |
| | 3 | Environmental Monitoring | 1,765,920,000 | 441,480 |
| | 4 | Training of environmental management team in house | 129,600,000 | 32,400 |
| | 5 | Public Health & Safety (including HIV/AIDS Programmes) | 864,960,000 | 216,240 |
| | 6 | Measuring device for air/water/soil pollution and vehicle, laptop etc. | 324,000,000 | 81,000 |
| Total ESMP cost | | | 3,568,640,000 | 892,160 |

○ RAP Cost

| | | | | |
|----------------------------------|----|---|-----------------------|------------------|
| Compensation | 1 | Compensation for lands | 4,670,100,000 | 1,167,525 |
| | 2 | Compensation for trees | 971,722,432 | 242,930 |
| | 3 | Compensation for food crops | 335,340,802 | 83,835 |
| | 4 | Building/Structures, Houses | 873,408,750 | 218,352 |
| | 5 | Constructional damage for plants outside of the ROW, inside access road $(=(2+3)*10\%)$ | 130,706,323 | 32,676 |
| | 6 | Compensation for losses of income $((1+2+4)*10\%)$ | 325,761,559 | 81,440 |
| | 7 | Add-on amounts for vulnerable project affected persons $(=(1+2+3+4)*5\%)$ | 342,528,599 | 85,632 |
| | 8 | Professional fees, reimbursement for permits etc $(=(1+2+3+4)*10\%)$ | 685,057,198 | 171,264 |
| | 9 | Contingency allowances to cater for the effect of probable increases in property values $(=(1+2+3+4)*10\%)$ | 685,057,198 | 171,264 |
| Subtotal | | | 9,019,682,861 | 2,254,918 |
| Activities for RAP | 10 | Social action plan, community support | 230,636,000 | 57,659 |
| | 11 | Livelihood restoration program | 213,576,000 | 53,394 |
| | 12 | Community infrastructure Program $(=(1+2+3+4)*5\%)$ | 342,528,599 | 85,632 |
| | 13 | External monitoring and Evaluation | 106,000,000 | 26,500 |
| | 14 | Purification rites / ceremonies | 28,000,000 | 7,000 |
| | 15 | Indirect cost $(=(10+11+12+13+14)*10\%)$ | 92,074,059 | 23,018 |
| Subtotal | | | 1,012,814,658 | 253,203 |
| Total RAP cost | | | 10,032,497,519 | 2,508,121 |
| Total ESMP & RAP Cost | | | 13,601,137,519 | 3,400,281 |

9.1.4. Guinea

ESMP Cost

| No | ITEM | Cost (GNF) | Cost (USD) |
|----|--|----------------------|----------------|
| 1 | A review and disclosure of the impact report on the environmental assessment | 429,408,000 | 59,640 |
| 2 | Verification of the RAP and ESMP | 167,760,000 | 23,300 |
| 3 | Environmental Monitoring | 662,688,000 | 92,040 |
| 4 | Training of the in-house environmental management team | 146,880,000 | 20,400 |
| 5 | Public health and safety (including HIV / AIDS programs) | 683,352,000 | 94,910 |
| 6 | Measuring devices for air/noise/soil pollution and a vehicle, laptop etc. | 291,600,000 | 40,500 |
| | Total | 2,381,688,000 | 330,790 |

RAP Cost

| | No | ITEM | Cost (GNF) | Cost (USD) |
|-----------------------|----|---|-----------------------|------------------|
| Compensation | 1 | Compensation for land | 1,228,720,000 | 171,208 |
| | 2 | Compensation for trees | 7,464,861,100 | 1,036,783 |
| | 3 | Compensation for crops | - | - |
| | 4 | Buildings / structures, houses | 89,215,000 | 12,390 |
| | 5 | Constructional damage for plants outside of the ROW, inside access road $(=(2+3)*10\%)$ | 746,486,110 | 103,678 |
| | 6 | Compensation for loss of income $(=(1+2+4)*10\%)$ | 878,279,601 | 121,983 |
| | 7 | Add-on amounts for vulnerable project affected persons $(=(1+2+3+4)*5\%)$ | 439,139,805 | 60,991 |
| | 8 | Professional fees, reimbursement for permits etc $(=(1+2+3+4)*10\%)$ | 878,279,610 | 121,983 |
| | 9 | Contingency allowances to cater for the effect of probable increases in property values $(=(1+2+3+4)*10\%)$ | 878,279,610 | 121,983 |
| RAP Activities | 10 | Social Action Plan, support the community | 118,612,800 | 16,474 |
| | 11 | Livelihood restoration program | 104,068,800 | 14,454 |
| | 12 | Community Infrastructure Program $(=(1+2+3+4)*5\%)$ | 439,139,805 | 60,991 |
| | 13 | External monitoring and evaluation | 83,880,000 | 11,650 |
| | 14 | Purification rites / ceremonies | 14,400,000 | 2,000 |
| | 15 | Indirect cost $(=(10+11+12+13)*10\%)$ | 74,570,140 | 10,356 |
| | | Total | 13,437,932,390 | 1,866,368 |
| | | Grand Total | 15,530,180,390 | 2,156,958 |

10. Conclusion

This Environmental and Social Impacts Assessment has identified potential impacts on the physical, biological, socio-economic/cultural environments, occupational safety, health and welfare of the employees. Mitigation and potential remedial measures have also been outlined. These will be actively pursued in order to minimize or, if possible, eliminate the identified negative impacts.

The transmission line project cannot be carried out without any impacts on the environment. Indeed, some of the impacts are unavoidable. However, the mitigation measures put forward are expected, as far as possible, to be able to minimize the impacts so as to make them pose no threats to the continued sustainability of the environment.

A review of the identified impacts shows that there will be some significant adverse irreversible impacts on the environment (e.g. land ownership and land-use characteristics). Other impacts will be minimal and temporary.

The benefits to be derived from the implementation of the project are immense, especially considering the problems of electricity supply experienced in Sierra Leone, Cote d'Ivoire, Liberia and Guinea in the past. The implementation of the project will ensure that the objective of ECOWAS to establish a regional electricity market in West Africa through the judicious development and realization of key priority infrastructure that would permit accessibility to economic energy resources, to all member states of the ECOWAS shall be realized.

The proposed transmission line is therefore designed to fulfill the objective of providing a more reliable and secure transmission of power to meet the expected increase in demand of electrical power within the ECOWAS sub region.

The key drivers for increasing electricity consumption are growth in per capita GDP, growth in population, urbanization, development of basic industries, more opportunities for the education, enhancement of women right, rural electrification towards poverty alleviation and the attainment of the Millennium Development Goals.

The utility companies, SOPIE, LEC, NPA and EDG believe that this ESIA has sufficiently dealt with the significant issues on the ground and will therefore meet the expectations of the Environmental Protection Agencies in each country and warrant the issuance of an Environmental Permit to enable it to proceed with the implementation of the project without delay.