



PROJECT: **ELECTRICITY TRANSMISSION SYSTEM
IMPROVEMENT PROJECT**

COUNTRY: **FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA**

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ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT SUMMARY

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1. INTRODUCTION

1.1 The African Development Bank (AfDB) supported the energy sector in Ethiopia by financing high voltage transmission lines, rural electrification and regional interconnection projects. The current Ethiopia Electricity Transmission System Improvement project consists of (a) construction, on a turnkey basis, of four (4) 230 kV transmission lines; (b) construction of 12 (twelve) associated substations; (c) upgrading of four major substations in Addis Ababa; and (d) Consultancy Services to draw up a power distribution master plan for Addis Ababa. This ESIA summary summarized the four ESIA and RAP documents prepared for (i) Metu – Gambela, 140 km of 230 kV line; (ii) Koka-Hurso, 352 km of 230 kV line; (iii) Alamata-Muhoni-Mekele, 141km of 230 kV line; and (iv) Alaba-Hossana-Wolkite-Gilgel Gibe I-Jima-Agaro-Bedele, 315 km of 230 kV line.

1.2 The project is intended to provide sustainable power for Northern, Eastern and Southern parts of the country, will allow the transmission of reliable power from the interconnected system, will facilitate the implementation of the rural electrification program, reduce high transmission losses, and improve system efficiency, stability and reliability. As such, the proposed project is in line with the Bank Country Strategy Paper and the Government's PASDEP (2005/06-2009/10).

1.3 Site investigations were made to comprehend the existing biophysical environment and have key baseline information along the proposed entire route. Data on hydrology, topography, soils, climate, land use, flora and fauna, settlement, historical and cultural sites, development infrastructures, etc, were collected. Public consultation and disclosure meetings were conducted in the project areas. The views and attitudes of project affected persons (PAPs) were duly considered as part of the ESIA process (the minutes of meetings attached in ANNEX-I of the respective full ESIA reports). Discussions with the relevant stakeholders in government sectors were also held to make sure that the proposed development project is in conformity with the Regional sectoral policies and strategies.

1.4 The final route line is selected after exploring different option by EEPSCO surveyors, keeping in mind the three basic principles of avoidance, minimization and mitigation of environmental and social impacts. On the basis of these principles, two route alternatives including do nothing alternative were considered and evaluated in terms of social, biophysical and economic and technical factors.

1.5 This ESIA Summary outlines the Summary of the Environmental and Social Impact Assessment (ESIA), the Environmental and Social Management Plan (ESMP) and the Resettlement Action Plan (RAP) formulated for the proposed project. The Summary gives a synopsis of the project and the project areas; gives the project justification; lists the relevant policies, legal and administrative framework; describes the project environment; analyses the project alternatives; provides potential impacts and mitigation/enhancement measures; stipulates public consultations and disclosure processes; provides some complementary initiatives considered; outlines the monitoring program; makes a conclusion; and provides some reference and contact points. Attached to the Summary is an Annex (a summary of the Resettlement Action Plan (RAP)).

2. PROJECT DESCRIPTION AND JUSTIFICATION

2.1 Project Description

2.1.1 The Ethiopia Electricity Transmission System Improvement project consists of (a) construction, on a turnkey basis, of four (4) 230 kV transmission lines; (b) construction of 12 (twelve) associated substations; (c) upgrading of four major substations in Addis Ababa; and (d) Consultancy Services to

draw up a power distribution master plan for Addis Ababa. The lines and substations to be constructed are as follows:

2.1.2 Metu – Gambela, 140 km of 230 kV line

2.1.3 The proposed transmission line project is located in the regional states of Oromiya and Gambela. It traverses five districts (woredas). The project is purposed to extend the existing Grid further to Gambela substation and alleviating the over loading problem of the self contained system (SCS) of existing Gambela I substation. To realize this a 230 kV 150 km transmission line shall be constructed from Metu by upgrading the substation to new Gambela II 230/66/33/kV substation and this substation will be connected to the existing Gambela I 66/15kV substation by 66 kV, 15 km transmission line.

2.1.4 The transmission line will have single circuit on double circuit steel lattice tower with hot deep galvanized members, with optical fiber ground wire (OPGW) feature for control and monitoring and communication purposes. Average tower span is expected to have 350 meters, which totally requires erecting about 430 pylons. The transmission line route is selected along the road following the 66 kV wooden type of transmission line. The proposed route will thus facilitate ease of construction and maintenance. There will be a new 230/66/15kv substation to be constructed some 15 km away from the existing 66/15kv substation.

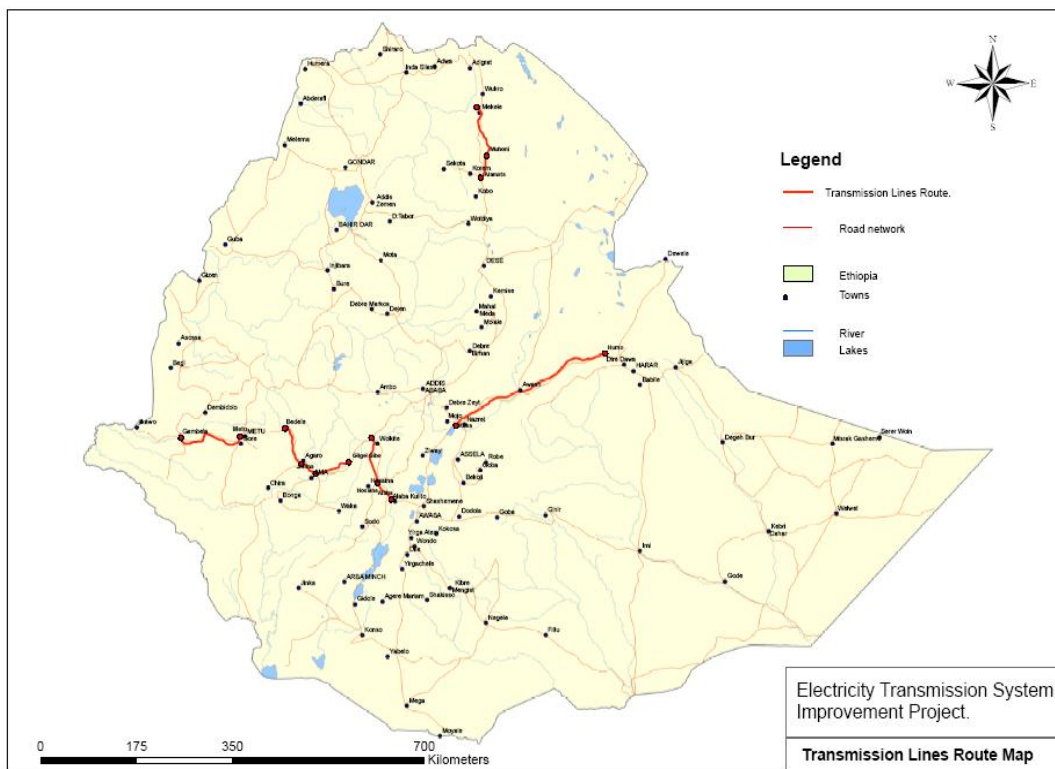


Figure 1: Transmission Lines Route MAP

2.1.5 Koka-Hurso, 352 km of 230 kV line

2.1.6 The proposed Koka-Hurso-Dire Dawa transmission line has 352 km in length will be constructed between Koka existing substation, Hurso (new substation) and Dire Dawa existing substation. The existing Koka substation will be an extension with complete 230 kV equipment of the fourth diameter of 230 kV one-and-half bus bar system to accommodate the two (2) 230 kV Hurso lines, two (2) 230 kV

line bays, two (2) 230 kV shunt reactor bays, two (2) 15 kV, neutral compensating reactors and two (2) 230 shunt reactors. The Hurso substation will be newly constructed, with 230/132/33/15 kV, substation, composed of six (6) 230 kV line bays, one (1) 230 kV bus bar coupler bay, two (2) 230 kV transformer bay, four (4) 230 kV shunt reactor bays, four (4) 132 kV transformer bay, two (2) 132 kV line bays etc, and upgrade the existing Awash 7 kilo substation by 132/66/15 kV substation by constructing one 230 kV double bus bar system, one 230 kV bus bar coupler bay, two 230 kV transformer bays, two 132 kV transformer bays, two 230 kV line bays , two 230/132 kV, 125 MVA autotransformers.

2.1.7 Alamata-Muhoni-Mekele, 141km of 230 kV line

2.1.8 The proposed Alamata – Mehoni – Mekele high voltage transmission line, 141 km in length will be constructed between Alamata substation, Mehoni (new substation) and Mekele substation. The existing Alamata substation will be upgraded with 2 outgoing line bays and additional installation of 132/15, 1 X 25 MVA. The Mehoni substation will be newly constructed, with 230/33 kV, 1 X 63 MVA and the existing Mekele substation will be upgraded with 2 incoming line bays of 230 kV. It is located between 120 47' North and Longitudes 390 32' East at Alamata substation and from Latitude 130 30' North and from Longitude 390 27' East at Mekele. The transmission line will traverse 5 Woredas all of which are found in Tigray Regional State.

2.1.9 Alaba-Hossana-Wolkite-Gilgel Gibe I-Jima-Agaro-Bedele, 315 km of 230 kV line

2.1.10 The proposed transmission line project is located in two different regional states namely Southern Nations Nationalities and Peoples (SNNPR) and Oromiya regions. It traverses some eleven districts (woredas). The line is also suppose to make a strong interlink between the 132 kV lines on the south west and the 400 kV lines on central south part of the country as well as the future power plant such as Gojeb ,Halele Werabesa,

2.1.11 The project is purposed to replace the aged wooden pole type of 132 kV transmission line by upgrading by 230 kV Steel Tower Transmission line in order to transmit the power generated from Gilgel Gibe reliably

2.2 Project Justification

2.2.1 The proposed project is in line with the Bank CSP and the Government's PASDEP (2005/06-2009/10). Ethiopia's ability to meet its medium-term growth target of 7% and to increase the rate of population access to electricity from 22% to 50% by 2015 with a focus on rural electrification relies on the development of adequate transmission system of power to various parts of the country. The project will be critical to meeting sufficient power transfers to overcome the demand in the regions. This project will support the Bank's country strategy by supporting economic growth and rural development through making available necessary power supply to meet the growing demand. The project is intended to provide sustainable power for Northern, Eastern and Southern parts of the country, will facilitate the implementation of the rural electrification program, reduce high transmission losses, and improve system efficiency, stability and reliability.

3. POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORK

3.1 The ESIA study for the proposed Ethiopia Electricity Transmission System Improvement project has been carried out within the framework of local, national and international environmental regulations. The legislative framework applicable to the proposed project is governed by the Federal Democratic

Republic of Ethiopia (FDRE) and the Africa Development Bank's environmental and safeguard policies and procedures.

3.2 Regulatory Framework of FDRE

3.2.1 The Federal Democratic Republic of Ethiopia adopted its Constitution in 1995, which provides the basic and comprehensive principles and guidelines for environmental protection, and management in the country. The Environment Protection Authority (EPA) has established an Environmental Impact Assessment system for Ethiopia including the preparation of Procedural and Sectoral Guidelines as a prerequisite for the approval of new development activities and projects. The EIA Process, as applicable to development projects, is detailed in the 'Environmental Impact Assessment Procedural Guidelines Series 1' of November 2003, as per Schedule I of the Guidelines.

3.2.2 Federal EPA and mandated line ministries administer the EIA process in Ethiopia, as set out in its establishment proclamation. EEPCO has complied with the EIA and procedural and documentation requirements of EPA, with submission of the EIA, ESMP and Resettlement Action Plan reports.

3.2.3 EEPCO and the contractor will be responsible for implementing the recommended environmental mitigation measures and management plans in coordination with the Federal EPA and the Regional Environmental Protection Offices. The environmental performance of the project will be monitored on a regular basis through EEPCO's own set-up and through external/ third party audits.

3.3 Relevant Guidelines

3.3.1 The Ethiopian Environmental Protection Authority has issued guidelines for environmental and social impact assessment of projects in different sectors.

- ✚ EPA, 2000. Environmental Study Procedural Guidelines require all projects to be subject to an IEE to decide whether the project is to be submitted to full EIA.
- ✚ EPA, 2003. Environmental Impact Assessment Procedural Guidelines Series 1.
- ✚ Sectoral Guidelines for specific types of projects, e.g. water supply, dams and reservoirs, irrigation, hydropower, rangeland management, soil conservation.
- ✚ EPA, 2004. Guidelines to prepare environmental and social management plans.
- ✚ Guidelines on Hydropower Production, Transportation and Distribution.
- ✚ Guidelines on ambient water quality of domestic, agricultural and industrial wastes
- ✚ EEPCo's environmental guidelines.

3.4 African Development Bank Guidelines

3.4.1 According to AfDB screening criteria, the Ethiopia Electricity Transmission System Improvement project is a category "1" project, for which a full-scale environmental impact assessment is required. This ESIA reports were prepared to fulfill the requirements of AfDB involvement in financing of the project investment.

3.4.2 The following AfDB policies and guidelines dealing with environmental and social issues related to the project were taken into consideration for preparation of the ESIA, ESMP and RAP reports and the Ethiopia Electricity Transmission System Improvement project is in compliance with the AfDB polices.

- ✚ Environment and Social Assessment Procedures
- ✚ Policy on Involuntary Resettlement

- ✚ Policy on Environment
- ✚ Policy on Poverty Alleviation
- ✚ Policy on Gender
- ✚ Policy on Collaboration with CSOs
- ✚ Handbook on Public Consultations and Participation

3.5 Multi-lateral Agreements

3.5.1 The Federal Democratic Republic of Ethiopia has ratified several international conventions and protocols and these include:

- ✚ Vienna Convention and Ozone Layer Protection (1990)
- ✚ Montreal Protocol for Substances Depleting the Ozone Layer (1990)
- ✚ Convention on Biodiversity (Rio convention) 1997
- ✚ Framework Convention of United Nations on Climate Change (1997)
- ✚ Convention on the Control of Trans-boundary movement of Hazardous Substance (1987)
- ✚ African Convention on the Conservation of Nature and Natural Resources
- ✚ Convention on Wetlands of International Importance especially as waterfowl habitat (Ramsar)
- ✚ Convention to Combat Desertification
- ✚ Convention Concerning the Protection of World Cultural and Natural Heritage
- ✚ Convention on International Trade in Endangered Species (CITES)
- ✚ Stockholm convention on persistent organic pollutants (PAPs, 22nd may 2001)

3.6 International Conventions

3.6.1 The Federal Democratic Republic of Ethiopia has ratified several international conventions and protocols, and some of these have relevance to the Ethiopia Electricity Transmission System Improvement project and these include:

- ✚ Convention on Biodiversity (Rio convention);
- ✚ Frameone convention of UN on climate change;
- ✚ African convention on the conservation of Nature and natural Resources;
- ✚ Convention on Wetlands of International importance Especially as waterfowl Habitat (Ramsar);
- ✚ Convention concerning the protection of world cultural and Natural Heritage.

4. DESCRIPTION OF THE PROJECT ENVIRONMENT

4.1 This chapter of the EIA summary provides a description of the environment that will potentially be affected by the Ethiopia Electricity Transmission System Improvement project. Information on existing natural and socio-economic resources is of fundamental importance for evaluation of environmental impacts. The baseline data on the status of the physical, biological and socio-cultural environments of the project areas have been assembled evaluated and presented in **Table 1** below.

Table 1: Summary of the Description of the project environment for each transmission line.

<i>Description of the project environment</i>	<i>Metu –Gambela, 140 km</i>	<i>Koka-Hurso, 352 km</i>	<i>Alamata-Muhoni-Mekele, 141km</i>	<i>Alaba-Hossana-Wolkite-Gilgel Gibe I-Jima-Agaro-Bedele, 315 km</i>
Physical environment				
Topography	<p>The topographic nature of the land where the 230 kV line is supposed to cross mostly consists of undulating hills mixed with few plain areas when specially coming closer to Gambela. There are of course steep – sloped mountains with deep valleys prevailing in some areas. The route section especially crossing the Metu Zone of Orimiya Region is most characterized by undulating hills. The other 15 km route from the proposed new Gambela-II Substation to the existing Gambela-I Substation is however crossing almost plain areas. The elevation range is between 430 and 1760</p>	<p>The topography of the Afar region varies from hilly escarpment in the western and southern edges with an altitude of 1000 – 1500 m.a.s.l to lowland plain land areas in the north east and south east. The altitude of the lowlands fall on average between 0 – 1000 m.a.s.l, while there are some areas below sea level. Over 95% of the Afar Region lies in the altitude range below 1000 m.a.s.l. About 8% of the total land area lies below sea level. This region is also known for its lowest altitudinal location (depression) in the world, having depths as low as 116 meters below sea level (m.b.s.l.) in the Danakil depression in the northern part of the</p>	<p>The area between Alamata and Mehoni for about 20 km is plain agricultural land with about three plateaus with scattered vegetation cover. From Mehoni to Kukuftu about 20.8 km to the north the area is plain but without any crop production activity (except cactus). Then after, for about 75 km, the area has very steep and rugged mountain chains. From Adikeyih up to Mekele about 26 km, is plain agricultural land. Altitude of the Region ranges between 600 m.a.s.l – 3,935 m.a.s.l.</p>	<p>The topographic nature of the land where the 230 kV line is supposed to cross is consisting of undulating hills mixed with plain areas. The route section especially from Mana Woreda until it reaches Bedele is mostly characterized by undulating hills. the route From Alaba to Hossana and Wolkite is however predominated by plain cultivated land mixed with some undulating and plateau areas.</p> <p>The elevation range is between 1662 and 2315 m.a.s.l</p> <p>The elevation range is between 1600 and 2980 m.a.s.l</p>

	m.a.s.l	region.		
Climate	<p>The climate within the routes of traverse varies. The annual temperature range is between 15 °c-40 °c.</p> <p>The Precipitation in and around the project affected Woredas is the highest in Ethiopia, with rainfall spreading throughout the year. Total annual precipitation in these areas exceeds 1500mm.</p>	<p>The region is one of the areas having high temperature and low rainfall. Temperature in the region ranges from a mean maximum temperature of 42.5°C in the area of Dubti Woreda and mean minimum temperature of 17.8°C in the high altitude zone at Gewane. The area has moisture index of less than 0.25 and receives mean annual rainfall of 200 mm.</p>	<p>The variation in altitude is primarily the cause for variation in climate. The annual mean temperature of the region varies from less than 100c to 27.5°c.</p> <p>The Region is stratified into five temperature zones, these are, highland comprising 11.5 %, semi highland 40.3%, lowland 47.9%, Arid 0.2 % and sub alpine 0.01 %.</p> <p>The region's mean annual seasonal rainfall is 690 mm.</p>	<p>The climate is characterized as cold, moist and humid. The mean annual temperature along the entire route varies from 11° C to 30 °C .The temperature around Hosanna comparatively is low. It goes down to 11°C.</p> <p>The amount of annual rainfall ranges between 1000mm-2800mm. the route section from GGI-Jimma-Agaro-Bedele gets the largest amount of rainfall.</p>
Soil	<p>Different types of soils were observed in the project areas which predominantly consist of Eutric Nitosol, Luvisol, and Chromic Vertisol, Alluvial soils</p>	<p>The major soils of the region in general include: Fluvisols, Leptosols ,Eutric Regosols ,Eutric Cambisols and Vertic Cambisols, Solonchaks</p>	<p>The soils types of Tigray Regional State are Leptosols 54.09 %, Cambisols 21.91%, Vertisols 11.99 %, Luvisols 4.85 % etc.</p>	<p>Soils along the route were observed as various types in the study area. They are classified in the order of Nitosol, Pellic vertisol, Orthic Acrisole and Cambisol. Nitosol and Pellic Vertisols covers larger portion of the project area. They constitute about 60% and 80 % of the total area.</p>
Water Resource	<p>Some major streams and rivers like that most exist in the project area were also observed during the assessment, of</p>	<p>There are also several seasonal rivers /streams in the region which are usually the source of water supply for human being as</p>	<p>The major rivers like Tekeze, Werdi, Kaza, Asem, Ferfer and Girebgiba flow permanently throughout the year in the Region.</p>	<p>Some major streams and rivers that most exist in the project area were also observed during the assessment, of which some of them were seen crossing the</p>

	which some of them were seen crossing the line.	well as animal consumption.	There are also several seasonal rivers /streams in the region which are usually the source of water supply for human being as well as animal consumption.	line.
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Biological Environment

Flora	The Forests in the study area are characterized by highland rain forest. However they have been largely affected by human interference mainly due to population increase, lack of awareness, etc. coffee cultivation by farmers has a serious impact on the forest and leads to decreasing the natural forest density. According to the Woreda agricultural office in the project area, there is a designated forest named Babiya forest covering about 687ha,	Some indigenous flora that are commonly found in the region is <i>Cordia Africana</i> , <i>Juniperus procera</i> , <i>Ficus vasta</i> , <i>Ficus sur</i> , <i>Acacia spp</i> s and <i>Eucalyptus spp</i> s	Some indigenous types of flora that are commonly found in the region include <i>Cordia Africana</i> , <i>Juniperus procera</i> , <i>Ficus vasta</i> , <i>Ficus sur</i> , <i>Acacia spp</i> s and <i>Eucalyptus spp</i> s.	The vegetation coverage in the study area as a whole is low. Human induced crops due to cultivation and livestock grazing have replaced much of the natural vegetation. The coverage where the line suppose to cross specially from Alaba-Hossana-
Fauna		The diversity of wild animals in the study area is very low because of the decline of their natural habitat. However, some common wild animals are hyena (<i>Crocuta crocuta</i>), Monkey (<i>Cereopithecus aethiops</i> , guinea fawl, Warthog (<i>Phacochlerus aethiopicus</i>), Fox (<i>Otocyon megalotis</i>), elephant, eland, greater kudu, leopard, etc	The diversity of wild animals in the study area is very low because of the decline of their natural habitat. However, some common wild animals like, hyena (<i>Crocuta crocuta</i>), Monkey (<i>Cereopithecus aethiops</i> , guinea fawl, Warthog (<i>Phacochlerus aethiopicus</i>), Fox (<i>Otocyon megalotis</i>), elephant, eland, greater kudu, leopard, etc	Wolkite comparatively maintains lower forest coverage. On the other hand, the areas that the line traverses along <i>Jimma –Agaro – Bedele</i> however has relatively better coverage. There are forest reserves named <i>Arga Kara</i> and <i>Beddessa</i> which cover about , 1331ha 1083ha of lands respectively.

Socio Economic Environment

<p>The 230kv transmission line passes through areas with different socio economic conditions as indicated by type and size of residential houses and type and amount of house hold income from crop yields and livestock keeping and other assets. The common annual crops produced in the project area are Teff, wheat, barely and maize, sorghum, etc. and perennial crops such as coffee is predominantly growing in the area</p>	<p>Health is an important social indicator that has enormous development implication. In the Region there are 44 hospitals, 283 health centers, 2,337 health posts and 1,553 clinics.</p>	<p>The total population of the Region according to census projection of 2009 is 4,682,310 and the average population density of the Region is 0.02 persons per km². Major agricultural products produced in the Region are cereals like maize, wheat, sorghum, teff, and barley.</p>	<p>The 230kV transmission line passes areas with different socio economic conditions as indicated by type and size of residential houses and type of and amount of house hold income from crop yields and livestock keeping and other asset. The common annual crops produced in the project area are teff, wheat, barely and maize etc. and perennial crops such as enset, coffee, chat etc .are predominantly grown in the area</p>
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5. PROJECT ALTERNATIVES

5.1 Alternative I: “Do-nothing”: With the “do-nothing” alternative, the potential social and socio-economic benefits to the nation would be foregone, and quality of life would remain at a low level for many of those who live in the country. Long-term development plans for the country would be compromised and slowed down, since a reliable power supply and the improved service associated with it are fundamental to achieving the full benefits of other development initiatives and meeting the Millennium Development Goal (MDG). Therefore, from an environmental viewpoint, the “**do-nothing**” alternative is not preferable to project implementation.

5.2 Alternative II: The transmission line traverses mountainous and large forest covered areas .The areas are comparatively rich in its biodiversity resources and could be affected severely due to the opening of ROWs. The topography was also found very difficult to access even for construction purposes. It requires additional forest clearing to open up access roads for construction activities. The proposed route also makes the project cost to elevate due to the increasing number of bends and towers.

5.3 Alternative III: (Preferred option): The proposed Transmission line route comparatively affects less forest coverage areas and the biodiversity loss would be minimum. The route also avoids many settlements which otherwise would cause more households to be affected. It avoids clearing of additional forest areas, dislocation of more households, interfering to further cultivated lands, etc. The line route is also found much more preferred than opening another new line even from the economical and engineering points of view.

5.4 Therefore, from the environmental and socio economic points of view, option 3 is preferred as the best to implement the proposed project, given that the proper mitigation measures are undertaken in advance.

6. POTENTIAL IMPACTS AND MITIGATION/ENHANCEMENT MEASURES

6.1 This chapter serves to assess the identified potentially significant environmental impacts associated with the proposed site for the development of project and to make recommendations for the mitigation measure of these impacts.

Table 2 - Synthesis of Environmental Impacts Matrix

No	Environment components	Pre-construction phase		Construction stage activity components				Operational phase
		Line route survey	Land Acquisition	Equipment and material mobilization	Tree cutting & corridor free	Foundation tower erection and stringing	Access roads construction	
I	Social -economic Env.							
	▪ Residential areas	0	c	0	C	d	0	0
	▪ Income							
	▪ Cultural and historical sites	0	C	E	D	E	e	0
	▪ Health & safety							
	▪ Quit daily life	0	0	0	0	0	0	0
	▪ Society unrest							
		0	0	e	d	d	0	0
		0	0	d	d	d	e	e
		0	E	0	0	0	e	0
II	Physical-Environment							
	▪ Soil	0	0	E	D	C	c	0
	▪ Air quality							
	▪ Land use	0	0	E	e	0	e	0
		0	0	c	e	d	e	0
III	Biological Environment							
	▪ Flora							
	▪ Fauna							

▪ Parks and reserves	E	0	E	d	e	C	0
	e	0	E	d	e	E	0
	0	0	0	0	0	0	0

Positive Impact
O=No important

D=Fair Important

Negative Impact

d=Fair Important

A=Very important

E=Less Important

a=Very important

e=Less Important

B=More Important

b=More Important

C=Important

c=Important

6.2 Beneficial/ Positive Impacts

6.2.1 Key potentially beneficial impacts associated with the implementation of the project are:

- ❖ **Additional Power Capacity:** With the additional substations and power lines, EEPCO will be able to increase its electric power reliability and power supply capacity. This additional capacity would have a positive impact on meeting power demands across the areas since EEPCO would have adequate supply.
- ❖ **Employment opportunity:** The power project is expected to generate employment opportunities during both construction and operation. It is expected that many people (including women to the extent possible) will get jobs during construction; and an additional people will probably get direct and indirect jobs during operation.
- ❖ **Boost the economy** through investment and expansion of businesses and income generation opportunities.
- ❖ **Gender Issues:** Women as well as men will benefit equally from the employment opportunities that will be created and from convenient and safe access road facility. Women often run shops and bars in the areas and during the construction period, it is anticipated that there will be further income generating activities for women such as food catering/restaurants for workers on the construction sites and the selling of local products to construction camp workers. These activities will benefit mainly women who are very often the sole supporters of their families. It is also recommended for the contractor to give equal employment opportunities to women as well as men within the project skills requirements; and to maximize the procurement of local products and services.
- ❖ **Connecting more** households and institutions to the national grid,
- ❖ Enable to reduce poverty.
- ❖ Improve living standards.

6.3 Potential Negative Impacts:

6.3.1 Key potentially adverse impacts associated with the implementation of the Ethiopia Electricity Transmission System Improvement project are:

6.3.2 Impacts on Fauna: Large predatory birds, including night active birds are the ones most affected by HVTL. These will be because of physical clearance and hazard to birds especially on the Koka-Hurso line, which lies in the Rift Valley where birds are potentially to migrate through; and are a danger to climbing animals and people. Extensive clearance of the way-leave can potentially create a specific biotope in areas with denser vegetation hence may become hunting ground for carnivores.

6.3.3 Impact on flora: Clearance of the way-leave and for access roads will impact of vegetation cover; and cutting down of tall trees and shrubs will result in a form of deforestation and loss of forests for commercial purposes. The most intense effect is during the construction phase, when in addition to clearing, vehicles and machines move in the way-leave for tower construction and stringing further compacting the soil and/or triggering **erosion**.

6.3.5 Noise, Vibration and Dust Emissions: During the construction period the activities like excavations and blasting movement of vehicles and the operations of heavy machinery may impact people living nearby access roads as well as in the neighborhood of the construction site .how ever these nuisance will be short term effects restricted to day time and a period of some days along distinct line stretches a few km along mainly around the tower sites and the access roads.

6.3.4 Impacts on Residential Areas and Community Services: The project will result in affecting 752 households through creation of the way leave for the transmission line. During the line survey no community services' structures or facilities were found to be affected by the project.

6.3.6 Impacts on Crop Production: There will be a permanent loss on some croplands due to the occupation of the tower pads, which is quite insignificant as compared with the total area of cultivated land in the project area. The farmers' seasonal agricultural activities may be disrupted in the construction activities. On farm, crops may also be affected temporarily during construction period. They can however be mitigated either by undertaking the construction works after the crops harvest or doing proper compensation payments for all damaged crops.

6.3.7 Social Impact: HIV/AIDS and other sexually transmitted diseases problems the major impacts on health and safety are related to the work force engaged in the construction and operation of the transmission line. Communicable diseases like sexually transmitted infections (e.g. HIV/AIDS, Hepatitis, etc) and malaria can be spread around and in the construction areas. The influx of labor to the construction areas and their interaction with the locals can cause tensions and pressure on resources.

6.3.8 Electric and Magnetic Fields: Although there is little evidence to suggest resultant negative effects on human health, exposure to Electro-Magnetic fields (EMF) may be viewed as potentially harmful. However, the EMF decrease very rapidly with distance from source and there should be no potential health risks for people living outside the way-leave corridor.

6.3.9 Landscape and Visual Intrusion: The HVTL are likely to cause visual impacts hence disturbing the aesthetic beauty of the area, more so through the Awash National Park where tourist will be seeking pristine natural environments they may find this disturbing; however, from the perspective of rural populations, it is seen as a sign of development.

6.3.10 Electrocutions: During operation, impacts are related mainly with electrocutions and possible induce effects from electromagnetic fields. The placement of low-slung lines or lines near human activities (e.g. high ways, buildings) also increases the risk of electrocutions. Therefore, the lines should be checked regularly, whether they are at low slung, so that immediate measures would be taken on time to avoid the risks on high ways and residential places.

6.3.11 Impact of Polychlorinated Biphenyls (PCBs) : Health effects that have been associated with exposure to PCBs include acne like skin conditions in adults and neurobehavioral and immunological changes in children. PCBs are also known to cause cancer in animals.

6.3.12 Impacts on Soil: The risk of erosion would be higher where there is an increase in land slope. Particularly in the Metu -Gambela 230 kV transmission line and Alamata – Mehoni – Mekele 230 kV transmission line where the topographic condition of the project areas is hilly and highly sensitive to erosion. The emergence of erosion may cause the increase of sedimentation load and deterioration of quality of streams nearby. During the erection of tower pads and access road construction, there will be clearing of vegetation and excavation works, which may lead the top soil to be threatened by wind and water erosion. The machineries used during the construction period may also cause soil erosion.

6.3.13 Impacts on Drainage and Water Resources: Although not significant, earthworks might release suspended particles into water, which could have temporary detrimental effects on water organisms; and the effect from tower pads and maintenance roads on the hydrological functions of wetlands or water resources.

6.3.14 Impact of National Park: The Koka – Hurso Dire Dawa 230 kv transmission line the Awash National Park in part (756km²). Even though the transmission line passes through the Awash National Park, it has no any significant impact as the current transmission line follows the same corridor as the existing line.

6.4 Mitigation/Enhancement Measures

Table 3: Mitigation/Enhancement Measures

Impact	Mitigation Measure
Potential Impacts on Fauna:	<ul style="list-style-type: none"> ✓ The recommendation proposed by the Ethiopian Wildlife and Natural History Society which is the representative of the IBA was to ensure that the lines passing through the rift valley be fitted with bird warning spheres (colored balloons), fitting of flapper devices on the shield wires which will make them more visible, and altering types of towers for the concerned line stretches and to reduce collisions. Monkeys, such as baboons, climb the towers, but soon learn to avoid the conductors. People will be stopped through sensitization and warning signs of danger. ✓ Roads should be kept to a minimum (as per draft layouts presented, with only one or two links between turbine rows) in order to limit direct vegetation loss and habitat fragmentation (Indirect impact). ✓ Following construction, rehabilitation of all areas disturbed during the construction phase and that are not required for regular maintenance operations must be undertaken. The main areas thus requiring rehabilitation will be parts of the laydown areas next to the turbines, the crane tracks alongside the permanent 6m roads, any cable routings where these fall outside the above-mentioned areas, and disturbed areas around the planned visitor centre and substation.
Potential Impacts on flora:	<ul style="list-style-type: none"> ✓ While impact on woody vegetation is going to be permanent, impact on grasses and herbs is mostly transient. It is important to reiterate that, vegetation clearance through the Protected Areas will be done with the guidance of forestry

	<p>officials, and selective clearing is recommended. Clearance for construction work and inspection shall be to no more than necessary extent. At completion of construction works areas not needed anymore will be replanted / reforested as far as the line security is not impeded.</p>
<p>Potential Impacts on Residential Areas and Community Services</p>	<ul style="list-style-type: none"> ✓ Such impacts can be avoided or minimized by careful selection of ROWs. During route alignment, surveyors take all possible measures to minimize the number of residential houses to be affected by the project. For the houses and Tukuls to be affected, they will be paid due compensation as per the Ethiopian and AfDB rules and regulations of the land and compensation policy.
<p>Potential Impacts on Geomorphology and Surface Processes (Increased runoff relative to the pre-disturbed state as a result of sealed surfaces roads, roofs)</p>	<ul style="list-style-type: none"> ✓ Use existing roads wherever possible; ✓ Ensure new roads have culverts placed in topographic lows; ✓ Avoid all pans and drainage lines and associated buffer zones, wherever possible for the siting of Infrastructure, even if of a temporary nature.
<p>Potential Noise, Vibration and Dust Emissions Impacts:</p>	<ul style="list-style-type: none"> ✓ Determine of whether time or other constraints would need to be stipulated with regard to all construction related vehicular traffic. ✓ Monitoring of any limitations/constraints that might be imposed. ✓ The impact of dust can be limited through taking proper dust abatement measures like watering of roads and control of traffic speed limit. The contractors will be required to incorporate such issue in to the management plan and submit with their contract proposals.
<p>Potential Impacts on Crop Production</p>	<ul style="list-style-type: none"> ✓ Due compensations will be paid for affected both perennial and annual crops.
<p>Potential Impacts on the Social Environment</p>	<ul style="list-style-type: none"> ✓ EEPSCO should establish a liaison committee made up of representatives from EEPSCO, the contractors and local elders to devise a code of conduct for workers to address conflicts that may arise. ✓ Even with the most vigorous campaign and safeguards, an increase in HIV/AIDS and STIs resulting from the project is inevitable. Therefore, systematic blood testing like voluntary counseling and testing VCT practice in the project area is quite necessary to keep it minimal. The blood testing must be used merely for information purposes and not to be used to dismiss infected employees.

Potential Impacts on Electric and Magnetic Fields	As a precautionary measure, EEPCo already adopted internationally accepted standard ROW width of 40 meters along its high voltage transmission lines. All habitation and structure are exclude from the ROW to ensure safety of people and animals from EMF produced as well as from direct electric shocks and ‘flash over’
Potential Impacts of Electrocutions	✓ Safety orientations in schools along the transmission line will further minimize impacts on the local community.
Potential Impacts of Polychlorinated Biphenyls (PCBs)	✓ The Stockholm convention is a global treaty, which Ethiopia has signed and ratified to protect human health and the environment from persistent organic pollutant (POPs) which PCBs are one of them. As per the convention most companies or manufacturers have stopped manufacturing PCBs contain transformers and capacitors. EEPCo will develop a program for the safe removal and disposal of any PCBs found in accordance with convention to which it is signatory.
Potential Impacts on Soil:	<ul style="list-style-type: none"> ✓ During the design and construction of access roads, substations, new camp sites and erection of towers, there should have a conservation plan for the proper management and control of significant soil erosion problems. ✓ Following the construction works ensure re -vegetation at all work sites at the earliest time and select tree species suitable soil conservation purposes.

7. ENVIRONMENTAL HAZARD MANAGEMENT

7.1 The contractor is responsible to organize on-site environmental management and safety training for its construction work force at least one month prior to the commencement of the construction. The Environmental and Social Experts of Power System Planning of EEPCO will supervise and monitor the activities. The contractor during the construction period should regularly provide adequate safety equipments and orientation to its employees.

7.2 The contractor and sub-contractors throughout the construction period will be required to use appropriate vehicles and comply legal gross vehicle and axle load limits. They are also required to repair damages at own expense. The contractor should minimize road safety hazards and inconvenience to other road users by taking all appropriate measures during the construction period.

7.3 Public safety may not be a significant problem since residents with ROW area will be relocated. The transmission line would be regularly checked whether they are at low slung so that prompt action would be taken on time.

7.4 During operational phase safety, orientation in schools along the transmission line will further minimize impacts on the local communities.

8. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

8.1 An Environmental and Social Management Plan (ESMP) has subsequently been developed for each transmission line. The Environmental management plan describes the range of environmental issues associated with the project and outlines corresponding management strategies that will be employed to mitigate potential adverse environmental effects.

8.2 In general terms, the contractor is responsible for implementing the majority of the day-to-day, construction related environmental mitigation measures specified in this report and measures specified in the contract. EEPCO will be fully responsible for implementing the project related to mitigation measures and resettlement action plan. Upon completion of construction, EEPCO will be responsible for implementing environmental management measures associated with operation of the plant.

8.3 The Environmental management plan describes the range of environmental issues associated with the project and outlines corresponding management strategies that will be employed to mitigate potential adverse environmental effects and provide performance indicators, monitoring means and frequency, responsibility for monitoring and associated estimate costs.

8.4 According to the ESMPs and RAPs prepared for the project, EEPCO will pay full compensation for each lost items (houses, Tukuls and other properties) as per the Federal Proclamation No 455/2005. The compensation shall be completed before the commencement of the construction activities. For the successful compensation implementation, there will be a property valuation committee designated by the woreda's administration of the specific project areas. The committee would consist of different experts with relevant qualifications to value the properties thereon. The affected households and their family members would be adequately compensated considering the assets and opportunities they leave behind and expenses that are required for the support of their livelihood. The scheme would be fully backed by appropriate technical and administration support.

8.5 An estimated USD 10.2 million will be made available in the project budget for ESMP implementation and resettlement and compensation in accordance with AfDB policy on Involuntary Resettlement.

8.5 Environmental Monitoring

8.5.1 Environmental monitoring program has been recommended and will be performed during all stages of the project (construction, de-commissioning and operation) to ensure that impacts are no greater than predicted, and to verify the predictions. For this project, it is recommended to carry out both compliance and effects monitoring. The monitoring has to indicate where changes to construction procedures or operations are required, in order to reduce impacts on the environment or local population.

8.5.2 It is the responsibility of EEPCO to conduct regular internal monitoring of the project to verify the results of the Contractor and to audit direct implementation of environmental mitigation measures contained in the ESMP and construction contract clauses for the Project.

8.5.3 The Federal Environmental Protection Authority (EPA) will oversee all the environmental activities related to the project. The Ministry of Mines and Energy, Agricultural and Rural development, Health and other stakeholders will be involved with their specific monitoring responsibilities in the environmental and socio economic activities. Their responsibilities are exercised in the different stages, pre- construction, construction, and operation and maintenance phases.

8.5.4 Depending on the implementation status of environmentally sensitive project activities, EPA will perform annual environmental reviews in which environmental concerns raised by the project will be reviewed alongside project implementation. The Bank's project Team will receive regular progress reports on implementation of the ESMP and RAP and conduct on the spot checks during supervision and implementation support. The project affected persons and communities will be represented through relevant project committees and public participation forums to be held during the audits.

Table 4 - Synthesis of Environmental Monitoring Matrix.

Activity Phase	Resource	Environmental Components	Environmental Indicators	Weight Effect	Standardization	Location of the observation
I- Pre-construction	Site survey	Plants belonging to residents	Plant damage	e	The width of the plant damaged area.	Areas around tower lines
	Land acquisition	The society where the lower basis are	Society complaint	b	The land acquisition has been suitable with the rules.	Areas around tower lines
II: Construction	Labor equipment and material mobilization	Workers	Society complaint	D	Level of labor recruitment	Around the tower of residence
		Recruitment				
		Air quality	Dust pollution	e	Air quality Standard	Close to residence of the tower close to residence
		Notice	Noise	e	Noise quality standard	Part of the tower close to residence
	Route clearance	Society land	Plant damage	c	New land functions	Part of the tower close to residence
	Tower erection and stringing	Space and area	Land use	e	Changes in area function, erosion and land slide problems.	Part of the tower close to residence
Traffic		Traffic nuisance	e	Level of traffic nuisance	Part of the tower close to residence	
III operation	Electric power transmission	Free area	EM field	e	Free area according to the rules	Under the towers and R.O.W
	Maintenance	Society plants	Plant damages	e	How many plants are damaged	Part of the tower close to residence
		Excavation activity	Land slide/erosion	e	How much erosion appears	The towers sole

Positive Impact

A=Very important
d=Fair Important

B=More Important
e=Less Important

C=Important
O=No important

D=Fair Important

E=Less Important

Negative Impact

a=Very important

b=More Important

c=Important

9. PUBLIC CONSULTATIONS AND DISCLOSURE

9.1 Public consultations and disclosure requirements: During field assessment and scoping phase of the ESIA and RAPs preparation, public consultations and disclosure meetings were held with the affected community households, elders and chairpersons of the Kebele (Peasant) Associations. The consultations were conducted at Semein Woreda, Felegedearo village, Sire Robi Town, Guraghe Chahe, Jimma Mana, Gara Bechano and Kunde kebeles. The related ESIA documentation will be publicly available on EEPKO's web site at– www.eepco.gov.et). During the Scoping Phase, public participation was comprehensive and included advertising in national, regional, and local newspapers, subsequent notifications in regional and local newspapers, and the dissemination of a nontechnical Background Information Document (BID) in English, Amharic, Tigrigna and Affan Oromo languages. All key agencies such as Department of Wildlife, Department of Forestry, and Ministry of Agriculture, etc. will be served with copies of the respective ESIA. Regional and District Administration offices will also be supplied with copies to be shared and discussed with local leaders. On its part, the Bank will make this Summary of the ESIA and will post it on its website and distribute to PIC (Public Information Center) and Ethiopia Field Office allowing the required 120 days of disclosure before Board presentation.

10. COMPLEMENTARY INITIATIVES

10.1 Gender Labor Division

10.1.1 Women groups are more interested in the proposed project than other social groups because they are most likely to benefit more from the opportunities provided through the proposed project. The availability of electricity would help to improve the existing infrastructures and services to a level to which it will provide adequate services to the communities. Especially the burden of women will be reduced because of improved infrastructures and social services such as health facilities, schools, and flourmills, just to mention a few. Women and may no longer need to go long distances to seek flourmills, collect firewood, fetch water for drinking and cooking, etc. – in so doing save time and energy for other productive and educational activities, respectively. The availability of electricity in the project areas also helps to encourage investments in different economic sector so women can have opportunity to get jobs, participate in micro businesses, selling foods, etc. This may help to increase their income. Women tend to rely more heavily than men do on informal support networks, such as the help of friends, neighbors, or relatives for childcare. Break down of these net works due to dislocation may affect women than men hence the relocation committees must involve women and women interests must be highly considered.

10.2 Creation of employment and business opportunities (construction phase)

10.2.1 The construction phase for the Ethiopia Electricity Transmission System Improvement project or phase is expected to last approximately 24 months. During this period, the project will create a number of employment and business opportunities associated with the construction of transmission lines.

11. CONCLUSION

11.1 From the environmental and social points of view, the proposed 230 kV transmission line project poses minimum impact on the existing biophysical and socio-economic environment.

11.2 The overall mitigation costs as compared to the total project costs are minimum at about 4% of the total project cost.

11.3 Therefore, it is highly recommended to implement The Ethiopia Electricity Transmission System Improvement project to supply the energy in a reliable manner to meet the demands required in the country from the cheap and clean hydro energy coming from the operations of hydro power plants and the hydropower projects in Ethiopia. This will definitely facilitate agro-industrial developments; improve the rural socio-economic structures and living standards of the rural poor.

12. REFERENCES AND CONTACTS

12.1 References

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Constitution of the Federal Democratic Ethiopia Proclamation No 1/1995

Guidelines for the Preparation of a Resettlement Action Plan, June 2003

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Environmental and Social Impact Assessment for Koka-Hurso, 352 km of 230 kV line, July 2010.

Environmental and Social Impact Assessment for Alamata-Muhoni-Mekele, 141km of 230 kV line, July 2010.

Environmental and Social Impact Assessment for Alaba-Hossana-Wolkite-Gilgel Gibe I-Jima-Agaro-Bedele, 315 km of 230 kV line, July 2010.

Resettlement Action Plan for Metu – Gambela, 140 km of 230 kV line, July 2010.

Resettlement Action Plan for Koka-Hurso, 352 km of 230 kV line, July 2010.

Resettlement Action Plan for Alamata-Muhoni-Mekele, 141km of 230 kV line, July 2010.

Resettlement Action Plan for Alaba-Hossana-Wolkite-Gilgel Gibe I-Jima-Agaro-Bedele, 315 km of 230 kV line, July 2010.

Environmental policy of Ethiopia: Environmental Protection Authority, Addis Ababa, April 2003.

12.2 Contacts:

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ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA)

SUMMARY ANNEX

SUMMARY RESETTLEMENT ACTION PLAN (RAP)

Project Name: Electricity Transmission System Improvement Project

Country: Ethiopia

Project Number: P-ET-FAO-008

1. Project description, project area and area of influence

Project Description

1.1 The project consists of (a) construction, on a turnkey basis, of four (4) 230 kV transmission lines; (b) construction of 12 (twelve) associated substations; (c) upgrading of four major substations in Addis Ababa; and (d) Consultancy Services to draw up a power distribution master plan for Addis Ababa.

Project Areas

1.2 The project areas and areas of influence covering each individual line are:

(i) Oromiya and Gambela Regional States through which the Metu – Gambela line stretches over a distance of 140 km. The line traverses five districts (*woredas*). This sub-project will be extending the existing grid further to Gambela substation and alleviate the over loading problem of the self contained system (SCS) at the existing Gambela I substation.

(ii) The Koka-Hurso – Dire Dawa 230 kV high voltage transmission line spans for 352 km starting at Koka where a new substation will be constructed to Dire Dawa substation. The transmission line will traverse 3 Regional States and one city Councils of Oromiya, Afar, Somali Regional States and Dire Dawa City Council), and 5 Zone Administrations.

(iii) The Alamata-Muhoni-Mekele is a 141 km transmission line intended to deliver power generated from Tekeze hydro power plant and from Ashegoda wind power plant to the main load centres of the country. The high voltage transmission line will be constructed between Alamata and Mekele city. The transmission line will traverse 5 Woredas all of which are found in Tigray Regional State.

(iv) The Alaba-Hossana-Wolkite-Gilgel Gibe I-Jima-Agaro-Bedele line is 315 km long and is located in two different Regional States of Southern Nations Nationalities and Peoples (SNNP) and Oromiya. It traverses some eleven *woredas*. The line is to be constructed between Alaba substation and Wolkite substation and Gilgel Gibe I substation and Bedele substation. Most sections of this line will run parallel to the existing 132kV transmission line. The topography of the line route consists of plain areas mixed with plateaus and hills. In this line there will also be the upgrading, extending of the existing substations of Alaba, Hosaina, Agaro, Bedele, Wolkite and Gilgel Gibe I and construction of a new substation at Jimma.

2. Potential Impact of the Project

2.1 **Way leave of Right of Way:** The most significant cause of impacts such as resettlement and compensation will come from the need to clear the way leave or right of way (ROW). According to EEPSCO's regulations, this has to be 40 m on each side of the center line for a 230 kV high tension transmission line. This is required to ensure the safety during construction, maintenance and operation. Within the way leave, farmers may continue to cultivate crops except trees that may grow to 8 m and above. No buildings will be permitted under the transmission line to within the 40 m band.

2.2 **Foundation:** The area needed to construct the foundation shall also have both environmental and socio-economic impacts. The foundation is influenced by the type of terrain encountered as well as the underlying geotechnical

2.3 **Stringing:** Stringing can be under taken mechanically or manually. Either way, there will be need to clear the way and assets may get damaged I the course of action.

2.4 **Access Roads:** Access roads are required to allow access along the entire length during construction, operation and maintenance of the power transmission lines. During survey, route line was designed along the existing road in order to reduce the potential impact associated with the construction of new road. The construction of access roads should be in the manner of avoiding permanent removal of the existing vegetation. All access point and roads will be negotiated with land owners.

2.5 **Substations:** The project will involve the construction of 12 new substations which will occupy significant amount of land. Substations are fenced to minimize the potential for accidental electrocution to people and animals; and are accessible by a permanent road at all times.

2.6 The findings of the surveys revealed that about 644 households are identified to be affected by the project and most of them will partially or fully lose their farm land and buildings be it temporary or permanently. Considering that the nature of the project is linear, the households that will lose houses will be able to construct their houses at the remaining plot of land without any resettlement or relocation. For those who have no enough area to build own houses, there will be need to relocate them to short distances from the ROW so as to reduce the social disruption due to resettlement.

The Table below summaries the effects, on temporary and permanent basis, of the project on land and residential houses.

Route section	Line Length Km	Number of Households Affected	Total No. of houses to be relocated	Temporary loss of land due to ROW	Permanent loss of land due to Towers
Alaba-Hosaina-wolkite-Gelgel-Gibe-Agaro -Bedele	315	470	572	1260 ha	3.24 ha
Alamata-Mehoni-Mekele	141	54	56	194.55	1.45
Koka – Hurso-Dire Dawa	352	57	63	1408	3.63
Metu-Gembela	140	63	63	600	1.6
Total	948	644	754	3,462.55	9.92

2.7 Impacts on Buildings: As shown in the table, approximately 754 buildings will be affected by the project, out of which 476 are either Tukuls or roofed in thatch while 278 have iron sheet roofing materials. In most cases, the houses are built with burnt bricks, wooden poles and mud. During the line survey no community services' structures or facilities were found to be affected by the project. Much of the impacts have been avoided or minimized by careful selection of ROWs. The line surveyors during alignment took all possible measures to minimize the number of residential houses to be affected by the project.

2.8 Impact on Farmland: Land is the main asset and source of livelihood for the PAPs. Most of the project affected Woredas are characterized by acute shortage of farming land, very small and fragmented land holdings and intensive farming system. The average land holding size of the PAPs is only 1 ha.

2.9 Impacts on Crop Production: There will be a permanent loss on some crop land due to the occupation by the tower pads and construction of sub-stations which is quite insignificant as compared with the total area of cultivated land in the project area. The farmers' seasonal crops and agricultural activities may be disrupted during the construction phase. The loss will, however be mitigated either by undertaking the construction works after the crops harvest or doing proper compensation payments for all damaged crops. Most of the annual crops include wheat, barley, maize, sorghum, and teff. While the perennial crops include coffee, enset and chat.

2.10 Impact on vulnerable groups: Out of the 57 households on the Koka – Dire Dawa line 3 are female headed families, and 4 are households of elderly persons (aged above 65 years), on the Alamata – Mekele line, of the 54 households affected by the project 4 are female headed families and 3 are elderly. These groups shall be considered for additional assistance and need special attentions to ensure that they are supported to be benefited from compensation entitlement and other mitigation measures

2.11 Impact on Trees: Generally, the most common type of trees affected are eucalyptus, acacia, cactus, vegetation coverage in the project area is small. In some section of the transmission line some eucalyptus trees, acacia trees and cactus shall be cleared during the construction period. Any trees that will be cut down during construction and those not allowed to grow above the 8 m cup, will be fully compensated for..

2.12 Impact on public and community institutions: The socio economic survey made on the project areas and discussions held with affected Woreda representatives and community elders indicated that the proposed lines will have no impact on social services facilities like public buildings, schools, health facilities, water supply and religious institutions (churches and mosques). Therefore, no mitigation measure will be required.

3. Organizational responsibility

3.1 Implementation of the resettlement Plan is a critical activity. For effective and efficient implementation of the RAP it is necessary to establish the resettlement organ. The organ has a responsibility to manage the plan, coordinate, and monitor the resettlement. The implementation of the Resettlement Plan and all compensation matters such as allocation of the compensation fee is the responsibility of EEPCo for which the resettlement implementation unit (RIU) will be established under the project management unit (PMU) and to be in charge of implementing the Resettlement Action Plan.

3.2 In addition, the established office will consult and establish a valuation committees at Woreda level as per the proclamation No.455/2005 which comprises 5-7 members from relevant government offices and representatives of the project affected persons from each affected kebele. The members of the committees will consist of woreda administrator as chair person, and experts from agriculture and rural development office specially crop management and protection, land administration and utilization

offices and PAPs representatives from each kebele. The committees will take up the implementation of the RAP along with the project implementing office.

3.3 The key functions of the committee will be:

- Register the PAPs and affected assets;
- Verify the entitlement right of PAPs with concerned authority;
- Determine the compensation rates taking into account the country's legislation; and
- Based on the information, implement compensation payments.

3.4 The operation of expropriation, compensation and relocation activities shall be undertaken before the commencement of the construction works. The implementation agency shall submit reports to the donor agency, African Development Bank (AfDB), which shall ensure that all the PAPs are fully compensated and resettled before the start of the construction works.

4. Community participation

4.1 Information disseminated and consultations with the PAPs were carried out with PAPs and community groups and selected communities between 21 June 2010 and 14 July 2010. The consultations took place at Sisum, Butore, Gari peasant associations for the Alaba-Jimma-Bedele line; Alle district, Gari Bachana peasant Association for the Metu-Gambela line; Tigray Regional Administration Office, Mekele Semen Woreda, Enderta Woreda Administration, Cultural and Tourism Office on the Alamata-Mekele line; and on the Korka– Dire Dawa line, organizations that were consulted include: Oromia Region Administration, health, education agriculture, offices Adama Woreda, Sire Robi town Administration, Cultural and Tourism Office, etc. Consultations were made with affected people, and selected communities at Adama Woreda Sire Robi Kebele.

4.2 Besides, meetings were held with local officials and representatives from relevant offices such as agricultural and rural development, land administration and utilization, and representative from kebele officials. These consultations will help to reduce the potential conflict, minimize the risk of project delay and also enable the project to include resettlement as a comprehensive development program to suite the needs and priorities of the PAPs. The main objective of the consultations is to fully share the information about the project and its components, the potential impacts and obtain information about the needs of the affected people and the reaction to proposed project and to ensure transparent in all activities related to land acquisition and compensation.

4.3 During the discussions important points were raised and discussed. The major issues raised during discussion were the positive and negative impacts of the project, the issues related to compensation payment, the manner and procedure of compensation payment for the expropriated land, crops, trees and houses.

4.4 The findings of the consultations indicated that the opinion of the people about the project is very encouraging and positive; the consulted people believe that it is one of the development project of the government that will definitely improve the existing conditions in and around the project areas and create employment opportunity for the local people. Generally, local administration officials are supportive and prepared for the compensation exercise. Participants at the meetings have requested reasonable, adequate and timely compensation payments for their lost assets. Small group meetings and regular interaction with PAPs will be on-going and to be continued during the course of compensation.

5. Integration with host communities

5.1 The project is linear in nature being a transmission line hence it is not expected that communities will be relocated to new areas in mass. Most house holds will step back within their respective compounds and rebuild their new homes. For those who have no enough land to build their new houses, there will be a need to relocate them to short distances from the ROW so as to reduce the social disruption due to resettlement.

6. Socio-economic studies

6.1 **Population and Demographic Characteristics:** The project area has an estimated population of 3,900,578 where the Alaba-Jimma-Bedele and the Koka-Horsu-Gambela having almost 70% of the population where the population densities reach 500 people per sq. km. compared to Alamata – Mekele line whose population density is 0.2 persons per sq. km.

6.2 **Economic activities:** In most cases the main source of livelihood is small scale subsistence farming which represents over 85 - 90% of source of income especially in semi highland areas. Agricultural activities mainly include farming and cattle rearing which is termed as mixed-farming. The common crops are wheat, maize, sorghum, enset, teff, soya beans, barley, coffee, avocado and mango. Small scale businesses such as trading are also common especially in densely populated areas.

6.3 **Access to social services (health and education):** Medical facilities such as health posts, centers and rural hospitals are available in the entire project areas. Access to health facilities ranges between 67% and 80% percent while education (primary school) access is between 88% and 97%.

6.4 **Access to potable water:** Protected water supply such as piped water is available but in limited quantities resulting in most kebeles relying on springs, ponds and hand dug wells. Most families walk long distances in search of potable.

6.5 **Land use and land cover:** The main land use and cover identified in the project affected woredas is split in the order of farmland, grazing land and land for habitation. The vegetation cover in highland and semi highland areas is mainly eucalyptus cordia Africana, podocarpus gracilior, croton machrostacyus; and in low land areas, savanna grass mix with acacia species.

6.6 Socio-economic surveys were carried out to assess and evaluate the economic resources base and socio economic conditions of the PAPs and to understand the socioeconomic characteristics feature of the affected households, and also their attitude and preference for rehabilitation. Villagers who will be affected by the project have limited access to most of the basic social services such as schools, water, health and communications (roads and telephones) and electricity. More-over, most of these services are either of poor quality or not sufficient.

6.7 Discussions held with affected Woreda representatives and community elders there was an indication that the proposed transmission line constructions will have no impact on social services facilities like public buildings, schools, health facilities, water supply and religious institutions (churches and mosques). The Route alignments were established in such a way that they will not cross community service structures, historical and archeological sites, etc.

7. Policy, Legal and Administrative Framework for Expropriation and Compensation

7.1 There is sufficient policy, legal and administrative framework in Ethiopia to deal with involuntary resettlement that may be caused due to development projects. Various policies and legal documents that are relevant to resettlement planning have been reviewed for the preparation of RAPs for the proposed transmission lines project. Some of these documents deal with issues related to land ownership, expropriation, entitlement, compensation and resettlement issues including grievance redress mechanisms.

7.2 The following legal instruments provide the legal framework for compensation and Resettlement in Ethiopia:

- (i) The Constitution of the Federal Democratic Republic of Ethiopia, August 1995;
- (ii) Civil code of Ethiopia, 1960;
- (iii) Proclamation No 455/2005, Expropriation of Landholdings for Public Purpose and Payment Of Compensation;
- (iv) Council Of Ministers Regulation No. 135/ 2007, Payment of Compensation for Property situated on landholdings expropriated for public purposes.

7.3 These legal frameworks provide detailed principles and procedures regarding resettlement such as expropriation of land for public purposes, property valuation, computing compensation rates, compensation payment and mechanisms for grievance redress.

7.4 In addition, there are both national and sectoral policies developed to be applicable for all development projects which entail involuntary displacement. The objective of the policies are to avoid dislocation of people as far as possible, when displacement of people becomes unavoidable, then the principles of the policy, institutions, and structure of the government of Ethiopia provide for the adoption of a wider developmental approach which seek to share the benefits of the development project with project affected people and local communities. The principle is that development projects at least should not impoverish people by degrading the physical environment and disruption of livelihoods.

7.5 In general the national policies, legislation and regulations are all consistent with all Regional Development Banks including The African Development Bank. More over, the national frameworks are also consistent with international conventions and treaties which Ethiopia is signatory to.

7.6 **Land Tenure:** According to the constitution of the FDRE Land holding rights became under the control of the people and government of Ethiopia. Article 40 states that ownership of both urban and rural land is vested in the state of and the people, and common property, which is not subject to sale or other means of exchange. Peasants have the right to obtained land without payment and are protected against eviction from land in their possession.

7.7 **Compensation:** Regarding the determination of compensation in part three, article 7 of the proclamation No.455/2005, the basis and amount of compensation is clearly explained .in article 7(1) a land holder whose holding has been expropriated shall be entitled to payment of compensation for his/her property situated on the land and for permanent improvements he/she may have made on such land.

7.8 Article 7(2) states that the amount of compensation for property situated on the expropriated land shall be determined on the basis of replacement cost of the property.

Under article 8(1) of this proclamation a surviving land holder whose land holding has been permanently expropriated shall, in addition to the compensation payable under article of this

proclamation, be paid displacement compensation, which shall be equivalent to ten times the average annual income he/she secured in the past five years preceding the expropriations of the land.

7.9 All PAPs and organizations (whether public or private) that lose houses, crops or sources of income will be compensated or rehabilitated according to the type and amount of their losses. The cut – off date for compensation eligibility will be set once all detailed measurements have been completed; compensation will not be paid for any structures erected or crops and trees planted purely for the purpose of gaining additional compensation. Cultivating land, constructing settlement in project affected areas after the cut of date will not be eligible for compensation or subsidies.

The African Development Bank Involuntary Resettlement Policy

7.10 The AfDB involuntary resettlement policy has been developed to cover involuntary displacement and resettlement of people caused by a Bank financed project and it applies when a project results in relocation or loss of shelter of the persons residing in the project area, or their assets being lost or livelihoods being affected.

7.11 The primary goal of the involuntary resettlement policy is to ensure that when people must be displaced they are treated equitably, and that they share the benefits of the project that involves their resettlement. The objectives of the policy are to ensure that the disruption of the livelihood of people in the projects area is minimized; the displaced persons receive resettlement assistance to improve their living standards and to provide explicit guidance to Bank staff and to borrowers, and set up a mechanism for monitoring the performance of the resettlement programs. The policy emphasizes that the resettlement plan should be prepared and based on a development approach that addresses issues of the livelihood and living standards of the displaced person as well as compensation for loss of assets, using a participatory approach at all stages of project design and implementation.

7.12 An important AfDB's guiding principle is to ensure that the total cost of the project as a result should include the full cost of all resettlement activities, factoring in the loss of livelihood and earning potential among affected peoples. This attempt to calculate the "total economic cost" should also factor the social, health, environmental and psychological impacts of the project and the displacement, which may disrupt productivity and social integration. The resettlement costs should be treated against economic benefits of the project and any net benefits to resettlers should be added to the benefit stream of the project.

7.13 The policy among others states that compensation at the full resettlement cost for loss of land and other assets should be paid prior to projects implementation with the view to improve the former living standards, income earnings capacity and production levels of the affected population. The borrower will be required to prepare a full resettlement plan for any project that involve a significant number of people (200 or more persons) who would need to be displaced with a loss of assets , or access or reduction in their livelihood.

EEPCo's Strategies for Expropriation and Compensation.

7.14 It is the objective of EEPCo to avoid or reduce the environmental and social impacts of its power projects to a minimum level. If adverse social impacts to be occurred are unavoidable, EEPCo will open consultation with PAPs and perform legal compensation for loss of all their properties. To achieve the

social mitigation goal EEPCo will allocate adequate budget for compensation before the project implementation.

7.15 EEPCo in consultation with the administration of regional state governments, zones, woredas and kebele associations shall establish property valuation committees to properly implement compensation payment for PAPs on time before the start of the project construction activities.

Grievance Redress Mechanisms

7.16 Dissatisfactions may arise through the process of compensation for a variety of reasons, including disagreement on the compensation value during valuation for assets, controversial issue on property ownership etc. During the on-going consultations, all PAPs will be informed of the existence of grievance redress mechanisms and the creation of the Grievance Redress Committee (GRC) at kebele level. At any point if the PAP feels he/she has been unfairly treated, he/she may approach the chairman of the grievance redress committee or the project implementer. The main function of the committee would be arbitration and negotiation based on transparent and fair hearing of the cases of the parties in dispute, between PAPs and the implementing agencies for local government. The committee examines the case and responds within a period of 15 days. The committee gives solution to grievances related to compensation amount, delays in compensation payment or provision of different types of resettlement assistance.

7.17 When a PAP has a grievance the preferred attempt is to settle the matter amicably whenever possible. That is, positive discussions are made to convince the affected PAP in the presence of elders, local administration (municipalities, woreda and kebele administration) representatives or any influential person in the locality. If the discussions within the GRC end without agreement, then the procedure will be guided by Proclamation NO.455/2005, Article 11, sub article 1 which states that: "In rural areas and in urban centers where an administrative organ to hear grievances related to urban landholding is not yet established, a complaint relating to the amount of compensation shall be submitted to the regular court having jurisdiction."

7.18 In urban areas, where court systems function, a PAP who is dissatisfied with the amount of compensation may complain to an administrative organ; and if the PAP is still not satisfied, he/she may appeal to the regular appeal court or municipal appeal court within thirty days from the date of the decision.

8. Entitlement and Eligibility of Affected Persons

8.1 To determine the eligible person for compensation EEPCo takes into account the National Proclamation and Regulations, the AfDB Policy on Involuntary Resettlement and the Criteria set by the World Bank contained in op 4.12 of the WB's Operational Manual. Therefore, the criteria for eligibility for affected persons contained in AfDB policy of 2003, in World Bank OD 4.30 and the National Proclamation No 455/2005 are adopted i.e. those who have formal and informal legal right or otherwise to land and lawful possession over the land to be expropriated and owns property situated there on.

8.2 To this effect, Census and inventory of lost assets and property is conducted. The date of census has established for the cut off-date to record the PAPs in a project area. A person who occupies the land after the completion of the inventory of affected household and assets will not be eligible for compensation for the lost assets and /or resettlement and rehabilitation support.

8.3 Eligibility: *Based on the predicted impacts and the broad entitlement framework, the affected persons in each project line shall be entitled to the following types of compensation and assistance:*

- Compensation for loss of land, crops, trees,
- Compensation for structures (residential/commercial) and other immovable assets,
- Assistance for loss of business/ wage income,
- Assistance for relocation and resettlement, and
- Rebuilding and/or restoration of community resources/ facilities.

8.4 Agricultural Land Title Holders: The majority of the population in the project area depend on agriculture. For those PAPs losing some of their agricultural land will be paid cash compensation for the lost plot of land and keep maintaining their livelihood with the remaining land. There is also an option of getting full compensation for PAPs losing their agricultural land permanently for properties situated on the land and permanent improvements made to such land where there is no enough agricultural land to replace.

Basis for Valuation of Assets

8.5 The Ethiopian legislation has well developed laws and regulation defining the basis to be used for valuation of type of loss due to development projects. The principles of the legislations include;

- Provide equivalent replacement land for long term losses;
- Compensating for any losses in net income; and
- Focus on restoring annual income.

8.6 Based on the compensation proclamation, EEPCo will employ the principle of replacement cost and compensation at full cost for valuation of lost assets. Replacement cost approach is based on the premise that the costs of replacing productive assets that have been damaged because of project activities may not necessarily have a market value especially in rural areas. The approach involves direct replacement of expropriated assets and covers an amount that is sufficient for asset replacement.

8.7 The total cost of the project as a result will attempt to include the full cost of all resettlement activities, factoring in the loss of livelihood and earning potential among affected peoples. In as much as it is possible, this will endeavor to calculate the total economic costs and those related to social, health, environmental and psychological impacts of the project and the displacement, which may disrupt productivity and social integration. The project has taken recognition of vulnerable and disabled persons who may need support; and also incorporated a moving allowance to support those who may not be able to relocate on own expense. The resettlement costs will have to be treated against economic benefits of the project and any net benefits to resettlers should be added to the benefit stream of the project.

8.8 The process and the necessary action to be taken will be concluded after consultations with Woreda administration and EEPCo and the entire exercise of valuating the affected assets will be done by valuation committees.

8.9 Compensation for loss of houses and structures will be based on replacement value when valuing the affected houses and structures.

8.10 Compensation of people affected by construction damages and losses shall be treated as to be compensated temporarily until the construction activities are completed.

8.11 Compensation for loss of crops and trees will be calculated on the basis of;

- unit rates of compensation for loss of crops;
- measured size of land for each type of crop (in square meter or hectare);
- quantified amount of agricultural production in kilogram, per hectare or per square meter;
- current market price for each crop type per kilogram; and finally
- Calculated amount of compensation payment based on the type, size and quality of each type of crop produced.

9. Implementation Schedule

9.1 Implementation of the respective RAPs will take a period of 7 months from commencement. It is planned that during the 1st month, EEPKO will facilitate the establishment of project level resettlement implementation units, valuation committees and the Grievance Redress Committee. This will be followed, in the second month, with the preparation of the final Inventory of PAPs and affected assets. During the 3rd month, all notifications on the property rights and agreement by number of PAPs will be made with the compensation committees. The committees will during the 3rd to 5th month consult with all affected persons and determine precise compensation levels. Depending on the climatic conditions, it is planned that construction of alternatives houses will; be carried out during the 6th and 7th month.

10. Compensation and RAP Implementation Cost

10.1 The total resettlement implementation cost for the construction of all the four high voltage transmission lines are summarized in the table below. The total budget required for compensation payment, i.e. for loss of crops, trees and residential houses due to, ROW, tower foundation, access roads will be Birr 83,912,340.96 or the equivalent of USD6,075,497.48. The budget includes internal monitoring costs but excludes contingencies.

Table: Estimated Costs for Resettlement and Compensation

Cost Item	Alamata-Mehoni-Mekele	Koka-Hurso-Dire Dawa	Alaba- Jimma-Bedele	Metu-Gambela	Total (Birr)
Loss of buildings	3,672,000	4,352,000	21,570,000	2,035,750	31,629,750
Loss of Crops	2,426,830.56	4,241,181.40	12,756,560	21,498,019	40,922,590.96
Loss of Trees	30,000	93,750	6,356,250	3,800,000	10,280,000
Monitoring Costs	210,000	270,000	100,000	500,000	1,080,000
Total per Line (Birr)	6,338,830.56	8,956,931.4	40,782,810	27,833,769	83,912,340.96

Exchange rate date July 6, 2010

1 USD = 13.8116 Birr

11. Monitoring and evaluation

11.1 In order to guarantee that the compensation plan will be smoothly performed and the benefits of the affected persons will be well treated, the implementation of the compensation plan will be under monitoring throughout the whole process and a budget has been provided to ensure its timely and efficient execution. The major monitoring areas shall be: (i) the over-all fairness and transparency of the compensation process; the amount of compensation; appropriateness of grievance redress mechanisms; and problems and difficulties encountered. Monitoring will be divided in two parts i.e. internal and external monitoring

11.2 **Internal Monitoring:** The internal monitoring will be performed by Resettlement Implementation Unit. The concerned local administration will also conduct their own monitoring .The target of internal monitoring is to ensure that there is overall fairness and transparency while compensation process, takes place and Resettlement Action Plan is performed based on legal rights.

11.3 The main parameter for monitoring will be the compensation allocation schedules, payment and use of compensation fees, implementation of the policies and regulations specified in the resettlement plan and the whole course of implementation of the compensation. In as much as possible, monitoring shall be participatory with kebele associations and community leaders constantly getting involved. The main source of data for internal monitoring will be the data base generated from the RAP for e.g. Records on compensation for assets as well as the day today observation by implementing staff. The resettlement office will record the progress of land allocation and resettlement. The office will make a summary report starting from the beginning of the activities and special events will be reported on continuous base.

10.4 **External Monitoring:** External monitoring is the responsibilities of Federal Ethiopia Environmental Protection Authority (FEPA), the Ministry of Mines and Energy and local NGOs active in development work in the respective areas. EPA will undertake all basic supervision on the impact of the project on PAPs and income restoration, degree of satisfaction of PAPs during implementation of resettlement including payment of compensation. The Resettlement Implementation Office within EMU in EEPCo will also undertake the resettlement monitoring work independently. The main responsibility of EMU is to assess the performance of the resettlement implementation office based on the consolidated reports and take corrective measures in case of problems.
