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SFG2018

FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA

ETHIOPIAN ELECTRIC POWER (EEP)

Ethiopia- Additional Financing for Energy Access Project

Seven Towns Electricity Distribution Network Rehabilitation and Expansion Project

ENVIRONMENTAL AND SOCIAL MANAGEMENT

FRAMEWORK (ESMF)

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Environmental Health Safety and Quality (EHS&Q)

Environmental and Social

February 2015

TABLE OF CONTENTS

LIST OF ACRONYMS

AF	Additional Finance
ARCCH	Authority for Research and Conservation of Ethiopian Cultural Heritage
BP	Bank Policy
CBE	Commercial Bank of Ethiopia
CEO	Chief Executive Officer
CFL	Compact Florescent Lamp
CSA	Central Statistical Authority
^{o}C	Degrees Celsius
dB	Decibel
EA	Environmental Assessment
EAP	Energy Access Project
EARO	Ethiopian Agricultural Research Organization
E.C	Ethiopian Calendar
EEP	Ethiopian Electric Power
EHS	Environmental Health and Safety
EHS & Q	Environmental Health, Safety and Quality
EHS-MP	Environmental Health and Safety Management Plan
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EPA	Environmental Protection Authority
ESMF	Environmental and Social Management Framework
EWNHS	Ethiopian Wildlife and Natural History Society
FDRE	Federal Democratic Republic of Ethiopia
GHC	grievance Hearing Committee
GM	General Manager
GO	Government Organization
Ha	Hectare
HH	Household

HIV/AIDS	Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome
IBCR	Institute for Biodiversity Conservation Research
ICS	Inter-connected System
IPDP	Indigenous Peoples Development Plan
Km	Kilometer
km^2	Square kilometers
M	Meter
m.a.s.l	Meters above sea level
m.b.s.l.	Meters below sea level
MEFCC	Ministry of Environment Forest and Climate Change
Mm	Millimeter
MoFEC	Ministry of Finance and Economic Development
Mts	Meters
MoWI&E	Ministry of Water, Irrigation and Energy
MW	Megawatt
NGO	Non-governmental Organization
No.	Number
OD	Operational Directive
OP	Operational Policy
PAP	Project Affected People
PCB	Polychlorinated Biphenyl
PMO	Portfolio Management Office
POP	Persistent Organic Pollutant
PSP	Power System Planning
RAP	Resettlement Action Plan
RR	Rural Road
SCS	Self-Contained Systems
SE	Supervising Engineer
STD	Sexually Transmitted Disease

T.B.	Tuberculosis
TVET	Technical Vocational Education Training
USEPA	United States Environmental Protection Agency
Vol.	Volume
WB	World Bank

EXECUTIVE SUMMARY

The purpose of the ESMF is to clarify the policies, principles and procedures that will govern the mitigation of adverse environmental and social impacts induced by the Additional Financing for the Energy Access Project.

It is found useful to have a policy document establishing principles and procedures that will govern the mitigation of adverse environmental and social impacts induced by the Additional Finance for Energy Access Project operations, to share with various stakeholders.

The Additional Financing intends to rehabilitate and expand the distribution system of seven (7) towns in Ethiopia namely; Beshoftu (Debrazeyit), Wolayita Sodo, Gondar, Adigrat, Debre Markos, Shashamene and Harrar.

The objective of the Distribution System Rehabilitation and Expansion Project for the seven proposed towns is to increase the capacity and improve the reliability of the electricity transmission and distribution system in the proposed seven towns. Esuring steady supply will improve the quality of life of the residents; improve the performances of the service providers; promote businesses, and thus contributing to economic growth and poverty reduction in Ethiopia.

The Distribution System Rehabilitation and Expansion Project is not expected to induce significant environmental and social impacts because the urban distribution rehabilitation expansion activities will take place within the existing distribution system.

Where medium and low voltage lines construction are required the construction will take place on existing road structure, and thus, if any, only negligent and reversible environmental and social impacts may be anticipated.

The rationale for preparing this ESMF is that:

a) The Project components are not expected to have any significant environmental and social impacts. However, since one cannot be sure whether environmental impacts will or will not occur in all the project components, it is proposed that precautionary

measures be taken to ensure that planned activities do not impose environmental impacts or negatively affect livelihoods of the surrounding population.

b) Ethiopian Electric Power (EEP) found it useful to have a policy document establishing principles and procedures that will govern the mitigation of any adverse environmental and social impacts likely to be induced by the Project operation to share with various stakeholders in the power sector, and

c) Ensure that investments are carried out in an environmentally and socially friendly and sustainable manner.

Thus, this ESMF will be used for implementing activities under the Additional Financing for the Energy Access Project.

The safeguard category of the project is B; since there are likely to be no significant and/or irreversible adverse environmental and social issues emanating from implementing any of the components financed under the Additional Finance Project. The project upgrades the existing distribution network in selected towns and rehabilitates existing substations which have saturated their capacity to supply additional load.

There is sufficient legal and administrative ground considered in this Framework document for environmental and social management in the process of implementation of development projects. The Framework considers both the Ethiopian and World Bank (WB) legal documents and guidelines. The Constitution of the Federal Democratic Republic of Ethiopia (FDRE) has adequate provisions on environmental, social and compensation aspects. Based on the Constitution, the Environmental Policy of Ethiopia, Proclamations on Environmental Impact Assessment (EIA), Pollution Control, Land Expropriation and Compensation as well as other legal frameworks have been issued to strengthen the sporadic efforts of environmental protection in a coordinated and standardized manner. In addition, sectoral Environmental Guidelines and Manuals are being developed in different sectors and the Ethiopian Electric Power (EEP) is part of this endeavor.

The WB's Policies, specifically the Safeguard Policies, were adequately followed in the preparation of this Framework document. The WB Safeguard Policies triggered in this project include those on Environmental Assessment/ EA (OP 4.01), Forestry (OP 4.36), Involuntary Resettlement (OP 4.12), and Physical Cultural Resources (OP 4.11).

Concerning the institutional arrangements, the Government of the FDRE has established the Ministry of Environmental and Forest and there are Regional Environmental Protection Bureaus and it is under process to realize the establishment of Environmental Units within sectoral Ministries and Organizations. Ministry of Water Irrigation and Energy has established Environmental Impact Assessment and Social Development Office and EEP established Environment and Social Office to address Environmental and Social issues in its activities.

The environment and social office has different team members including environmentalists, sociologists and resettlement social officers who can perform such duties of the office. The major tasks of the Environment and Social Office of EEP are to conduct periodic monitoring in power projects and operational activities under its mandate, prepare or supervise Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP). The team ensures whether or not the EEP power projects are complying with the approved environmental and social management plan and undertaking the appropriate mitigation measures accordingly.

The major component of the Distribution System Rehabilitation and Expansion Project for the seven proposed towns is Rehabilitation of the Distribution Network and Construction of Medium and Low Voltage Network.

Analysis of Alternatives: The option of not rehabilitating and expanding the distribution system would have resulted into further forced blackouts and load shedding in these towns, which would adversely affect the quality of life and services and restrained business development in the seven towns.

Under the "*Do Nothing*" option, increasing degradation of the distribution system will lead to consumers opting for additional or alternative energy sources. For businesses, this would lead

to the installation of diesel generators at a direct cost to the economy and increasing the reliance on fossil fuels, thereby increasing emission of greenhouse gases.

At the household level, many of the smaller households still rely on wood fuel for cooking and heating. Any further degradation in services will escalate this demand, putting ever greater pressure on the woodlots and natural forest supplying the major urban centers, and resulting in deforestation and forest degradation.

Alternative Energy Sources: The rehabilitation of the existing system does not preclude the introduction of alternative or supplementary energy sources or energy saving technology. However, at present there are no widely or economically available systems in the country that can entirely replace the existing system at household level or industrial level.

Impacts of the Distribution System Rehabilitation and Expansion

Positive Impacts: The Additional Finance Energy Access Project is a development project designed for the benefit of the population in the project area, and is likely to have the following overall positive impacts

- The Distribution Rehabilitation and Expansion project will promote Agro-industrial development, promote tourism, promote commercial centers, improve the socio-economic activities and help better living standards.
- Relieve pressure on biomass resource of the country and thereby reduce the loss of the biodiversity by providing alternative and reliable source of energy.
- Improve access to social services (education, health, water supply, etc…)
- Stimulate economic development.
- Provide job opportunities thereby creating income generation means for the respective communities in the project areas.

Potential Negative Impacts: As a result of the planned construction activities, possible negative environmental impacts are likely to occur and the impacts may include initiation and aggravation of soil erosion, loss of vegetation, air, water and soil pollution. These are however preventable, manageable and reversible.

During the construction works, dust emission may be produced. Similarly, noise pollution arising from construction works may disturb the neighboring communities and local fauna temporarily.

The major negative impacts anticipated in this regard include expropriation of land for distribution line expansion works. That is, the urban dwellers and farmers living in the periphery of the towns may lose their crops, houses, and other properties temporarily or permanently.

Although, it is proposed that, they would follow as much as possible the existing road network, the distribution lines may traverse, in some cases looking for shorter distances, culturally sensitive sites like graveyards, archaeological sites, etc.

The existence of PCB chemicals in transformers and capacitors, as one of the environmental impacts is also anticipated during the project life. Disposal of old transformers containing PCB will be handled in accordance with national and international guidelines.

Polychlorinated Biphenyls (PCBs) are mixtures of individual chlorinated compounds. Due to its high heat capacity, low flammability and low electrical conductivity, it was extensively used as insulating material in capacitors and transformers. It is reported in some studies, since 1997, that there are possibilities or chances of contamination by PCBs after it is found out to be non-biodegradable and has carcinogenic tendency, the manufacturing of PCBs has been banned. EEP, keeping this issue in mind, has taken all possible steps to check and ensure that the import of transformers, capacitors and other electrical equipment has to be free from PCBs. Technical specification in the tendering of documents and the contract for supply and installation will require the equipment supplied, do not contain PCBs and labeled with manufacturer's certificate to that effect.

The proclamation on Environmental Pollution Control No. 300/2002 is mainly based on the right of each citizen to live in a healthy environment, as well as the obligation to protect the environment of the country. The primary objective of the proclamation is to provide the basis from which the relevant ambient environmental standards applicable to Ethiopia can be developed and to make the valuation of these standards a punishable act. The proclamation

states that the "polluter pays" principle will be applied to all persons. Under this proclamation, MEFCC is given the authority to ensure implementation and enforcement of environmental standards and related requirement to inspectors assigned by MEFCC or Regional Environmental Agencies.

EEP in cooperation with Ministry of Environment, Forest Development and Climate Change (MEFCC) already has undertaken preliminary inventory of all previously imported transformers, capacitors and electrical equipment for identifying the presence of PCBs.

The first phase of inventory of transformers have been completed and currently at the stage of the second phase. MEFCC as part of the National Implementation Plan through the project, Enabling Activities for the Disposal of Polychlorinated Biphenyls (PCBs) is responsible for the safe removal and disposal of any PCBs found in accordance with the convention to which Ethiopia is a signatory.

Proposed Mitigation Measures for Distribution Rehabilitation and Expansion Works: To mitigate impacts arising as a result of projects and sub-projects, the Additional Energy Access Project will take the following measures:

- Influence the adaptation of a distribution line route with minimum effect on the bio-physical as well as the socio economic and cultural environment;
- Ensure the safe disposal of chemically treated poles at its storage facilities;
- Safe disposal of transformers that may contain PCBs;
- Employ and deploy manual labor to maintain the access roads and right-of-ways, as appropriate;
- Regularly monitor the process of upgrading and rehabilitation works of substations to avoid any oil or waste water leakages;
- Include Environmental Clauses for Contractors (Annex) in the contract documents and monitor their implementation;
- Compensation payment for properties and land for land replacement will be implemented as per Proc. 455/2005;
- Project affected people will be consulted and be involved in decision-making at

different stages of the Project;

- PCB-free transformers and capacitors will be ordered and the import process be followed strictly prior to project implementation;
- Route alignment to avoid cultural sensitive areas during surveying and on "chance finds" inform the Authority for Research and Conservation of Cultural heritage (ARRCH) upon discovery of ancient heritage, relics or anything that might or believed to be of archeological or historical importance during the execution of works.

Consultations during the ESMF Process: As part of the ESMF preparation for the Additional Finance Project Seven Towns Distribution Rehabilitation and Expansion, public consultations were undertaken in all the stated seven towns targeted.

The consultations were held from 15 to 30 September 2015, and were facilitated by the Environment and Social team of EEP. The consultations were conducted by meetings held at the respective towns with sector bureaus involved in the implementation of the Urban Distribution Rehabilitation and Expansion project and by conducting discussion meetings with the town dwellers. The main agenda for the consultation discussions were focused on providing information about the Distribution Rehabilitation and Expansion Project with emphasis on the project positive impact and potential environment and social negative impacts and mitigation measures. At the time of public consultation the team has made consultation with the communities including city administration, government officials, Ethiopian Electric Utility regional and district representatives, community elders, religious leaders, Women and different community members. Local language, Amharic has been used as media of communication and all social and cultural norms were appropriately maintained in all the sessions.

In the course of the consultation process, project's major objective, terms of implementation, possible environmental and socio economic impact which may surface in due course of the projects implementation phase thereby, further raising their awareness thereof from the outset and similar issues have been explained.

The consultation discussions were made in the seven towns and several general and specific issues, questions, concerns and opinions were raised by the participants. Many of the participants expressed the problems related to the interruption of electric power in the towns. They expressed their hope that the distribution rehabilitation and expansion project will solve the problem of electric interruption and enable for new electric connection to new customers.

Furthermore, it was suggested that the compensation payment for loss of assets shall be paid before the construction or rehabilitation works began and the Project office should be ready for this work.

Environmental and Resettlement/Social Cost Estimate: The cost estimate for compensation is based on the cost estimate of Additional Financing for Energy Access Project RPF, ESMF, February 2010. The total estimated environmental cost for ESMF, AF for Energy Access Project of 2010 was **USD 1,212,072.00 (ETB 16,470,606.71).** Therefore, updating that cost with an inflation rate of 8%, (August 2015 country level inflation rate FDRE Central Statistical Agency issued in September 2015) the total estimated cost for meeting the estimated compensation and for environment and social monitoring is about **USD 1,309,037.00 (Birr 17,788,254.71)**

The estimated cost for environment and social monitoring is about **USD 23,072.20 (Birr 313,523.51)** and this is assumed to enable the Environmental and Social experts of EEP to conduct periodic monitoring works on project sites.

1. INTRODUCTION

1.1. Background

Endowed with abundant water resources, Ethiopia is said to have a potential to generate a maximum of 30,000 MW of hydroelectric power. Nevertheless, the percentage of the population with connection to electricity is yet extremely low. The low level of access to electricity is a major barrier to economic development and to the provision of social services in rural and urban areas.

EEP uses two systems of power generation, i.e., interconnected system (ICS) and self-contained system (SCS).

The ICS consists of twelve hydro powers, one geothermal, 11 diesel standby and two wind farm with installed capacity of 1939.6 MW, 7.3, 112.3and 81 MW, respectively which together make a total of 2140.2 MW. (EEPCo Facts and Brief 2012/13)

The SCS consists of three small hydropower and many isolated diesel plants located throughout the country with a capacity of 6.15 MW and 30.6 MW, respectively. 89% of the generated energy comes from ICS while the remaining 11% from SCS.

Power distribution in both ICS and SCS is effected at a primary voltage of 33, 19, 15, and 11 kV. The distribution system consists of 148745.5 km of 33 kV, 19kV, 15 kV, and 11 KV; and 380/220 v lines; and 18,888 distribution transformers. (EEPCo Facts and Brief 2012/13) The major load centers are in and around Addis Ababa, Nazareth, Dire Dawa, Harrar and Bahir Dar.

The purpose of the ESMF is to clarify the policies, principles and procedures that will govern the mitigation of adverse environmental and social impacts caused by the Additional Financing for the Energy Access Project. The ESMF will be used by the various stakeholders in the power sector.

The project under the Additional Financing for the Energy Access Project intends to rehabilitate and expand the distribution system of Seven Towns in Ethiopia, namely:

1. Beshoftu/ Debrazeyit
2. Wolayita Sodo
3. Gondar
4. Adigrat
5. Debre Markos
6. Shashamene
7. Harrar

1.2. Description of Project Activities

The major project components of the Distribution System Rehabilitation and Expansion Project for the proposed seven towns include the following:

- ***Rehabilitation of the Distribution Network and Construction of Medium and Low Voltage Network:*** The seven town's rehabilitation of the distribution network is not expected to have any significant environmental and social impacts because the activities will all take place within the existing distribution system.
- ***Construction of Medium and Low Voltage Network:*** It will take place along the existing road network and hence significant negative environmental and social impacts are not anticipated in this project component.

The Rehabilitation of distribution network focuses on rehabilitating seven major cities of the country with the following major interventions:

- Replacement of existing wooden poles with concrete poles,
- Replacement of existing bare conductors with area bundled cable (ABC) insulated conductors,
- Replacement of existing bare overhead conductor system with cross-linked polyethylene (XLPE).

Additionally, Construction of medium and low voltage Network aims at the construction of distribution lines in the seven towns.

1.3. The Need for Rehabilitating the Distribution System

The proposed seven town's electricity distribution network system needs to be improved because:

- Reliable power is not properly available in the seven towns.
- The existing distribution network system's capacity is not reliable because of increasing population.
- Some components of the existing system are old and completed their efficient
- Lifetime and needs rehabilitation.
- In general, the 15 kV distribution networks are overloaded and in poor state of repair.

The problems are characterized by frequent interruption of electric power, high energy loss that is estimated at 21.9% of the generation capacity, and overloading of lines and distribution transformers. The following are the main causes of the problem:

- The existing feeder line loading capacity limitation
- Deteriorated old wooden pole and switching equipment
- Clashing of bare conductors

This is not only a power problem but also a risk to the urban population due to collapse of old wooden poles, bare conductors touching trees, houses and other objects.

The Urban Distribution Rehabilitation focuses on rehabilitating existing distribution systems with the following interventions:

- The project will include the replacement of the step-up transformers used in the seven towns.
- The project will reinforce the low voltage network with the construction of
- 415/230V overhead lines and will be extended to supply new development areas and replace the existing old lines.
- An additional wire will also be included in the cables to feed street light points.
- The project will also enable the installation of service drop lines the connection of 60, 000 customers in the new development areas.

- Replacement of existing wooden poles with concrete poles, reducing risk of collapse
- Replacement of existing bare conductors with area bundled cable (ABC) insulated conductors
- Replacement of existing bare overhead conductor system with underground insulated wire, cross-linked polyethylene (XLPE)

Construction of Medium and Low Voltage Network

The project mainly involves construction of medium and low voltage lines to provide power to new customers in the seven town's social service centers and households. The poles to be used are normally about 7-10m high. This type of distribution lines normally follows the road network except for bends and a curve where it is more economical to make shortcut if that is technically feasible.

The project site needs to be identified at the design stage. The project site map will be prepared to the seven towns using various sources of data and the map also helps to illustrate the general setting of the project related development sites as well as surrounding areas. The key components of construction of medium and low voltage network include the following:

- Erection of concrete poles
- Stringing of overhead medium and low voltage lines
- Installation of pole mounted distribution transformers in the towns
- Installation of distribution system and street lighting.

Causal labor will be recruited from the town's construction area thus providing employment opportunity to the local communities. No camp or other temporary facilities are required.

The main structural intervention is the erection of the line extension. However, the flexibility in the positioning of distribution poles and the relatively low costs of changing line direction mean that the alignment can be modified to avoid displacing any households, hence avoiding any land acquisition or resettlement of households. However, crop damage may occur during construction and a compensation plan will be prepared.

Implementing Agency

Ethiopian Electric Power (EEP) under the Ministry of Water, Irrigation and Electricity is the implementing agency.

1.4. Objective of the ESMF

The overall objective of producing the ESMF is to depict the general procedures and methodologies as a framework for the environmental and social impact consideration and management of the Project components to be financed under the Additional Financing for the Energy Access Project. The specific objectives of this framework are to:

1. Identify generic potentially adverse environmental and social impacts and risks that may be encountered in the Project intervention
2. Indicate the possible measures to avoid or minimize the predicted adverse impacts in the project areas. Show the Client the types of interventions required (in general) so that the former can work towards capacity building to cope up with the upcoming work load
3. Develop an environmental monitoring plan under the project to ensure that the proposed environmental and social issues will be managed effectively.

Since the specific location for the proposed project component is unknown the ESMF study would suffice for now as the appropriate environmental and social safeguard instrument. The rationale for preparing this ESMF is that:

a) The Project components are not expected to have significant environmental and social impacts. However, since one cannot be sure whether environmental and social impacts will or will not occur in all the project components, it is proposed that precautionary mitigation instrument is in place to ensure that planned activities do not cause negative environmental and social impacts.
b) EEP found it useful to have a policy document establishing principles and procedures that will govern the mitigation of adverse environmental and social impacts caused by the Project operation to share with various stake holders in the power sector, and

c) Ensure that investments are carried out in an environmental and socially sustainable manner.

This ESMF will be used for the implementation of project components under the Additional Financing for the Energy Access Seven Towns Distribution Rehabilitation and Expansion Project. The safeguard category of the project is B since no significant and/or irreversible adverse environmental and social issues in components financed under the project are anticipated. The project upgrades the existing distribution network in the selected seven towns.

1.5. Scope of Project and the Assessment

The main objective of the Urban Distribution Rehabilitation and expansion is to increase the reliability of electric supply by rehabilitating the distribution system and Construction of medium and low voltage Network. The project components involve replacement of wooden poles and bare conductors which helps to connect new customers.

The Urban Distribution Rehabilitation line route follows existing road networks, with the poles typically erected to avoid unstable soils and allow for future road improvement and maintenance. The routing can be easily adjusted to avoid problem areas. This ESMF Study provides a framework of environmental and social considerations while implementing the intended project.

1.6. Environmental and Social Planning

Environmental and social planning is the process of identifying and considering environmental factors that impact on, or are impacted by, the planned activities, in this case, the project proposed to provide urban distribution rehabilitation. A comprehensive and an overall environmental and social planning may generally follow the procedure given in Figure 1.1.

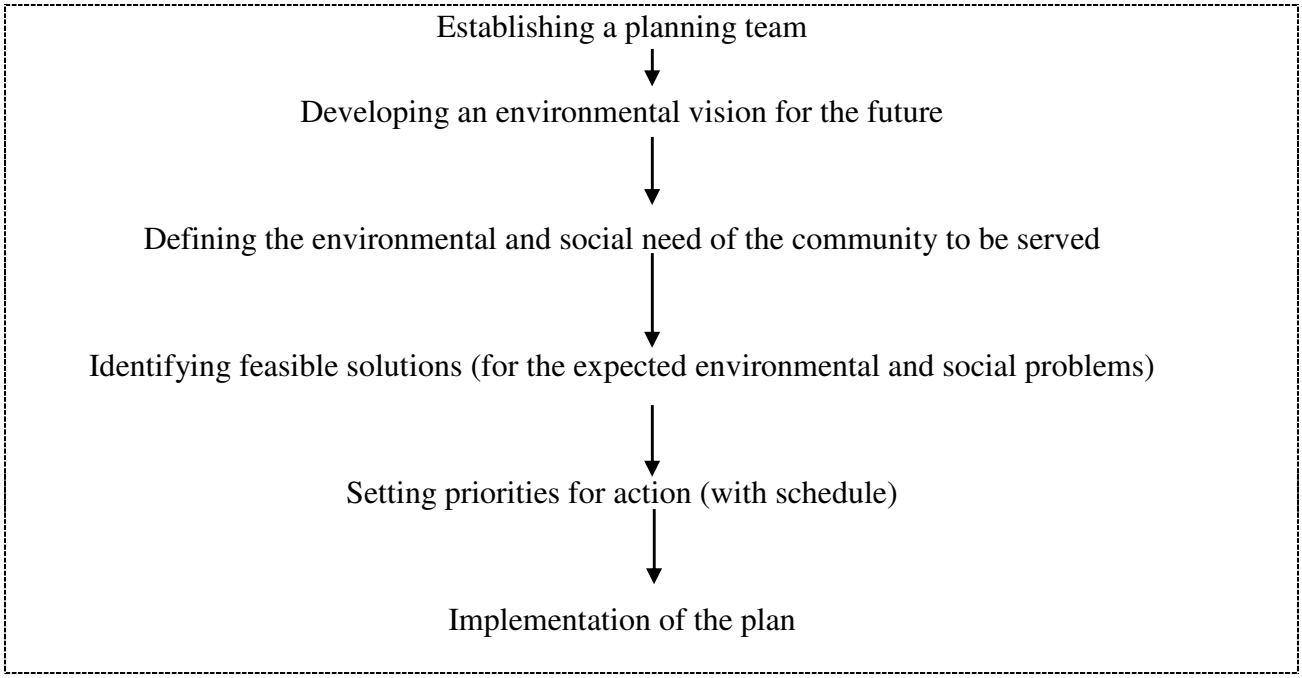


Figure 1.1 Comprehensive Environmental and Social Planning

Additional Finance for Energy Access Project in collaboration with the Environmental and Social Office of EEP will be responsible to handle the environmental and social issues and fully involve mitigating the adverse impacts that may occur in the different phases of the proposed projects. Environmental and Social Office of EEP role in general, is to monitor the project areas and help mitigate the environmental and social impacts properly.

The environmental and social needs of the community to benefit from the Project should also be considered. In other words, the environment from which the communities derive their means of livelihood should not be destructed or damaged as a result of implementing the Project. Areas of social and economic interest of the community should also be protected. Therefore, to achieve the needs of the community, the EEP, the Designers and Contractors should closely work with the impacted community at different stages of the Project.

If unavoidable environmental impacts result from the Project, the team will apply the ESMF guidelines to minimize the effects. The solutions or mitigation measures may vary from

simple to complex interventions depending on the problems that may arise during implementation and operation phases.

After identifying the possible solutions to the environmental and social problems, the next step may be to prioritize these solutions on activity breakdown and temporal basis (in the form of schedule). The final step is to undertake the proposed and prioritized activities.

At all stages, the planning made by the team should be reviewed by Additional Finance for Energy Access Project before proceeding to the next stage. Then, the Additional Finance Energy Access Project submits the finalized version of the planning of the Project to the Chief Executive Officer (CEO) of the EEP and the Project would be implemented after the approval by the CEO. In general, all the planning processes should be based on public consultation and participation for the sustainability of the project.

2. EXISTING POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORKS

2.1. National Environmental Requirements

It has become a customary practice that the effects of development projects on the environment should be assessed in order to ensure that projects, as much as possible, must be friendly to the environment. This initiative in turn will contribute to sustainable development in general and poverty reduction in particular.

To this effect, therefore, governments, donor agencies and other non - government entities have developed laws, policies, regulations and guidelines to enable proponents, competent agencies and other stakeholders to play their parts successfully.

The following sections present the existing legal and institutional framework from the Ethiopian government and the World Bank perspectives.

2.1.1. National Legal Requirements

Although there were sporadic efforts towards environmental protection the establishment of the Environmental Protection Authority (EPA) can testify the fact that a legal foundation has begun to be laid especially since 1995.

The Constitution

The current Constitution of the Federal Democratic Republic of Ethiopia (FDRE) was issued in 1995 through a proclamation No. 1/1995. The Constitution has an exclusive article on the environment and therefore states in its Article 44 Sub Article 1 that:

"All persons have the right to live in a clean and healthy environment."

Furthermore, concerning compensation to project affected people (PAPs), Sub Article 2 provides that:

> *"All persons who have been adversely affected or whose rights have been adversely affected as a result of state programs have the right to*

> *commensurate monetary or alternative means of compensation, including relocation with adequate state assistance. "*

On the other hand, regarding public consultation and participation, in Article 92 Sub Article 3, it is stated that:

> *"People have the right to full consultation and to the expression of views in the planning and implementation of environmental policies or projects that affect them directly."*

In general, the Constitution is the primary regulation on which the other proclamations and regulations have been based.

Proclamation on Environmental Impact Assessment

The primary objective of Proclamation No. 299/2002 is to make EIA a mandatory undertaking for specified categories of activities to be carried out by the public or private sector and to define the extension of EIA to policies, plans and programs level, in addition to individual projects.

National Legislation on Expropriation of Land and Compensation

The Proclamation on Expropriation of Landholdings for Public Purposes and Payment of Compensation (Proclamation No 455/2005) was issued in accordance with Article 55 (1) of the Constitution. The Proclamation established detail procedures setting the time limits within which land could be acquired after a request is received from proponent and principles of compensation. The Proclamation also states that the power of valuation of property shall be carried out by a committee to be established.

2.1.2. Research and Conservation of Ethiopian Cultural Heritage

The Constitution of the FDRE Article 51/3 declares the federal government "shall establish and implement national standards and basic policy criteria for public health, education, science and technology, as well as for the protection and preservation of cultural and historical heritage.

Based on this, the Council of Ministers of FDRE endorsed the Cultural Policy of Ethiopia in October 1997 and issued the Research and Conservation of Cultural Heritage Proclamation NO. 209/2000

Based on the proclamation the Authority for Research and Conservation of Ethiopian Cultural heritage (ARCCH) was established under Ministry of Culture and Tourism.

Protection and conservation of cultural heritage from manmade and natural hazards is one of the goals of the Authority.

Article 42 of the proclamation states under "reserved area" that the Authority has the power of issuing building permission for any work to be carried out in an area declared reserve by the Council of Ministers. There is an article which states that the removal of any cultural ruins is to be carried out under strict supervision of ARCCH.

2.1.3. Ethiopia's Environmental Policy

The policy was issued (through the approval by the Council of Ministers) in 1997 mainly based on the environmental concerns stipulated in the Constitution. The Policy has based itself on several guiding principles in order to ensure the consistency and sustainability of the subsequent policies and strategies for the formulation and implementation of programs.

2.1.4. National EIA Procedural Guidelines

The EPA, 2003, EIA Guidelines are based on the Constitution, the Environmental Policy of Ethiopia, the Proclamations on EIA, Pollution Control and Establishment of EPA and other Environmental Organs in the country.

The document details the required procedures for conducting an EIA in the country and the requirements for environmental management.

The EPA EA Procedural Guideline mainly aims particularly at:

- Ensuring the implementation of the EPE and compliance of EA related legal and technical requirements,

- Providing a consistent and good practice approach to EA administration in Ethiopia,
- Assisting proponents and consultants in carrying out their environmental assessment related tasks,
- Assisting Interested and Affected Parties, especially communities in realizing their environmental rights and roles,
- Assisting Environmental Protection Organs, Competent and Licensing agencies in discharging their roles and responsibilities, and
- Establishing partnership and networking among and between key stakeholders in EA administration.

2.1.5. Proclamation on Environmental Pollution Control

The proclamation on Environmental Pollution Control No. 300/2002 is mainly based on the right of each citizen to live in a healthy environment, as well as the obligation to protect the environment of the country. The primary objective of the proclamation is to provide the basis from which the relevant ambient environmental standards applicable to Ethiopia can be developed and to make the valuation of these standards a punishable act. The proclamation states that the "polluter pays" principle will be applied to all persons. Under this proclamation, Ministry of Environment, Forest and Climate Change (MEFCC) is given the authority to ensure implementation and enforcement of environmental standards and related requirement to inspectors assigned by MEFCC or Regional Environmental Agencies.

Article 4 (1) of the Proclamation, Management of hazardous waste, chemical and Radioactive Substances says, the generation, keeping, storage, transportation, treatment or disposal of any hazardous waste without a permit from the Authority or the relevant regional environmental agency is prohibited.

2.1.6. EEP's Environmental Guidelines for the Power Sector

On the basis of the Constitution as well as the Environmental Policy, and based on the peculiar functional and operational characteristics of the EEP produced an Environmental Guidelines that is currently serving the Environmental and Social Office of EEP for its day-to-day environmental activities.

2.2. Institutional Framework

2.2.1. Federal and Regional Environmental Organs

In order to implement the legal requirements at different hierarchy, it was found mandatory that institutional arrangement should be made**.**

To this effect, the establishment of the Environmentally Protection Authority - EPA - was realized with Proclamation No. 9/1995. Later, the re - establishment of the Federal EPA, along with the Regional Bureaus, was made through Proclamation No. 295 / 2002 to **"…** *ensure that all matters pertaining to the country's social and economic development activities are carried out in a manner that will protect the welfare of human beings as well as sustainably protect, develop and utilize the resource bases on which they depend for survival".*

The EPA and the Regional environmental organs, *inter alia,* have the following major duties and responsibilities.

a) To prepare environmental protection policy and laws; and upon approval follow up their implementation.
b) To prepare directives and systems necessary for evaluating the impact of social and economic development projects on the environment ; monitor and supervise their implementation ; and
c) To prepare standards that help in the protection of soil, water and air as well as the biological systems they support, and follow up their implementation.

2.2.2. Sectoral Environmental Organs

Following the establishment of the Federal EPA and the Regional Environmental Protection Bureaus, establishment of environmental units within Sectoral Ministries was proposed as a positive and proactive measure to consider environmental protection while appraising and implementing projects. That is, mainstreaming environmental protection through undertaking the Correspondent environmental management activities at different stages of the project cycle. The Sectoral environmental monitoring units have a direct functional relationship with the EPA.

2.2.2.1. Ministry of Water, Irrigation and Electricity (MoWI&E)

The Ministry of Water, Irrigation and Electricity is the regulatory body for the energy sector. Based on the delegation from EPA, the whole draft ESIA document will be submitted to the Ministry for reviewing purpose, they will give their comments and recommendations and finally provide approval /certify the implementation of the project and monitoring the performance of the development project will also be undertaken by the Ministry.

2.2.2.2. Ministry of Environment Forest and Climate Change (MoEFCC)

The rights and obligations of the Environmental Protection Authority (EPA) will be transferred to the newly established Ministry of Environment and Forest by Proclamation No. 803/2013, 29th July 2013.

The Ministry has the following powers and duties:

- Coordinate measures to ensure that the environment objectives provided under the constitution and the basic principles set out in the environmental policy of Ethiopia are realized.
- Establish a system for environmental impact assessment of public and private projects, as well as social and economic development policies, strategies, laws and programs.
- Prepare a mechanism that promotes social, economic and environmental justice and channel the major part of any benefit derived thereof to the affected communities to reduce emissions of greenhouse gases that would otherwise have resulted from deforestation and forest degradation.
- coordinate actions on soliciting the resources required for building a climate resilient green economy in all sectors and at all governance levels as well as provide capacity building support and advisory services.
- Establish a system for the evaluation of the environmental impact assessment of investment projects submitted by their respective proponents by the concerned sectoral licensing organ or the concerned regional organ prior to granting a permission for their implementation in accordance with the Environmental impact Assessment Proclamation.

- Take part in the negotiations of international environmental agreements and, as appropriate, initiate a process of their ratification.
- Establish an environmental information system that promotes efficiency in environmental data collection, management and use.
- Promote and provide non formal environmental education program and cooperate with competent organs with a view to integrating environmental concerns in the regular educational curricula.

2.2.2.3. Ethiopian Electric Power (EEP)

The establishment of the Ethiopian Electric Power (EEP) as a public enterprise on base of Council of Ministers Regulation No. 302/2013. The regulation set the purpose of EEP establishment to:

- Undertake feasibility studies, design and survey of electricity generation, transmission and substation,
- Undertake electricity generation, transmission and substation construction and upgrading.

2.2.2.3.1. Environment Health, Safety and Quality/EHS & Quality/ of EEP

Function responsible for managing operations concerning EHS and Quality aspects, such as:

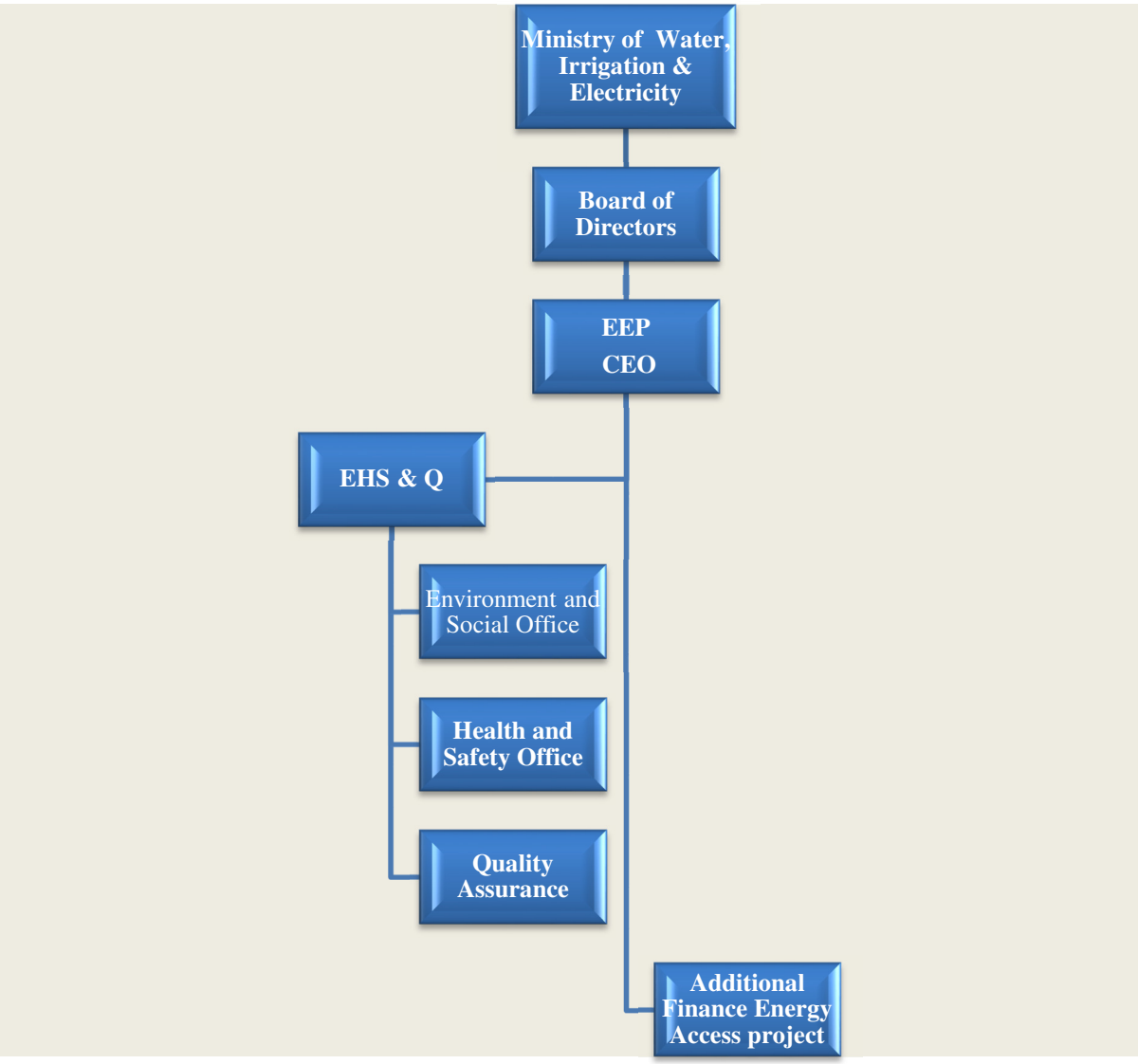
- Managing quality system.
- Evaluating and managing environmental impacts.
- Defining health and safety policies and operations.

Environment and Social Office

Environment and Social Office is one of the functional areas of EEP to address the major environmental and social issues in the power sector development. The team works to make the power generation and transmission construction environmentally and socially sound and sustainable. It works in line with the environmental proclamations, policies and international conventions enforcing EEP to comply.

The major task of the Environment and Social Office is to conduct periodic monitoring in power projects and operational activities of EEP, prepare or supervise Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP). The team ensures whether or not the EEP power projects are complying with the approved environmental and social management plan and undertaking the appropriate mitigation measures accordingly.

The team will be providing technical support and regular monitoring of identified potential risks and agreed solutions according to the WB social safeguard policy.



Organizational Structure of EEP and Additional Finance for Energy Access Project and Environment and Social Office

Adverse environmental and social impacts caused by the EEP's project operations will be monitored by the EEP's Environment and Social Office and the project office. The Environment and Social Office and the project office are responsible for the monitoring of adverse environmental and social impacts and coordinate the preparation and implementation of the ESMF, ESIA, EMP, and the RAP where it is deemed necessary.

2.2.2.4. The World Bank's Requirements

According to the World Bank project screening criteria, the Energy Access Project is categorized as "Category B Project". That is, more limited environmental analysis is appropriate, as the project may have specific environmental impacts.

The World Bank provides guidance on requirements in the Environmental Assessment Sourcebook, which includes the most recent versions of the World Bank Operational Policies as well as the updates. The World Bank has ten "Safeguard Policies" whose primary objective is to ensure that Bank operations do not cause adverse impacts. The ten safeguard policies are grouped into Environment and Social Policies.

Of these ten safeguard policies, three are not applicable as they relate to international law on waters and disputed areas, and the safety of dams. The following safeguard policies have been considered in this study.

2.2.2.4.1. The Bank's Safeguard Policies

The following are the World Bank Safeguard Policies that are pertinent to the project under consideration.

OP/BP 4.01 Environmental Assessment

The core requirement of this Policy is that screening should be done as early as possible for potential impacts and select appropriate instrument to assess, minimize and mitigate potentially adverse impacts.

Environmental Assessment (EA) ensures that appropriate levels of environmental and social assessment are carried out as part of project design. It also deals with the public consultation process, and ensures that the views of PAPs and local NGOs are incorporated as early as possible for Category A and B projects.

It is worth noting that OP 4.01 applies to all components of a project with financing from the World Bank, including co-financed components by the Borrower or by other funding agencies.

OP/BP 4.11 Physical Cultural Resources

Protection of cultural, historical archeological sites as stated in OP/BP 4.11. The policy requires the project avoid or mitigate adverse impacts of development projects on physical cultural resources.

The Policy bases itself on investigating and inventorying any chance finds and cultural resources potentially affected. It includes mitigation measures when there are adverse impacts on physical cultural resources.

The Borrower assesses the project's potential impacts on physical cultural resources as an integral component of the Environmental Assessment (EA). The process steps for the physical cultural resources component of the EA are the same for Category A and B projects.

The physical cultural resources component of the EA provides for (a) an assessment of physical cultural resources likely to be affected by the project, (b) documentation of the characteristics and significance of the these resources, and (c) an assessment of the nature and extent of potential direct and indirect impacts on these resources.

Where the EA predicts adverse impacts on physical cultural resources, the cultural resources component of the EA includes a management plan which includes: (a) actions to mitigate adverse impacts, (b) provisions for the treatment of physical cultural resources discovered during project implementation and operation (hereafter referred to as "chance finds"), (c) any necessary measures for strengthening institutional capacity to implement the management

plan, and (d) a monitoring system to track progress of these activities. The management of cultural property should be undertaken in conjunction with consulting the appropriate agencies including NGOs and academic institutions. The Bank avoids projects that will significantly damage non-replicable cultural property, and will assist only those projects that are sited or designed so as to prevent such damage.

OP/BP 4.12 Involuntary Resettlement

The Policy Objectives are:

- Avoid or minimize involuntary resettlement where feasible, exploring all viable alternative project designs.
- Assist displaced persons in improving their former living standards, income earning capacity, and production levels, or at least in restoring them.
- Encourage community participation in planning and implementing resettlement.
- Provide assistance to affected people regardless of the legality of land tenure.

The policy covers not only physical relocation, but any loss of land or other assets resulting in: (i) relocation or loss of shelter; (ii) loss of assets or access to assets; and (iii) loss of income sources or means of livelihood, whether or not the affected people must move to another location.

The impetus of this Policy is that development projects should not cause the impoverishment of the people who are within the area of influence of the projects. In cases where resettlement of people is inevitable, proper resettlement action plan should be undertaken to at least restore or improve, as stated above, their standard of life prior to the projects.

Concerning public consultation, re-settlers as well as the host communities should be consulted for the successful implementation of the resettlement process. The views of the consulted re-settlers and the host communities should be incorporated into the resettlement action plan (RAP) including the list of their choices.

OP/BP 4.36 Forestry

The Policy envisages the protection of forests through consideration of forest-related impact of all investment operations, ensuring restrictions for operations affecting critical forest conservation areas, and improving commercial forest practice through use of modern certification systems. In the process of forest conservation interventions, especially the local people, the private sector and other pertinent stakeholders should be consulted.

In general, the Policy aims at reducing deforestation and enhancing the environmental and social contribution of forested areas. Experience with the Bank reveals that the Bank does not support commercial logging in primary tropical moist forest.

2.2.2.4.2. Bank's Policy on Disclosure

It is a requirement of the Bank that the peoples residing in the project areas have the right to be informed of the proposed development project(s) in their respective areas. Therefore, prior to project appraisal, the summary of the study of projects along with other relevant information should be disclosed at the Bank's as well as project area (local) level.

The Disclosure Policy requires that Category B Environmental Assessment reports should be self-standing documents, and thus disclosure is a pre-requisite for appraisal of the project.

3. DESCRIPTION OF THE PROPOSED PROJECT

3.1 Project Description

The project component under the additional financing for the Energy Access Project is rehabilitation of distribution Network and construction of medium and low voltage Network. The main objective of the Urban Distribution Rehabilitation is to rehabilitate and expand the distribution network in the target seven cities to ensure safe system operation and enable connection of new customers in seven major cities namely: Adigrat, Beshoftu, Debre Markos, Gondar, Harrar, Shashamene and Wolayita Sodo.

Universal Electrification Access Program, Seven Towns Electricity Distribution Network Rehabilitation and Expansion Project Feasibility Study (October 2015) prepared by EEP identified the following major works:

1. Additional overhead transformer stations will be erected to replace the existing 15 or 33/0.415 kV transformer stations to supply new developmental areas
2. Replacement of existing step-up transformers at the seven towns.
3. Reinforce the low voltage network with the construction of 415/230V overhead lines to supply new development areas and replace the existing old lines.
4. An additional wire will also be included in the cables to feed street light points.
5. The project will also enable the installation of service drop lines for the connection of 60, 000 customers in the new development areas.

Significant environmental and social impacts are not expected because the rehabilitation activities will all take place within the existing distribution system. Where new distribution lines are erected, they will usually follow the road infrastructure, and therefore the environment and social impacts are expected to be minimum, manageable and reversible. The Urban Distribution Rehabilitation focuses on rehabilitating existing distribution systems of seven major cities with the following interventions:

- Replacement of wooden poles by concrete poles (low voltage),
- Replacement of wooden poles by concrete poles (medium voltage),

- Replacement of medium voltage overhead lines,
- Replacement of low voltage overhead lines,
- Installation of pole mounted transformers (50kVA-315kVA),

The Purpose of the Urban Distribution Rehabilitation is:

- Enhance reliable power supply,
- Reduction of voltage drop and power loss,
- Supply of electricity to new customers, and
- Enhance aesthetics of the cities (by replacing old wooden poles with new concrete poles and installation of underground cable)

The concrete poles to be used are normally about 8-12 meters high. This type of distribution line normally follows the road network except for bends and a curve where it is more economical to make shortcut if that is technically feasible. Causal labor will be recruited from the construction area thus providing employment opportunity to the local communities. No camp or other temporary facilities are required.

The main structural intervention is the erection of concrete poles. However, the flexibility in the positioning of distribution poles and the relatively low costs of changing line direction mean that the alignment can be modified to avoid displacing any households, hence avoiding any land acquisition or resettlement of households. However, crop damage may occur during construction and a compensation plan will be prepared.

3.2 Description of Baseline Environmental Conditions by Region

The country is composed of nine regional states and two Metropolitan City Administrations under the Federal Administration. The following description of the environmental baseline situation deals with that of these Regional Administrations.

3.2.1. Tigray Regional State

3.2.1.1. Bio-Physical Environment

Topography

Topography of the Tigray Region is mainly the extension of the central highland and associated western lowlands, and is divided into two major blocks: the eastern block comprises of highlands, while the western block is predominantly lowland. Topography of the Tigray Region is mainly the extension of the central highland and associated western lowlands, and is divided into two major blocks: the eastern block comprises of highlands, while the western block is predominantly lowland. Altitudes range from 500 meters up to 3,900 meters above sea level. It is situated between $12^0$15 'N and $14^0$57'N latitude and between $36^0$59'E and 40^oE longitude with an estimated area of 53,638 km^2. The Regional Administration is divided into four zones.

Climate: Tigray Region falls within 6-ecological zones (desert, kola, woina-dega, dega and wurch).

Land Use Pattern of Tigray Regional State

Land use	**Percentage in hectare**
Built up area	12,960
Cultivated land	2,667,710
Grazing /grass land	1,512,160
Vegetated or bush/shrub land	954,090
Wet land	5,590
Bare land	1,640
Water body	1,760
Total	**5,155,910**

Source: Regional Agricultural and Rural Development Office (data, 2011)

As shown in table above, bush /shrub and vegetation cover of the Region is totally about 18.51 %. The natural vegetation on the hill side of the route line are mostly cleared or over exploited mainly for expansion of crop land, construction and fuel wood consumption.

Tigray regional state, i.e. the eastern and southern zones, where Mekele is situated receive peak rain in April and August, whereas the western and central parts receive a single maximum rainfall between June/July to August/September and for the north western part the wet period runs from April/ May to October/November. The mean annual rainfall for the region ranges from 600mm in the northeastern part to 1600mm in the western part of Welkait Woreda. Temperature ranges between 16ºC – 20ºC in the highland eastern and central part, while it is 38ºC to 40ºC in the lowlands of the western zones.

Geology and soil type

The Geology of Tigray comprises low-grade metamorphic, Paleozoic and Mesozoic rocks. Tertiary volcanic, quaternary deposit and acidic to basic/ultra basic intrusions are characteristic of this region.

Major soil types of the region identified in a study conducted in 1976 is quoted by the Bureau of Planning and Economic Development (Report of 1998) as: orthicAcrisels, chromic and Eutriccambisols, Humiccambisols, Verticcambisols and Verticluvisols, Eurthicfluvisols, dystric nitosols, EutricNitosols, Euricrogosols, Haplic Xerosols, Cambic Arenosols, and chromic Andisols.

Water Resources

There are three major river basins in the Tigray Region; Tekeze basin, Mereb basin, Afar basin and Angereb valley. The current Project may fall mainly in the Tekeze basin and partly in Mereb basin. Some of the surface water sources comprise Tekeze River, Sure River, MaiTell River and MaiHitsatsa River. Groundwater source is abundant and is the major water supply source in the area.

Vegetation and wildlife

Due to human interference and early settlements in this part of the country, the major vegetation has been destroyed. Currently the dominant ones are woodland and savannah, junipers woodlands, acacia woodland and savanna. Accordingly, the vegetation cover of the region is divided into forest, woodland savanna and grassland regions. The plant species

include acacia trees mixed with savanna, juniperus trees mixed with savanna, and mixed deciduous woodland.

The vegetation cover of the north – western zone of the region comprises of grazing grass land, scattered bush and scrub covered and dense forest covered land. There are protected forest areas in the Tahitay Adiabo and Atsgede Tsimbela woredas of western zone. This includes Maikohni forest area, Aditsetser, AdiAscere areas and Enda Tanki protected site. The region has varied wild life species including Hyena, Tiger, Monkey and fox.

3.2.1.2. Population, Ethnicity and Religious Groups

According to the Statistical Abstract of CSA, 2008, the population of Tigray Administrative Region was 2,333,282 with an annual growth rate of 3% in urban areas. Out of the total population of the region, 84.6% live in the rural area while only the remaining 15.4%live in the urban dwellings. Mekele is among the 7 towns with detailed master plan out of the 38 towns in the Region. There are a number of ethnic groups that inhabit the Region. Tigre being the major ethnic group, there are also Kunama, Saho, Agew, Argoba and others in smaller proportions. The major religious groups are Orthodox Christianity and Islam.

3.2.1.3. Cultural and Historical Heritage

Tigray has rich cultural and historical resources and high potential for the tourism industry. In Tigray Region, we find the colossal obelisks, rock-hewn churches, ruined temples, palaces, mosques, church paintings, stone inscription and manuscripts are some of the ancient Ethiopian properties that have tourist attraction values. The Axum Obelisks, the rock-hewn churches are the major tourist attractions of the Region.

3.2.2. Amhara Regional State

3.2.2.1. Bio – Physical Environment

Topography and climate

The Amhara Regional Administration has diverse topographic features, with rugged mountains, extensive plateau and scattered plain separated by deeply cut gorges, steep slopes and cliffs. The elevation varies from 600 masl at Metema up to 4620 masl at Ras Dashen.

The Amhara Regional State is located between 9^0 N and 13^0 45' North latitude and 36^0 to $40^0$30' East longitude. It is bounded by Tigray in the north, Oromia in the south, Benishangul Gumuz in the west and Afar region in the east. The Regional State is divided into ten Zonal administrations and has a land area of about 161,828 km^2 (15% of the land area of Ethiopia).

Climate

The climatic condition of the Region is divided into temperate (Dega), subtropical (Woina-Dege) and arid (Kolla) agro-climatic zones. Mean annual rainfall of the Region varies from 700mm to over 2000mm in the Region and the temperature range is between 10 ^{0}C and 26 ^{0}C. There are two rainy seasons, while short rain occurs during March, May, and April, heavy rain is during June, July and August.

Geology and Soils

The Precambrian rocks, Cenozoic rocks and Mesozoic Rocks cover most part of the Amhara Region. The soil of the region includes Arthic Acrisds, cambisols, Rendizinas, phaeozems, Lithisols, Aluvisds, and vertislols. Soil erosion is the major environmental degradation problem in the Region due to lack of vegetation cover and rugged topography. Soil in the Region has high erodibility compared to other parts of the country. According to a study conducted in 1984 E.C, the quantity of soil loss in Amhara Region was estimated at 1.1 billion tonnes per year. This accounts for 58% of the total annual soil loss of the country in general.

Water Resources

There is an abundant water resource in the Region. The major water resource bases being the Abay River basin, Tekeze River basin and Awash River basins. There are also several lakes like Lake Tana, Lake Zengena and Haik. Ground water resource is abundant and it is the major water supply source in the region.

Vegetation and Wildlife

The natural forest in the Region is heavily depleted and degraded by intensive human interference, mainly for agricultural purpose and for energy (firewood) production. Currently less than 10% of the total estimated forest area is considered to be natural forest in the Region.

The rest are scattered wood lots (planted by individual farmers on different land use types) and plantation forests (those that have been planted for different purposes).

Indigenous tree/shrub in the area include Olea africana, Juniperousprocera, Podocarpusfalcatus, Acacia species, Hygeniaabyssinica, Ximeniaamerican and Ficus species are some of the indigenous plant species diminishing in the area due to human activities.

Wildlife availability depends on the extent of vegetation cover in an area. Parks of the Siemen Mountains are preserved for the most endangered species, such as Walia, Ibex, Siemen fox, Gelada baboons and different species of birds, most of which are endemic to Ethiopia. Endangered bird species in the region include Harwood, francolin and ostrich.

The Siemen Mountain National Park, and protected areas of Main Bird Sanctuaries, like Lake Tana, Ankober are found in the region. Moreover, –DebreSina mountain, Awi Zone, Choke Mountain, Fogera, Guasa/ in Menze/,Jama and Jara valley, Middle Abay valley, Gofa Forest are found in the region.

Land Use/ Land Cover

The land use/land cover composition of the Region is depicted in Table 4.2.

Table 4.2:- Land use/Land cover of the Amhara Region /2002/

S/N	Land use type	Area	% of total area
1.	Cultivable land	4,815,206	28.2
2.	Grazing land	5,122,560	30
3.	Forestland bush land	2,510,054	14.7
4.	Water bodies	648,858	3.8
5.	Settlement area	904,986	5.3
6.	Wasteland	307,354	18

Source: Regional bureau of agriculture, agricultural statistical data, Jan, 2011.

3.2.2.2. Population, Ethnic and Religious Group

According to the Statistical Abstract of CSA, 2008, the population of the Amhara Region was 17,214,256 and accounted for 17.3% of the country's total population. Out of this only, 10.98% was urban while the remaining was rural population.

The Amhara Region is inhabited by a number of ethnic groups, the major ones being Amhara, Awi, Oromo, Kimant, Argoba, Falasha (Ethiopian Jew), Tigre, Gurage and others. The religious group includes Coptic Orthodox Christianity, Muslim, Protestants, Catholic Christian.

3.2.2.3. Socio-Cultural and Historical Heritage

The Amhara Region is rich in cultural and historical heritages. Very old Monasteries, Rock-hewn churches, palaces and Castles are found in the region. The Lalibella Rock-hewn Churches, the Gondar Castle that are registered as International Cultural Heritage sites are found in this Region. There are several monasteries in the Lake Tana Islands, which is also the origin of Blue Nile (Abay) River.

The Blue Nile Falls found just few kilometers downstream of the Regional Capital, Bahir Dar, is also a tourist attraction site.

3.2.2.4. Social Service and Infrastructure

Education

The success for economic development depends mainly on the level of educated population that a country has. Education contributes and enhances individual productivity and earning. Over 66% of the population was illiterate according to survey made in year 2003, on 50-woredas of the region. The female illiteracy was about 76% of the total population. Among the literate, about 43.9% have attended the first cycle of primary education and 27.2% were able to read and write. The gross enrolment rate of primary education was 70.7%.

According to the data of the Bureau of Finance and Economic Development (BoFED), in 2004, there were 223 kindergarten, 3,793 primary schools (1-8), 99 first cycle secondary schools, 24-second cycle secondary schools and 17 technical and vocational schools in the Region.

Public Health

The most prevalent diseases of the Region include malaria and upper respiratory tract diseases. According to information from the regional BoFED, health institutions available in the Amhara Region in 2004 were 15 hospitals, 78 health centers, 517 clinics, and 385 health posts. Health facility to population ratio is below the national average.

The survey made in 2003 revealed that awareness of households interviewed about HIV/AIDS among the study population was found to be high. However, the report of the findings also emphasizes that the HIV/AIDS pandemic in the Region is critical. The pandemic is affecting the most productive labor force and is increasing the number of orphans. HIV/AIDS prevalence rate among blood donors in year 2001/2002 was reported to be 8.1% for the Region.

Transport Infrastructure

Road, air and marine transport systems are available in the Region. Road transport is the most used system. Report of the year 2004 indicates that there were 606-km asphalt roads, 2384 km all weather, and 2808 km dry weather roads in the region.

Water Supply and Sanitation

The rural population mainly uses water from unprotected sources; rivers, springs, ponds and wells. Survey made in 2003 reveals that about 71% of the rural population use water from unprotected sources. Regarding sanitation the case is even worse. In year 2003, 95% of the rural population used open defecation.

3.2.3. The Oromia Regional State

3.2.3.1. Bio- Physical Environment

Topography and land area

The Regional State is located in the central part of the country and extends from south- east, bordering with Kenya in the south part and up to the Sudan border in the western part. It has an area of 353,690 km^2 and is divided in to 12 Zonal administrations. Oromia Regional State lies between 3º 40'N and 10º35'N latitude and 34º05ºE – 43º11'E longitude.

The Regional State has topographic features of mountainous and rolling terrain in the northwestern and northeastern parts, valleys and gorges in the central and eastern, flat and plain land in the south and southeastern part. Altitude in the Region varies from 500 m.a.s.l in the south eastern part to 3300masl in the central and north western parts.

Climate

The climatic condition varies from southeast lowland to central and northwestern highland part of the regional state. The east and southern parts are dominated by arid climate while the central and northwestern parts are more of temperate climate. The lowlands (500 – 1500masl) experience mean annual temperature of 20º – 25º C , areas of altitude 1500 – 2300 m.a.s.l have mean annual temperature of 15 ºC – 20º C, while the highland areas(2,300 – 3,300 m.a.s.l) have mean annual temperature range of 10ºC - !5ºC.

Mean annual rainfall ranges between 200mm in the south east to 2000mm in the northwestern part of the Regional State.

Geology, Physiographic Divisions and Seismicity

The major part of Oromia falls in the Great Rift Valley of East Africa, and is tectonically unstable. It appears to be zone of volcanic and seismic activities. There are six physiographic sub-regions in Oromia; the Rift lakes plain, the transitional scrap slops, the young lava plain, zone of ancient crystalline rocks, the central lava highlands and massifs, and zone of Mesozoic sedimentary rocks. The geology of the region consists of; Rocks of the Precambrian era, Rocks of the Paleozoic era, Rocks of the Mesozoic era, and Rocks of the Cenozoic era.

Soil and Soil Fertility

The major soil types of the area constitute Luvisols, Fluvisols, Andosols, Fluvisols are commonly found in the plain lands of rivers and lake shores. This soil type has good agricultural use. Andosols are formed from volcanic ash parent material. They are light, loose and porous, and have high drain ability capacity and easily eroded by rain or wind action. Andosols have limited agricultural value. Luvisols on the other hand are good for agriculture.

Water Resource of the Region

There is an abundant water resource including surface and ground sources. Major rivers in the country like Blue Nile, Awash, Gibe, Wabe Shebele, Dabuss, Didessa traverse the Oromia regional state. Most of the rift valley lakes in Ethiopia and those in the Awash River basin, like Lake Langano, Zeway, and Abiyata are found in Oromia. Ziway Zone has the highest number of lakes in Ethiopia. There are about 20 lakes covering 8% of the Zonal land area. The wetland ecosystem of these water bodies has significant environmental and socioeconomic values.

Vegetation Cover and Wildlife

Oromia region possesses most of flora and fauna types found in Africa, and several endemic species.

The region has dense forest cover in the central, southwestern and western areas, while southern and southeastern areas are covered mainly by sparse vegetation, bushes and scrubs. The vegetation types are varied including Coniferous forest, broad leaved forest, woodland and savanna, grassland, riverine forests and wetland vegetation..

There are number of parks and protected sites in the region, including Awash National park (partly) Abijatta–Shala National Park, Bale Mountain National Parks, Yabelo mountains, Controlled hunting zone of Borena, wildlife Reserves (Sanctuaries) of Babile, Senkele, and Yabelo, Game Reserves of Arsi, Bale and Borena; over 20 Main Bird Sanctuaries. Those parks and protected areas host variety of wildlife and important bird species

Wide varieties of wild animals exist in the Region. The wildlife resources of the Region include Warthog Hammadrayas, baboon, gelada baboon, civet, mountain reed back, striped hyena, giant forest hog etc. Important Bird species include; Rappel's, chat, spor-breasted plover, Abyssinian long claw, etc.

3.2.3.2. Archeological and Cultural Heritages

The Sofe Omar Cave, the Aba Jiffar palace, etc are found in the Oromia Regional State as sites of cultural heritage.

3.2.3.3. Population, Ethnic and Religious Group

According to the Statistical Abstract of CSA, 2008, the population of Oromia Region is 27,158,471. Oromia stands first in terms of population density in the country. Ethnic group residing in the region is also varied, the majority being Oromo, followed by Amhara, and several other ethnic groups.

3.2.4. The Southern Nations, Nationalities and Peoples Administration

3.2.4.1. Bio-physical Environment

Topography

The south Nation Nationalities and Peoples' Region lies surface area of 117,500Km2. The Regional State is located between 4o25'_ 8o20' North latitude and 34o20' - 38o50' East longitude. Altitude ranges from 400masl in the southern part upto 4200masl in the northern

part of the regional state. The physiographic feature of the region is divided in to highlands in the north, rift valley and lowland in the south.

Climate

The region's climatic conditions vary from place to place. It has semi –desert climate in the southern extreme of the Kenya border, tropical climate in the northern highlands, and warm temperate in the mountainous areas of north Omo zone. The mean annual temperature and mean annual rainfall are 24ºC and 600mm respectively, in the semi desert climatic zone, the warm temperate climatic zone of north Omo has mean annual temperature of less than 18oC and mean annual rainfall of 2500mm.

Soils Type and Soil Fertility

The soils of the region constitute:

- Luvisols and phaeozens that cover most of the zones of the region.
- There are also Lithosols, Arenosols and Regosols, fluvisols, andosols, vertisols and Cambisols.
- Soil fertility is high in the region and is suitable for cereals, root crops, coffee and vegetables.

Vegetation and Wild life

The Region is characterized by dense natural forest, and rich wildlife resources. The forest resource is mainly situated in Kafa and Bench-Maji Zones and in the southern part of the Region. The most common groups of vegetation include broad leaved deciduous woodland, ever green scrubs, dry evergreen Montana forest and grasslands, acacia – commmiphora woodland. There are several National Parks in the Region. They include Nech Sar, Mago and Omo National Parks in which wildlife ranging from birds to big mammals exists.

Water Resources

There are abundant water resources both from surface and sub-surface sources. Surface water resource of the Region include rivers like Omo River, Gibe River, Bilate River, Awash River, While Rift valley lakes like Awasa Lake, Chamo Lake and Abaya Lake are also found in

the region. The Additional Financing for the Energy Access Project, the distribution network is known that does not traverse any of the water resources.

3.2.4.2. Socio-cultural Environment

Population and ethnic groups

According to the Statistical Abstract of CSA, 2008, the population of the regional state is 15,042,531, accounting for 18.5% 0f the total population of Ethiopia. The majority of the population (Over 87%) is rural while the remaining 13% are urban. The region is known for its diverse Ethnic composition .There are about 45 ethnic groups residing in the Region, constituting over 50% of the total ethnic groups of the country, Ethiopia. Most of the populations living in the rural areas of the Region are mainly dependent on agriculture and pastoralist economy, while trade and other businesses are the principal practices in the urban areas.

Cultural and Historical Heritage

There are cultural heritage sites like the Tiya monuments and the Omo valley archaeological site.

3.2.4.3. Social services and infrastructure

Education

The education coverage in the region is low especially for secondary and higher educational levels. In year 2001, the gross primary and secondary school enrolment ratio is 63.6% and 4% respectively for all school age population. There were 2305 primary schools and 84 secondary schools in the region in the same year.

Health Facilities

The health service coverage of the regional state is low. In the year 2001 the coverage was estimated at 55.06%. However, this figure is relatively on a better side as compared to 51.2% of the nationwide health coverage in Ethiopia for the same year.

Environmental health coverage is on a better condition, and improvements being made are encouraging. Considering access to latrine as an indicator, in year 2001, the coverage was estimated at 70% in urban areas and 9.7% in rural areas. However, it is reported to be over 80% at regional level in 2005. These drastic improvements are encouraging provided the developments are kept sustainable. Available health facilities as of year 2001 include:

- 12 hospitals,
- 107 health centers
- 433 health stations
- 290 health posts
- 158 private clinics
- 27 pharmacies and 43 drug shops

3.3 Seven Towns Baseline Information

3.3.1. Debrazeyit /Beshoftu Town

Location

Bishoftu city /Debrazeyit / is found in Eastern Showa zone of Oromia region located between $8^0 43^l$-$8^0 45^l$N Latitude and $38^0 056^l$-39^l-$39^0 01$E longitude and has an elevation of 1920m (6300ft). It is located at a distance of 47 km south east of Addis Ababa and 52 Km from Adama to the North West.

Area in hectare

The total area of the city was 3,280 hectare in the year 1992 C.E. and in 2002 E.C increased to 15,273 hectares.

Population

Up to the end of 2005 E.C. Bishoftu city administration has a total population of 154,310 from these 73,736 (48%) are male and 80,574 (52%) are female. And in terms of age distribution 62% of the population is categorized under age of 15-64 populations.

Religious groups

The majority of the inhabitant's practice Ethiopian orthodox Christianity with 79.75% while 13.82% of the population was protestant and 4.98% of the population were Muslim (2007 population and housing census of Ethiopia).

Ethnic groups: According to 1994 census Amhara (42.86%) and Oromo (39.4%) and all other group (9.44%).

Social services

Education service

According to the data of Bishoftu town education office, in 2014, there are 57 kindergartens, 63 primary schools, 2 high schools, 2 preparatory schools and 3 TVET's in the town.

Health service

Bishoftu town has 2 hospitals, three heath care centers, Four junior centres, 18 private clinics seven private pharmacies one private rural drug vender's, one malaria controlling centres and 19 other private health accessibilities are available. Based on these facilities, the health coverage of the Bishoftu City is 75%. This percentage coverage was calculated as the national standard that is one health centre is for 40,000 people.

The data obtained from Bishoftu City Administration Health Office indicates that 29 medical doctors, 21health officers, 64 nurses, 11 pharmacist, 6 sanitarians, 2 health assistances 42 community health extensions and 70 technicians are on providing government and non-government health institutions.

Water supply: In 2014, the Bishoftu town portable water coverage was 95%.

3.3.2. Wolayita Sodo Town

Location

WolayitaSodo town is located in the southern part of Ethiopian the Southern Nation, Nationalities and Peoples Region. The town is located at a distance of 390km from Addis Ababa and 167km from Hawassa, the regional capital. Its geographical coordinates are$6^0$54'N latitude and $37^0$45'E longitude and located at an altitude about 1900m.

Temperature

The average monthly temperature in the area ranges between 11.9^{0}C (August) and 26.2^{0}C (January) with a mean annual temprature18.9^{0}C.

Population

Based on the 2007 census conducted by CSA Wolayita, Sodo town has a total population of 76,050 of whom 40,140 are men and 35,910 women. Based on annual population predictions, the city population is growing at 4.8% at 2014 has a total population of 105,591 of whom 55691 are men and 49900 women.

Religious group

Based on CSA 2007, the majority of the inhabitants were Protestants with 54.61% of the population reporting that belief, 38.43% practiced Ethiopian Orthodox Christianity, 4.76% were Muslim and 1.28% was Catholic.

Social services

Education *services*

In the city there are 30 non-government and private schools and 14 government schools and 12 KG schools and totally 44 regular schools are available. And also 3 government Colleges, 4 private colleges and 1Government University are giving service in the city for 21000 students.

Health service

Wolayita Sodo city has two hospitals, three health centers, 10 medium and 19 small clinics, 3 dental and 2 diagnostic laboratories as well as bed rooms. The number of medical personnel has increased from year to year. The data obtained from the 3 health centers indicates 15 health officers, 7 BSC's (Bachelor of Science) nurses, 37 public nurses, 11 pharmacists, 4sanitarians,15 midwifes, 4 community health extension workers and 4 technicians are providing health services in government and non-government health institutions.

Water supply: In 2014, the Bishoftu town portable water coverage was 76.4%.

3.3.3. Gondar Town

Location

Gondar town is located in the northern part of Ethiopia in Amhara national regional state, north Gondar zone at a distance of 747km from Addis Ababa and 170km from regional capital Bahirdar. Its geographical coordinate is 120 45' N latitude and $37^0$45' E longitude with an elevation of 2133 m.a.s.l. (6998ft).

Total area: The town has an estimated area of 209.27km^2 (80.80km^2)

Population

Based on information provided by the Mayor's Office of the Gondar City Administration in 2014, Gondar had a total population of 306,800.

Religious group

Based on Gondar city administration mayor office, 85% of population practiced Ethiopian orthodox Christianity while, 13% were Muslim and 2% were others.

Social services

Transport

Air transport is served by the Atse Tewodros airport in Gondar town. The airport is found 18 km south of the city. Transport within Gondar town is mostly by minibuses and 3-wheel motor cycles (accommodating 3-4 passengers).

Education Services: According to the data of Gondar town mayor office, in 2014/15, primary School coverage is 95.08, Secondary School 87.71 percent and preparatory school is 79.3 percent.

Health service: Based on data of Gondar town mayor office, the health coverage of the Gondar City is 75%.

Water supply: In 2015, the Gondar town portable water coverage is 100%.

3.3.4. Adigrat Town

Location

Adigrat town is located in the northern part of Ethiopia, eastern zone of Tigray region at 14^0 16^0N latitude and $39^0$29'E longitude with an elevation ranges from 2530- 2660 m.a.s.l. at a distance of 898km towards north from Addis Ababa and 125km from Mekele city.

Total area

Based on the data from 2011, Adigrat city municipality, the town has an estimated area projected for 2012 is 19.34km^2 (1934ha).

Population

Based on the 2007 national census conducted by CSA of Ethiopia, this town has a total population of 57,588 (26,010men and 31,578 women), projected to reach 72,781 i.e., 32,872 male and 39,909 female in 2012.

Religion

According to 2007 census, 94.01% practiced Ethiopian Orthodox Christianity, while 3% of the population was Catholics and 2.7% were Muslim and 0.2% was protestant and 0.022% was traditional and other religious groups.

Social services

Transportation

Adigrat is located along Ethiopian highway 2, which connects the city with Addis Ababa and Mekele. In Adigrat Ethiopian highway 2, turns off the main highway to the west in the direction of Adwa. To the north of Adigrat, Ethiopian highway connects the city to Kokobay and Asmera in Ertriea.

Education service

According to the data of Adigrat education office 2011, in 2010, there are 15 kindergartens, 22 primary schools, 4 high schools, 2 preparatory schools,1 TVET's, 3 colleges, 1 university in the town.

Health service

According to data from Adigrat health office 2011, Adigrat city has 1 zonal hospital, 2 health centers, 1 medium and 3 lower clinics. There are 7 health officers, 108 nurses, 4 pharmacists, 3 sanitarians, 11 community health assistants and 32 technicians are on providing services in government and non-government health institutions.

Water supply: In 2015, the Gondar town portable water coverage was 71.93%.

3.3.5. Debre Markos Town

Location

Debre Markos is located in north western Ethiopia in Amhara regional state, East Gojam zone, at a distance 300km from A.A and 265km from Bahirdar the regional capital. Its geographical coordinate is $10^0$21'N latitude and $37^0$43'E longitude.

Population

Based on Debre Markos city administration mayor office, Debre Markos has a total population of 107,433 of whom 50,036are men and 57,397 women.

Religion

According to census 2007, majority 97.03% of inhabitants practice Ethiopian orthodox Christianity. While, 1.7% is Muslim and 1.1% is Protestants.

Ethnic group

The 1994 nation censes reported in Debre Markos town 97.12% were Amhara, 1.29% Tigray and 0.67% Oromo and all other ethnic groups 0.92%.

Social services

Road sector

Asphalt roads are found in very few areas/routes/ mainly along the main roads. It covers 45.312 km out of these 32.312km constructed by city administration and 13km by city road authority. Cobble stone and other stone works cover 126.057km. In recent years, the city is taking initiations to develop main routes with standardized asphalt roads and cobblestones for inner roads.

Water supply: According to city administration office the portable water supply is 95%.

3.3.6. Shashamene Town

Location

Shashamene town is located in Oromia national regional state west Arisi zone 250km from Addis Ababa. The town is located 70 08’ 51’’N to 70 18’ 19’’N latitude and 38 0 32’ 43’’E_ 380 41’ 07’’E longitude.

Population

The 2007 national census reported a total population for this town of 100,454 of whom 50,654 were men and 49,800 were women.

Ethnic Group

The Population and Housing Census of 1994 and information obtained from the town administration revealed the fact that there are several ethnic groups that residing in Shashamene town. Among the various ethnic groups in the town, Oromo (50.1%) constituted the large proportion of the total population. Next to Oromo, Amhara, Guragie, Welaita, Kembata, Tigray, Siltie, Hadiya and others formed about 17.3, 10.2, 9.7, 3.6, 3.1, 2.5, 1.1 and 2.4 percent respectively.

Religious Group

The Population and Housing Census conducted in 1994 showed that, the largest proportion of the residents of the town was the followers of Orthodox and Muslim religion, which constituted about 44.0% and 43.9% of the total population of the town respectively. Protestant, Catholic, and other religion followers constitute 10.1, 1.4 and 0.6 percent respectively.

Social service

Road sector

The road sector is mainly dominated by earthen road that constitute more than 60% of the total road networks. Asphalt roads are only found in very few areas/routes/ mainly along the main routes and five outlets of the cities. Since recent years, the city is taking initiations to develop main routes with standardized asphalt roads and cobblestones for inner roads.

Education service

According to the data of city administration office 2010, there are 25 primary schools, 3 high schools, 2 preparatory schools.

Health service

According to data from Shashamene health office 2011, Shashemene city has 1 hospital, 7 health posts, 3 health centers, and 16 higher and medium clinics. There are also 12 pharmacies.

3.3.7. Harrar Town

Location

Harrar is the capital of the Harrar city regional administration and is located in the south-east part of the Ethiopia at about 525 km road distance from Addis Ababa at an elevation of 1885m.

Population: Based on the central statistics agency (CSA) in 2013 Harrar had an estimated total population of 215,000 of whom 108,000 were men and 107,000 women.

Social services

Telecommunication Services: Harrar city has a modern digital microwave that enables telephone, Internet service, telex, fax, mobile telephone service, which provide access to communicate with anyone in any part of the world easily.

Postal Service

Harrar city has one main post office and five post agents. The main post office has 2,000 private boxes of which 1,183 were rented. There are also 10 letter-collection boxes (five of them are found in the post agents).

Electric Power

Harrar city gets a 24 hours electric power services from the national grid. The total amount of electric power that Harrar gets is 29 megawatt. Currently, closed circuit power supply has been applied to upgrade the power supply.

Water

Groundwater resource is being developed at Asseliso locality in Dire Dawa administration for supply of water for Harrar and other towns i.e. Aweday, Alemaya, Adelle and Dengego. Ten boreholes that are designed to produce about 287l/s water have been developed to supply water for the first phase design period (up to 2015). The project is completed and the people of Harrarare getting water service.

Road

The total length of roads in 2001 which was 18.1km asphalt; 19.3km gravel has been expanded to 21.7km asphalt and 70 .9 km gravel roads.

4. POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS AND MITIGATION MEASURES

4.1. Positive Impacts (Distribution Rehabilitation and Expansion)

The Energy Access Project is a development project designed for benefit of the urban population and is likely to have the following overall positive impacts:

- Relieve pressure on biomass resource of the country and thereby reduce the loss of the biodiversity by providing alternative source of energy.
- Improve access to social services (education, health, water supply, etc.)
- Stimulate economic development.
- Provide job opportunities thereby create income generation means for the respective communities in the project areas.
- Enhance aesthetics of the cities by replacing old wooden poles with new concrete poles and installation of underground cable.
- Replacement of existing wooden poles with concrete poles and reduce risk of collapse
- Social infrastructure can be expected to improve with the construction and improvement of roads in the construction period.

One of the direct impacts of the project will be to reduce greenhouse gas emissions through replacing some of the local biomass energy use with electricity generated primarily from hydropower.

4.2. Negative Impacts (Distribution Rehabilitation and Expansion)

4.2.1. Bio-physical Environment

➢ *Short-term, Construction Phase*

It is stated that the distribution rehabilitation activities will all take place within existing road reserves. However, rehabilitation work may affect biodiversity as vegetation may be removed and ecosystems minimally disturbed. These impacts may be prevented, reversed or mitigated by ensuring that appropriate measures that are simple and cost-effective are put in place and

complied with. It is stated that the final alignment would follow a route that takes account of local conditions including avoiding forested routes and avoiding wetlands or other "sensitive areas". Potential negative environmental impacts are likely to occur and the impacts may include the following:

- Initiation and aggravation of soil erosion as a result of removal of vegetation and soil mass and leaving slopes unprotected,
- Air pollution that may result from dust production and exhaust fumes from construction machinery,
- Water pollution from spill of hazardous substances especially during construction works,
- Soil pollution and contamination resulting from hazardous substances especially during construction, and
- Noise resulting mainly from construction machinery,
- Impact on cultural, archeological and religious sites during construction,
- Chance finds of cultural/religious/historical value,
- Loss of livelihood or displacement (temporary and/or permanent).

➢ *Long-term, Operation Phase*

During the operation phase of the Project, the following impacts may be anticipated.

- Interference of the distribution line with bird life as there are a lot of bird sanctuaries and bird species in the country;
- Erosion of soil may persist if no protection measures are implemented;

4.2.2. Impacts of PCB Chemicals

The problem of PCB (Polychlorinated Biphenyl) chemical is real. It poses major and increasing threats to human health and the environment. In the Stockholm Convention of 2001 (to which Ethiopia is a signatory), PCB is one of the twelve Persistent Organic Pollutants (POPs) to be eliminated from products like transformers and capacitors.

Polychlorinated Biphenyls (PCBs) are mixtures of individual chlorinated compounds. Due to its high heat capacity, low flammability and low electrical conductivity, it was extensively used as insulating material in capacitors and transformers. It is reported in some studies, since 1997, that there are possibilities or chances of contamination by PCBs after it is found out to be non-biodegradable and has carcinogenic tendency, the manufacturing of PCBs has been banned. EEP, keeping this issue in mind, has taken all possible steps to check and ensure that the import of transformers, capacitors and other electrical equipment has to be free from PCBs.

Technical specification in the tendering of documents and the contract for supply and installation will require the equipment supplied, do not contain PCBs and labeled with manufacturer's certificate to that effect.

The proclamation on Environmental Pollution Control No. 300/2002 is mainly based on the right of each citizen to live in a healthy environment, as well as the obligation to protect the environment of the country. The primary objective of the proclamation is to provide the basis from which the relevant ambient environmental standards applicable to Ethiopia can be developed and to make the valuation of these standards a punishable act. The proclamation states that the "polluter pays" principle will be applied to all persons. Under this proclamation, MEFCC is given the authority to ensure implementation and enforcement of environmental standards and related requirement to inspectors assigned by MEFCC or Regional Environmental Agencies.

EEP in cooperation with Ministry of Environment, Forest Development and Climate Change (MEFCC) already has undertaken preliminary inventory of all previously imported transformers, capacitors and electrical equipment for identifying the presence of PCBs.

The first phase of inventory of transformers have been completed and currently at the stage of the second phase. MEFCC as part of the National Implementation Plan through the project, Enabling Activities for the Disposal of Polychlorinated Biphenyls (PCBs) is responsible for the safe removal and disposal of any PCBs found in accordance with the convention to which Ethiopia is a signatory.

4.2.3. Socio-economic and Cultural

Land Expropriation-short term

The principal impact during the implementation of the project is the taking of land temporarily for stores and equipment yards and experience shows that when projects are delayed, project proponents sometimes do not compensate for the additional time (for delay).

Land Expropriation-Long term

The planned routing of distribution lines follows the urban road systems. The poles are erected near the edge of the road and would be sited, as far as possible; to avoid any need for resettlement. However, much of the land on the periphery of the cities could be farmland and during construction there will inevitably be some crop damage and impact on grazing pastures.

Beside and beyond crop damage, the major negative impact anticipated in this regard is expropriation of land due to access roads and the area for the new substations to be constructed, if there would be any. That is, the farmers and urban dwellers may lose their crops, houses, and other properties forever.

In certain instances, the project may have to prepare an Abbreviated Resettlement Action Plan that will have to be executed prior to undertaking any civil works under the project. .

Health and Safety

It is assumed that, during construction phase, the health and safety problems that will be encountered are vehicle accidents, fall from above, hit by objects, etc. During operation phase, impacts on public health and safety are related mainly with possible electrocution induced effects from electromagnetic fields.

As a precautionary measure, EEP has already adopted internationally accepted standard corridor /ROW/ width of 5 meter (2.5 m on each side of the distribution pole). All habitation and structures are excluded from the ROW to ensure safety to people and animals from electromagnetic fields as well as from direct electric shocks and flash over.

Given this, it will be necessary to ensure that there are no asset left beneath the ROW and to the sides of the source of potentially high strength (transmission line) and the residential houses.

Protection of Workers' Health/ Safety

Safety regulation /safety manual regarding workers' health and safety must be included in the tender document. The construction crew should receive specific and routine safety trainings /orientation and issued with job specific safety equipment. Subject to the oversight shall lead to disciplinary actions by supervisors, management and construction inspectors.

Health Effect of Electro Magnetic Fields (EMF)

Electromagnetic fields (EMF) are invisible lines of force that surround any electrical device. Power transmission lines, electrical wiring and electrical equipment, all produce EMF. There are many other sources of EMF as well. Electromagnetic fields are produced by voltage increase in strength as the voltage increases. The electric field strength is measured in units of volts per meter (V/m). Magnetic fields are measured in units of gauss (G) or tesla (T).

Most electrical equipment has to be turned on i.e., current must be flowing for any magnetic field to be produced. Electric fields are often present even when the equipment is switched off, as long as it remains connected to the source of electric power.

Electric fields are shielded or weakened by materials that conduct electricity - even materials that conduct poorly, including trees, buildings and human skin. Magnetic field, however, passes through most materials and is therefore more difficult to shield. However, both electric fields and magnetic fields decrease rapidly as the distance from the source increases. Such Project involves mobilization of labor force. Although the Distribution Rehabilitation is designed to use the local labor force, the risk of the transmission of communicable disease like STDS and HIV/AIDS in the work sites is expected. This may however be minimal and easily contained.

Impacts on Cultural Heritage

Ethiopian is known for its long history and rich cultural heritage. Archeologically, it is considered as the birth of mankind. One of the oldest hominid "Lucy" and "Ardi" are found in Ethiopia, in a place called Hadar, located in Afar Regional State.

Although it is proposed that they would follow as much as possible, the existing road network, the distribution lines may traverse, in some cases looking for shorter distances, culturally sensitive sites like graveyards, archaeological sites, etc. Therefore there is sufficient reason to be cautious when constructing distribution lines in the project operation.

4.2.4. Birds and Power Line Interactions

Ethiopia is recognized as one of Africa's bird hotspots with over 850 species recorded, out of which around 30 species are endemic (There are 17 species endemic to Ethiopia and a further 13 species restricted to the geographical region of the Ethiopian Highlands, which includes parts of Eritrea). It is also worth noting that there are over 200 paleartic migrants and many of these have breeding populations in Ethiopia. Key areas include the wetlands and the rift valley migratory routes. The main source of information on bird populations is the Ethiopian Wildlife and Natural History Society (EWNHS) who have been identifying "Endemic Bird Areas" and "Important Bird Areas".

In some parts of the world, bird collisions with power lines have become a significant issue, both to environmentalists concerned with threats to rare and endangered species, and to the power companies as these encounters with power lines can cause power outages. While there is as yet no experience of bird deaths being a significant problem in Ethiopia, it is a potential localized problem that may occur with an expansion of the distribution lines.

There are two main causes, large low flying birds physically flying into power lines and raptors and other large birds perching on distribution lines and touching across insulated conductors. In the majority of cases the problem is relatively localized, where a distribution line crosses a specific bird flight path, such as a valley between a wetland area and roosting area or feeding area.

4.3. Mitigation Measures (Distribution Rehabilitation and Expansion)

4.3.1. Bio-physical Environment

The main mitigation measure is built into route alignment in the distribution rehabilitation works. This shall be taken care of at the design stage to avoid the need for any land acquisition, resettlement, or any interference with cultural heritage or natural habitats. Therefore, the routing of lines should follow existing transport or telecommunications ROW as much as possible. Environmentally or culturally sensitive areas shall be avoided by re-routing the lines. That is, the distribution lines can also be routed to avoid any direct or visual impact on cultural heritage sites, such as churches, mosques, archaeological and historical sites and away from any viewpoints or other sites of outstanding natural beauty. The project should be aware of any such sites along planned routes.

Before starting detailed line survey, EEP will consult the key stakeholders to be aware of any potentially sensitive habitats or protected areas that may be affected by the route. These include: the state authorities, MEFCC, Ministry of Agriculture Natural Resources Department, Institute of Biodiversity Conservation and Research and the Ethiopian Agricultural Research (forestry), Ethiopian Wildlife Conservation Organization (protected areas) and the Ethiopian Wildlife and Natural History Society (birds and sensitive habitats). The distribution corridors will be aligned to avoid critical habitats (e.g. nesting grounds, heronries, rookeries, bat foraging corridors, and migration corridors).

[if the line crosses surface water resources, mitigation measures to prevent and control impacts to aquatic habitats are required including siting of Site power transmission towers and substations to avoid critical aquatic habitat (e.g. watercourses, wetlands, and riparian areas), as well as fish spawning habitat and other mitigation measures described in WBG EHS Guidelines]

4.3.2. Socioeconomic and Cultural Impacts

Compensation for Crop Damage during Construction

Compensation procedures for damage of properties should be prepared and clarified at the early stage of the project. That is, compensation for crop damage during construction should be paid in cash before construction starts according to current market value.

In order to compensate and valuate property lost to the project, a committee should be formed that will handle the appropriation of land and compensation issue according to Proclamation No. 455/2005 and Regulation No.135/2007. Land temporarily expropriated should be compensated for and returned to the owners immediately. If there would be project delay and the land return schedule would be delayed accordingly, compensation should be effected for the prolonged time.

Compensation for Loss of Crop-Long term

The project proponent should ensure that appropriate measures are taken to ensure that affected persons are compensated in accordance with the principles and procedures and the national proclamation on compensation and land appropriation (Proclamation no. 455/2005). Any permanent loss of land, houses and other immovable assets such as perennial crops and grazing pastures due to the construction of compact substations need to be identified and project affected persons (PAPs) compensated prior to commencement of construction activities as per the project Resettlement Policy Framework outlined principles. At this stage, in undertaking the ESMF, the exact construction sites cannot be determined, yet there is unlikely to have new restrictions for agricultural activities on land within the ROW, however the issue has been discussed with the PAPs during the consultation process. Please add to this section clarifying whether there will and whether these have been discussed with PAPs.

Depending on the availability of land, permanently cultivated land and grazing pastures lost to the Project will be compensated on a land for land basis. Permanent loss of perennial plantations will be compensated with sufficient cash to the project affected person. Residential

houses, buildings, land, and other fixture losses will be directly and fully compensated at replacement cost.

Protection of Cultural heritage

During surveying of the route alignment cultural, historical, religious and archeological sites will be avoided. When there is "chance findings" the contractor will immediately inform EEP on such findings and the Authority for Research and Conservation of Cultural Heritage (ARCCH) will be informed for further investigation. "Chance Findings" during the exploration of geothermal fields may also occur. In the same way ARCCH will be informed for further investigation.

The following are procedures when "chance findings" occurs:

A. Upon discovery of ancient heritage, relics or anything that might or believed to be of archeological or historical importance during the execution of works, immediately suspend and report such findings to the SE so that the appropriate authorities may be expeditiously contacted for fulfillment of the measures aimed at protecting such historical or archaeological resources.
B. The contractor shall take the necessary measures for preventing that any person or equipment may damage the article or things and shall provide barricades, fences, and signals and, if necessary, protect against atmospheric agents, as directed by the engineer. Also guard service may be required by the engineer.
C. The supervising engineer shall take the following measures:
    - Notify the Project office
    - EEP notify the relevant Regional department of antiquities and ARRCH
    - Request for representative to make site inspection
    - Secession of work in the vicinity of the find until the visit of representative; and
    - Decision by the department of antiquities on possible salvage or excavation within 48-72-hours of notification.

Occupational Health and Safety

Occupational health and safety standards and guidelines for the project should be prepared at the early stage of the project, these standards and guidelines shall be made part of contract document to be signed with any contractor. Particular attention is required for workers exposed to occupational hazards from contact with live power lines during construction, maintenance, and operation activities. Live-wire work will only be conducted by trained workers with strict adherence to specific safety and insulation standards.

To minimize incidence of STDs, especially HIV/AIDS, health education program shall be provided with the involvement of health care institutions (both GOs / NGOs) around the project sites. In general, all work operations should be considered in a systematic manner to reduce the short term and long term risks to health (disease, injury and death) of the work force.

Concrete Poles

The present proposal is to use concrete poles, rather than timber ones, avoiding adding to the pressure on the scarce wood resources. In addition, the designs specify special foundations in areas with unstable soils, to prevent movement of the poles, minimizing the risk of poles falling over and presenting a hazard to human and livestock, as well as limiting power outages, and maintenance or repair costs to EEP.

Protection from Bird Collision and Electrocution

There are two main approaches to dealing with the issue; that is, design and insulation of distribution poles and attaching “flappers” to the lines so that they can be more easily seen and avoided in flight. Research carried out on different pole configurations has shown that the armless compact construction design is regarded as being the safest. However, even with the armless compact design, raptors flying into land on one of the short support brackets can contact both of the lower phase conductors at the same time.

Birds usually are thought to select their breeding habitats on the basis of vegetation coverage. After the construction of the transmission /distribution line the vegetation clearing activity in the ROW will affect birds in many ways. Bird collision nowadays is also becoming a significant issue not only from environmental point of view, but also from economical and technical viewpoints.

- The threats are immense to those birds with relatively large body size, fast flight, flocking behavior, long appendages relative to body size, poorly developed fovea and spending relatively high proportion of time in the air.
- Some of the conductors are thinner and are more difficult to be seen hence, causes bird collision.
- Birds at most risks are due to their relatively wide wingspans and tendency to use poles as nesting platforms.
- Also bird collisions with the transmission line occur especially to those night active once.
- Electrocution and death of birds occur when bird's body bridges the gap between two energized components of conductors.
- Moreover, other birds also are more often killed through direct flying into wires at high speed.

Mitigation Measures (*if a particular area is identified as a problem after installation***)**

- Careful pre-construction siting should avoid transecting wetlands or separating known roosting and foraging habitats. The line should also be parallel to prevailing winds condition, and on prominent landscape features such as cliffs it should utilize existing transmission line corridors.
- Power lines should be modified and re-designed to make sure that wires are more visible to avifauna to protect them from power line collisions.
- Remove all static leftover lines from poles.
- Use wire markers on static lines to make it more visible.
- Minimize opportunities for birds to come in contact with wires by placing perches above wires.
- Ensure that wires are spaced to accommodate the wingspan of the largest birds and provide nesting platforms in areas where raptors are likely to nest on poles.
- Install deflectors /flapper devices or balloons in sensitive areas with potential for bird collision, which will be fixed on shield wires to make it more visible and reduce or minimize collision of birds significantly.

- Increasing the distance between phase conductors and installing molded plastic insulation on conductors.

In general EEP with its projects will strictly adhere and abide to the Ethiopian government's Proclamation No. 635/2009 of June 2009. Also as a signatory body of the "Agreement on the conservation of African-Eurasian Migratory Water birds" Ethiopia has a vested interest and legally binding law to conservation of Migratory Birds. EEP as a proponent for the construction of transmission /distribution lines throughout the country used to take this issue seriously and tried to minimize the impact of transmission lines by electrocution and collision of bird population during the feasibility, ESIA study and design stages of projects.

EEP should also monitor bird strikes during regular maintenance activities. if there are any concerns about possible bird/power line interactions in a particular area, EEP will implement a system for communities to report power line bird deaths if they occur. Birds being killed by collision, in most cases it also results in power outages and hence needs to be thoroughly studied and serious action be taken starting from early stages.

Avoidance of PCB Chemicals

It is evident that the existing imported transformers and capacitors (especially those imported before 1989) are suspected of containing PCB chemicals. Therefore, the newly to be imported transformers and capacitors should first be certified as PCB-free and be given much care during the procurement and the importation process.

Polychlorinated Biphenyls (PCBs) are mixtures of individual chlorinated compounds. Due to its high heat capacity, low flammability and low electrical conductivity, it was extensively used as insulating material in capacitors and transformers. It is reported in some studies, since 1997, that there are possibilities or chances of contamination by PCBs after it is found out to be non-biodegradable and has carcinogenic tendency, the manufacturing of PCBs has been banned. EEP, keeping this issue in mind, has taken all possible steps to check and ensure that the import of transformers, capacitors and other electrical equipment has to be free from PCBs.

Technical specification in the tendering of documents and the contract for supply and installation will require the equipment supplied, do not contain PCBs and labeled with manufacturer's certificate to that effect.

The proclamation on Environmental Pollution Control No. 300/2002 is mainly based on the right of each citizen to live in a healthy environment, as well as the obligation to protect the environment of the country. The primary objective of the proclamation is to provide the basis from which the relevant ambient environmental standards applicable to Ethiopia can be developed and to make the valuation of these standards a punishable act. The proclamation states that the "polluter pays" principle will be applied to all persons. Under this proclamation, MoEF is given the authority to ensure implementation and enforcement of environmental standards and related requirement to inspectors assigned by MoEF or Regional Environmental Agencies.

EEP in cooperation with Ministry of Environment, Forest Development and Climate Change (MEFCC) already has undertaken preliminary inventory of all previously imported transformers, capacitors and electrical equipment for identifying the presence of PCBs.

The first phase of inventory of transformers have been completed and currently at the stage of the second phase. MEFCC as part of the National Implementation Plan through the project, Enabling Activities for the Disposal of Polychlorinated Biphenyls (PCBs) is responsible for the safe removal and disposal of any PCBs found in accordance with the convention to which Ethiopia is a signatory.

The Proposed Project Potential Impacts and Mitigation Measures

The following presentation summarizes potential, Impacts and Mitigation Measures as well as implementing bodies for the performance of the respective activities.

Potential Environmental and Social Impacts	**Proposed Mitigation Measures**	**Implementation/Monitoring Responsibility**
Soil erosion, Air Pollution, Soil Pollution, Noise	○ Use Environmental Guidelines for Contractors ○ Procurement of transformers and Compact Substations free of PCBs ○ Safe disposal of transformers containing PCBs (MEFCC is responsible for the disposal) ○ Safe disposal of creosote-treated wooden poles ○ Safe disposal of excavated rock cuttings, sludge and debris during the construction of the proposed project. ○ Adjust time of construction to reduce or minimize the adverse effect of noise. Contractor to ensure noise limits in the WB General EHS Guideline (or national regulations, whichever is more stringent) are met.	Contractors /EEP MEFCC, EEP EEP EEP Contractors Contractors
Loss of Assets and access to homes, business and services	○ Compensation payment for Project Affected Persons ○ Compensation Payment for crop damage ○ Compensation for loss of livelihood and mitigation for loss of access	EEP EEP EEP
Cultural heritage	○ Avoid historical, cultural and archeological sites during Route alignment ○ Inform Authorities when there are any chance findings	Surveyors Contractors
Bird Collision and Electrocution	○ Conduct baseline study to determine important bird areas and migratory routes. ○ Review design to insure appropriate distance between phase conductors and installing molded plastic insulation on conductors as appropriate. ○ Monitor bird strikes during regular maintenance and implementing reporting mechanism for communities to identify when bird strikes have occurred. Review and adjust mitigation measures as necessary	EEP
Health and Safety	○ Provide Health education program. ○ Consider all work operations in a systematic manner.	Contractor/ EEP

5. GRIEVANCE REDRESS MECHANISMS

Grievance redressing mechanisms have to be designed in view of the fact that project activities may upset the existing balance in society. The resettlement project will touch upon property issues, means of livelihood, and organization of social and spatial aspects that influence proximity to a set of environmental, economic, social, and spiritual assets. Therefore, the grievance redressing system has to be designed in such a way that it functions in a flexible manner. And the implementing agency has to incline to a pro-poor approach in all its decisions.

Grievances will be actively managed and tracked to ensure that appropriate resolution and actions are taken. A clear time schedule will be defined for resolving grievances, ensuring that they are addressed in an appropriate and timely manner, with corrective actions being implemented if appropriate and the complainant being informed of the outcome.

Grievances may arise from members of communities who are dissatisfied with (i) the eligibility criteria, (ii) community planning and resettlement measures, or (iii) actual implementation. This chapter sets out the measures to be used to manage grievances.

The grievance procedure does not replace existing legal processes. Based on consensus, the procedures will seek to resolve issues quickly in order to expedite the receipt of entitlements, without resorting to expensive and time-consuming legal actions. If the grievance procedure fails to provide a result, complainants can still seek legal redress

A local grievance hearing committee (GHC) will be established, consisting of representatives from the village or town, municipality, Woreda, or kebele administration, the displaced persons, town elders or influential personalities other than the displaced persons, and the church administration. Grievances should be settled amicably whenever possible. That is, positive discussions are made to convince the affected PAPs in the presence of the GHC. However, if the resolution of a case requires additional payment or any form of relocation of resources, the report shall be sent to the appropriate administrative executive for consideration. If the administrator agrees to the recommendation, he/she shall instruct the resettlement Unit to implement the amended provision; on the other hand if the

recommendation of the GHC is such that it upsets legal frameworks, the aggrieved party may be advised to pursue the case in a normal law court.

According to proclamation N0.455/2005, Article 11, sub article 1:

> *"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."*

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

World Bank Group (WBG) Grievance Redress Service

Communities and individuals who believe that they are adversely affected by a WBG supported program, may submit complaints to existing program-level grievance redress mechanisms or the WBG's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed in order to address program-related concerns. Program affected communities and individuals may submit their complaint to the WBG's independent Inspection Panel which determines whether harm occurred, or could occur, as a result of WBG non-compliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the WBG's attention, and WBG Management has been given an opportunity to respond. For information on how to submit complaints to the WBG's corporate Grievance Redress Service (GRS), please visit http://www.worldbank.org/GRS.

6. PUBLIC CONSULTATION AND DISCLOSURE

6.1. Public Consultation

Public consultation and participation is a continuous process which identifies and discusses the key issues and impacts of the proposed project. Views from local residents, local leaders, surrounding institutions and development partners who in one way or another would be affected or have interest were sought through interviews and public meetings.

Public participation includes both the information exchange (dissemination and consultation) and collaborative forms of decision making and participation. Dissemination refers to transfer of information from Project Office of EEP to the affected population. While consultation generally refers to joint discussion between Project Office and the affected population, serving as a linkage for transfer of information and sharing of ideas. Public participation is an on-going process throughout the implementation of the project and is not an event. The level of information which is disseminated or the issues on which consultation takes place vary with the progress in the project process.

During the field assessment, information dissemination and public consultations meetings were conducted with the project affected households, elders, and chairperson of the specific objective of information campaign and public consultation are:

1. To share fully the information about the proposed project, its component and its activities with the community;
2. To obtain the information about the needs and priories of the communities , as well as information about the reactions to the proposed polices and activities;
3. To inform communities about various option on relocation and rehabilitation;
4. To obtain cooperation and participation of communities in activities required to be undertaken for resettlement planning and implementation;
5. To ensure transparency in all activities related to land acquisition, compensation payment, resettlement and rehabilitation;
6. To establish a clear, easily accessible and effective compliant and grievance;
7. To assist communities in relocating or replacement of their houses.

At the time of public consultation the team has made consultation with the communities including city administration, government officials, Ethiopian Electric Utility regional and district representatives, community elders, religious leaders, Women and different community members. Local language, Amharic has been used as media of communication and all social and cultural norms were appropriately maintained in all the sessions.

The issues mostly focused are;

1. Brief explanation of project's major objective, terms of implementation and possible environmental and socio economic impact that may surface in due course of the projects implementation phase, thereby further raising their awareness thereof from the outset.
2. Involve such stakeholder attending the meeting in the brainstorming pertaining to the caption impacts.
3. The communities' attitude toward the project is expecting employment opportunities and development income generation schemes during construction period.
4. The communities' expectation to have electric power supply for their localities and improve their livelihood status.

The team during all public consultation explained that the project plays significant role in the development of the national economy such as industrial development, foreign exchange, enhancement of rural educational opportunities and general betterment of the way of life for the population by providing electrical energy from reliable and cheap hydro energy sources.

As for the projects socioeconomic impacts, the team also explained that the project would play vital role in supporting and improving the local economy by supplying power for investment sectors, social service like health, education, creating employment opportunities to the local communities and it enables easy and accessible situation for women which reduces work load.

Accordingly, the team explained to the participant that EEP would conduct proper and transparent compensation prior to project construction for the lost assets, be it permanent or

temporary as per the Proclamation No. 455/2005 and Regulation No 135/2007 on the payment of compensation for property situated on land holding expropriated for public purposes.

The team also briefly discussed the positive impact of the project in relation to health and environmental impacts which include;

1. It addresses the prevailing adverse environmental impact on the localities forest / natural vegetation resources.
2. Using of PCB free transformers and capacitors which reduce adverse impact of the project.
3. Reduction of health problems related to smoke during combustion, falling of weirs and reduction of criminal activities.

6.2. Attitude of the Community and Government Officials

The local communities attending the public consultation and government officials attitude at various levels was very encouraging.

The participants of the meeting have expressed their hope that the distribution rehabilitation project will solve the problem of electric interruption in the towns. The distribution expansion will also enable the town dwellers the chance to have electric power to their homes and businesses.

The respective stakeholders attending the meeting have come up with the following suggestions, which marked the meeting adjournment:

1. Since the project is highly expected to avail employment opportunities to the local communities, the project owner shall be required to ensure that the local communities is the primary beneficiary such opportunities there by conducting all the required follow-ups to that effect.
2. The respective project affected households shall be entitled to all the reasonable compensation schemes, including the acquisition of replacement lands, the implementation of which must be initiated and implemented by the employer / project owner in consultation and collaboration with the respective stakeholders,

including the Woreda agricultural office.

3. This discussion gave a clear indication of local acceptance of the project and they have also expressed their serious concern about the proper and transparent implementation of the project.

6.3. Disclosure

The Info-Shop and World Bank website will also contain the ESMF and the revised Project Information Document, Integrated Safeguards Data Sheet and the World Bank Project Paper for the Additional Financing for the Energy Access Project after Board Approval as per the World Bank disclosure policy.

7. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN FOR ADDITIONAL FINANCE ENERGY ACCESS PROJECT IMPLEMENTATION

Project Phase	Potential Environmental, health and safety,and Social Impacts	Proposed mitigation measure(s) (Incl. legislation & regulations)	Institutional Responsibilities (Incl. enforcement & Coordination)	Cost Estimates
Pre–construction Phase	• Most civil work projects lack detail considerations to implement the proposed environmental, social, health and safety mitigation measures • Transformers and capacitors are suspected of containing PCB chemicals • Cultural heritage	• Include the environmental, social, health and safety clauses into the contract document • Transformers and capacitors should be checked for PCB-free during procurement and prior to importation. • Inventory storage and waste disposal of PCB transformers. • Route alignment during surveying toalign with existing ROW as much as possible.Avoid cultural heritage sites (historical, archeological sites, etc.) and environmentally sensitive areas. Minimize land acquisition.	EEP/Designer (Annexes I and II) Ethiopia is signatory for Stockholm Convention for the disposal of POPs. There is project office in the Minstry of Environment. Environment and Social officers will monitor during route allignment.	Checking for PCB free Transformers will be supervision consultant duty prior to importation. No cost for disposal of transformers. Cost will be covered by National implementation Plan

Project Phase	**Potential Environmental, health and safety,and Social Impacts**	**Proposed mitigation measure(s) (Incl. legislation & regulations)**	**Institutional Responsibilities (Incl. enforcement & Coordination)**	**Cost Estimates**
Constructio n Phase	• Removal of vegetation • Dust emission • Land acquisition (expropriation) permanently and temporarily • Temporary access to homes, businesses & services • Noise from construction machinery working noise and vibration • Occupational health and safety impacts to workers and communities	• Clearance of vegetation should be minimized and to the extent possible not during the rainy season. If it is removed, the area should be replanted immediately. • Using proper erosion control methods including biological and physical means(energy dissipaters, grassing of slopes, etc.) • Protect the crops from being damaged by equipment or machinery • Appropriate compensation & mitigation measure to be put in place • Any damage should be repaired or compensated • Recover, re-use and recycling of solid and hazardous waste should be encouraged on the constriction sites • Limit the traffic to the only authorized access road • Take precautions required to avoid the fall of fragmented or	• Contractor for implementatio n • Environmenta l and Social Office of EEP (for monitoring) • Environmenta l & Social Office of EEP ,	Mitigation measures to be included as bill item in the contract 2307.22 USD 2307.22 USD

Project Phase	Potential Environmental, health and safety,and Social Impacts	Proposed mitigation measure(s) (Incl. legislation & regulations)	Institutional Responsibilities (Incl. enforcement & Coordination)	Cost Estimates
	• Impacts on cultural heritage • Crop and grazing pasture damage • Vehicles transporting equipment and materials will raise dirt and dust clouds	rubbishmaterials on the soil and water. • All the dismantled metals, cable must be collected and transported away from the site • Used oil and hydraulic fluids must be collected in a closed container and stored temporarily in a safe place and sent to an authorized recycling depot • Apply dust abatement measures • Adjusttime of construction to reduce or minimize the adverse effect of noise (from religious sites, schools, health centers, etc.) • Inform ARCCH upon "Chance findings" • Compensation payment and alternative solution • Make the community aware of the work schedule and provide adequate signage to protect the community from electrical and	• Contractor for implementation • Contractors • /EEP • EEP • Environmental and Social experts of EEP (for monitoring) • Contractor for implementation	2,653.30 USD 2307.2 USD

Project Phase	**Potential Environmental, health and safety,and Social Impacts**	**Proposed mitigation measure(s) (Incl. legislation & regulations)**	**Institutional Responsibilities (Incl. enforcement & Coordination)**	**Cost Estimates**
	• Excavation sludge, construction waste and debris • Waste soil • Surface water/ground water • Changes in the topography • Soil erosion • Flora and fauna • Cultural heritage	other construction hazards Contractor to report all environmental, health and safety incidents and near misses with corrective actions. • Prepare appropriate dumping site • Reduction of the volume and appropriate disposal • Use appropriate dumping site • Restore the site after the completion of construction activity	• Environmental and Social experts of EEP (for monitoring) • Contractor for implementation • Environmental and Social Office of EEP (for monitoring) • Contractor • EEP	2,307.20 USD 1,307.2 USD

Project Phase	Potential Environmental, health and safety,and Social Impacts	Proposed mitigation measure(s) (Incl. legislation & regulations)	Institutional Responsibilities (Incl. enforcement & Coordination)	Cost Estimates

8. GENERAL MITIGATION ISSUES AND EEP'S COMMITMENT

The key mitigation factor for minimizing (and, if possible, avoiding) detrimental environmental impacts as a result of the distribution rehabilitation is line alignment. Prior to starting construction EEP carries out a line survey and prepares a map showing the routing and estimating quantities so that a contract can be drawn up. The line survey also records any areas that may be adversely affected by the Project. The detail of (sensitive areas) checklist to be considered for site selection is presented in section 6.1.

EEP will specifically record where the line crosses any protected areas. The contract also specifies the type of distribution poles to be used and the configuration of the arm and insulators. The poles should be concrete, and a compact armless configuration. The contact will also specify the conductor.

For a proper decision-making, prior to undertaking the detailed line survey, EEP will consult the various stakeholders including the MoWI&E, EWNHS, IBCR, EARO, ARCCH, Ministry of Agriculture and the PAPs etc., to consider if there are any "Environmentally Sensitive Areas" recognized by these organizations (that is, listed in their schedule as areas which harbor protected, threatened or endangered species, areas of particular historic or archaeological interest, primary forests, wetland of national or international importance, national park and protected area) and may be affected by the Program. If there are sensitive areas identified, then the relevant organization can arrange for a site visit and advice EEP on possible problem areas and the potential for alternative alignments. In general, decisions are made by EEP after consulting the pertinent organization depending on the type of sensitive area(s) identified.

As an additional requirement EEP will record any areas where there is a potential for the alignment to affect the visual amenity of a cultural heritage site. EEP will also, at the time of the survey, record the need for any unforeseen land acquisition, and impact on the grazing grounds of the pastoralists. Following this consultation process, this information along with the map of the selected routing will be passed to MoWI&E, for their review and comments.

EEP will report on any recorded bird deaths and indicate on a map where these have occurred. Should any hotspots be identified, EEP will report these to the MoWI&E for the input of the latter (to enable the former to decide) and propose appropriate interventions, which may include the localized installation of bird flappers or arm/line insulation.

Concerning protection of cultural heritage, EEP will report to the Authority for Research and Conservation of Cultural Heritage (ARCCH) upon discovery of ancient heritage, relics or anything that might or believed to be of archeological or historical importance during the execution of works, during the construction period of the Project components.

9. INSTITUTIONAL ARRANGEMENTS

The implementation responsibility of the ESMP rests on EEP. To a considerable degree, construction contractors will be responsible for implementing mitigation measures but the ultimate responsibilities to ensure the proposed mitigation measures are implemented and monitored are those of the relevant Project Office under the AF Energy Access Project. The Ministry of Water, Irrigation and Electricity (MoWI&E) will oversee all the environmental and social activities related to the project.

The offices of the City Municipalities, Woreda Administration, Health Departments and other relevant stake holders will be involved with their specific responsibilities in the environmental and socio-economic activities. Their responsibilities are exercised in the different stages, preconstruction, construction and operation and maintenance.

10. ESMF IMPLEMENTATION AND MANAGEMENT

Implementing the ESMF

Environment and Social Office of EEP will be responsible to conduct environmental and social monitoring of the seven towns Distribution Rehabilitation works.

The implementation of ESMF will be exercised in different stages of the project, i.e. preconstruction, construction and operation phases.

11. ENVIRONMENTAL AND SOCIAL MONITORING AND MANAGEMENT

The process of environmental and social monitoring and management involves several activities with the corresponding responsible actors and stakeholders. The following sections, present the roles and responsibilities of the actors, the monitoring intervention and the mitigation cost estimate.

11.1. Mitigation Principles and Clauses

The Environmental specification as part of the project contract document shall contain all the necessary clauses relevant to the project. The contract document shall be a binding legal document to be signed by the contractor and EEP.

(Please refer to the Annex - Environmental and Social clauses).

11.2. Work Place HIV/AIDS Program

The Ethiopian Government issued a policy, which calls for an integrated effort involving a multi-sectoral response, to control the epidemic. The Ethiopian Government's HIV/AIDS policy urges communities at large, including government ministries, woreda level government institutions, and the civil society to assume responsibility for carrying out HIV/AIDS awareness and prevention campaigns.

In line with this policy, EEP has taken the initiative to develop and implement an HIV/AIDS awareness and prevention strategy. The strategy will comprise three phases:

a) Awareness creation campaign for EEP's management personnel.
b) Awareness creation educational programme and campaign to be organized for EEP project employees.
c) Continuation and consolidation of awareness creation and education programme and campaign for domestic and international contractors and their work force.

The overall objective of the EEP's HIV/AIDS awareness creation strategy is to contribute to reducing HIV/AIDS infection and incidents. This will not only contribute to strengthening national efforts to halt the epidemic but also support international initiatives to stop the spread of the disease.

Operational Objectives

The operational objectives are:

- To promote continuous sectoral, gender related information, education and communication (IEC) messages about HIV/AIDS infection, protection, counseling and care;
- To increase availability and accessibility of condoms;
- To establish a sectoral policy that will safeguard human and civil rights and avoid discrimination of EEP employees who are infected with HIV/AIDS;
- To contribute to the national efforts in establishing indicators that will ensure effective monitoring and evaluation.

EEP's strategy on HIV/AIDS was prepared in 2005, and following its preparation, a number of workshops were held to familiarize its staff with the objectives of the strategy. EEP has now received funding support from the National HIV/AIDS Prevention and Control Office for the implementation of the HIV/AIDS strategy.

11.3. Air Quality Management

With the exception of some dust emission and nuisance caused by heavy truck movements from access roads during the construction periods, the Project will not cause significant impacts on the existing air quality. For the dusts arising from access roads proper dust abatement measures (periodic spraying of water and traffic speed limit) will be taken by contractors.

11.4. Soil Quality Management

Vehicles and machineries used oils, etc., are considered as the major soil contaminants. They can leach to the ground and contaminate the soil easily.

Therefore, such waste materials should be handled properly until they are taken to their proper disposal areas.

11.5. Water Resource Management

Streams and creeks can be affected by chemicals, used oil spills and untreated discharges during construction period. Used oils and chemicals specially can penetrate to the ground and affect ground water resources. Liquid wastes will be pretreated before discharging to streams. Chemicals should be properly stored and utilized.

11.6. Noise Abatement

Noise pollution is most related with the noisy operations like, heavy truck movements, use of machinery, drilling machine and heavy equipment. The schedule of construction works should be adjusted so as not to disturb the sleep of the persons living near. The noise levels would be monitored on site and in the surrounding communities regularly. The equipment and machinery should be maintained in good state.

11.7. Health and Safety

The contractor throughout the construction period will be required to use appropriate vehicles and comply with legal gross vehicle and axle load limits. They are also required to respect the standard driving speed limit. The contractor should minimize road safety hazards and inconvenience to other road users by taking all appropriate measures during the construction periods. During operational phase safety orientation in schools and other Project areas will further minimize impacts on the local communities. Only trained and certified workers will install, or decommission electrical equipment.

11.8. Application of Environment, Health and Safety (EHS) Guidelines

The Environment, Health and Safety (EHS) Guidelines of April 2007, which are part of OP/BP 4.01, shall be applied for (i) general EHS, which includes occupational health; (ii) Geothermal Resource Appraisal; and (iii) Electrical Power Distribution. The EHS Guidelines can be easily found on www.ifc.org. These guideline requirements have to be integrated in the EMPs.

The EHS Guidelines are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP). When one of more members of the World Bank Group are involved in a project, these EHS Guidelines are applied as required by their respective policies and standards. The General EHS Guidelines are designed to be used together with the relevant Industry Sector EHS Guidelines which provide guidance to users on EHS issues in specific industry sectors. A complete list of industry sector guidelines can be found at: www.ifc.org/ifcext/enviro.nsf/Content/EnvironmentalGuidelines.

12. ROLES AND RESPONSIBILITIES OF MAJOR ACTORS

12.1.Major Actors

The principal actors involved in the management and monitoring of environment and social concerns related to the implementation of the Project are the following:

- Ethiopian Electric Power; project management unit,
- the Environment, Health Safety and Quality (EHS&Q),
- Environment and Social office
- the Contractor, and
- the Supervision Engineer (SE)

However, it is recognized and obvious that the following components of other stakeholders may play an affirmative role in the process of the Project implementation:

- the Community,
- the Ministry of Water, Irrigation and Electricity (MoWI&E),
- Authority for Research and Conservation of Cultural Heritage (ARCCH)
- Other relevant sector ministries
- Project affected communities
- local NGOs (as required)

The major roles and responsibilities of each of the actors are presented in the following sections.

12.2.Ethiopian Electric Power (EEP)

Ethiopian Electric Power; project management unit, is the owner of the project that undertakes the overall contractual follow-up to ensure the successful implementation of the Project. The core responsibility of the Project is that it makes sure that compensations are effected; that is, compensations are made at replacement costs and as per the provision in Proclamation No. 455/2005. The Project establishes an exclusive team to implement compensation.

12.3.The Environment and Social office of EEP

The Environment and Social office of EEP comprises environmentalists and Resettlement and Social Officers. The role and responsibility of the environmental and resettlement/social experts of EEP mainly focuses on regular monitoring of the Project operations; that is, to ensure that proposed mitigation measures have been implemented.

12.4.The Contractors

The Contractors of the Project are responsible to undertake the construction works as per the design and the ESMP. In simple projects environmental and social clauses will be part of the bidding documents and part of the contracts of the contractors. In complex projects the contractors will need to prepare their own Environmental and Social Management Plan (ESMP). The Contractors are responsible for the implementation of their ESMP and need to appoint qualified environmental and/ or social specialists. After preparing the ESMPs it needs to be approved by the Supervision Engineers and submitted to Bank of clearance and public disclosure before staring physical activities.

12.5.The Supervision Engineer (SE)

The SE is responsible for the day-to-day monitoring of the Program implementation. By contractual arrangement, the Supervision Engineers will be responsible for adequate implementation of the environmental and social clauses of the ESMP. The SE approves or rejects, as the case may be, the proposals and undertakings of the contractor in relation to the requirements of the contract documents.

12.6.The Community

The Community has the right to be consulted to ensure the overall project acceptability without which the Project would not be sustainable. In general, the community should be involved at different stages of the Project implementation up to decision-making level.

12.7.Authority for Research and Conservation of Cultural Heritage (ARCCH)

The Authority will be informed whenever there are significant cultural heritage sites in the project areas for further investigation.

12.8.Ministry of Water, Irrigation and Electricity (MoWI&E),

Ministry of Water, Irrigation and Electricity is the regulatory body delegated to review the ESIA document, give approval and monitor the performance of development projects.

12.9.Local NGOs

In project areas where there exists NGOs involved in energy-related interventions, the EEP may approach the NGOs for their possible contributions especially for the sustainability of the Project. NGOs are important specifically during the operation phase of the Project.

13. IMPLEMENTATION OF COMPENSATION

As stipulated in the Ethiopian legal framework and the WB Safeguard Policies, development projects should not impoverish the people within the project areas. Rather, the PAPs should gain from the project and one aspect of their achievement is that adequate compensation should be effected prior to project implementation.

On this basis, therefore, the Energy Access Project should assign a team, for the Project life, responsible for the effective and efficient implementation of the compensation estimated as per the valuation methods/techniques.

14. ENVIRONMENT AND SOCIAL MONITORING

Environmental and Social monitoring is an essential component of project implementation. It helps to ensure that the implementation of the proposed mitigation measures and helps to anticipate possible environmental hazards and or detect unpredicted impacts over time. Construction contracts will include environmental monitoring and management procedure and plan and this must be prior to the commencement of any construction activities.

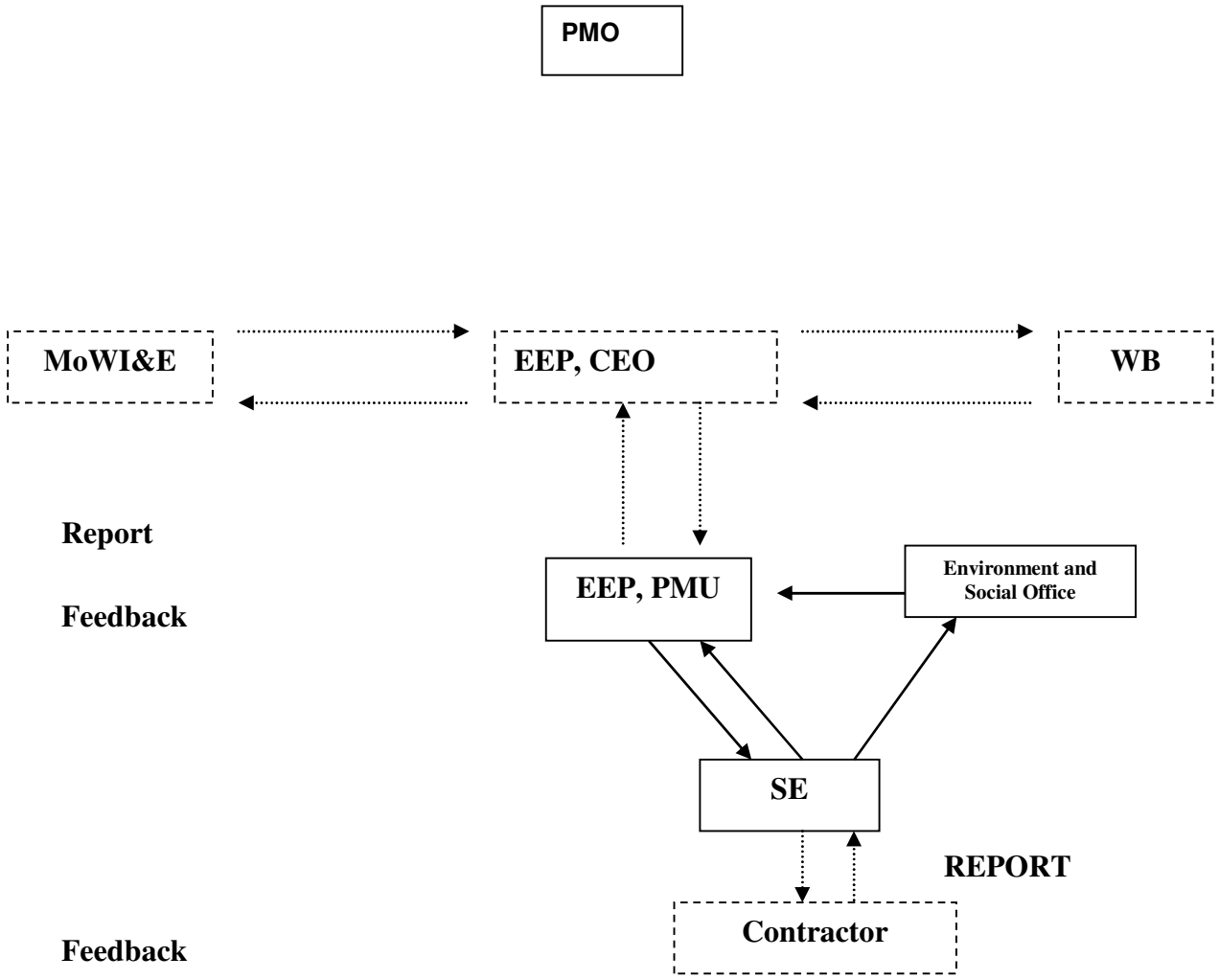
The Environmental and Social Office of EEP should perform environmental and social monitoring during all stages of the project, especially during the construction stage of the Project, mainly focusing on the following issues to be monitored:

- removal of vegetation,
- noise levels,
- soil erosion,
- water quality,
- accidents/health, spills
- Waste storage and disposal
- rehabilitation of work site,
- preservation of cultural/religious heritage, and
- effective implementation of compensation
- Grievances or complaints from the community

15. REPORTING PROCEDURE

During the implementation of the Project, reports mainly originate from the SEs who is after the day-to-day progress of the works. The SE's submits reports to the Additional Finance Energy Access Project (EAP) and the Environment and Social Office for their follow-up and review and comment on the reports. EEP will submit copies of reports to the Ministry of Water, Irrigation and Electricity) for the prompt action of the latter. EEP will submit copies of reports to the donor-WB. The feedback of reports from Additional Finance Energy Access Project and EHS & Q should be provided to the SE's within the time stipulated in the contract document.

Figure 2: summarizes the reporting procedure/flow within EEP as well as between EEP and other pertinent stakeholders.



16. ESTIMATED ENVIRONMENTAL AND SOCIAL/RESETTLEMENT MITIGATION COSTS

The cost estimate for compensation is based on the cost estimate of Additional Financing for Energy Access Project RPF, ESMF, and February 2010. The total estimated environmental cost for ESMF, AF for Energy Access Project of 2010 was **USD 1,212,072.00 (Birr 16,470,606.71)**

Therefore, updating that cost with an inflation rate of 8%, (August 2015 country level inflation rate FDRE Central Statistical Agency issued in September 2015) the total estimated cost for meeting the estimated compensation and for environment and social monitoring is about **USD 1,309,037.00 (Birr 17,788,254.71)**

The estimated cost for environment and social monitoring, is about **USD 23,072.20 (Birr 313,523.51)** and this is assumed to enable the Environmental and Social experts of EEP to conduct periodic monitoring works on project sites.

- ***1 USD = Birr 21(DEC, 2015 Exchange Rate, CBE)***
- ***November 2015 Nonfood inflation Rate 8% (Central Statistical Agency)***

17. SUBMISSION / CLEARANCE OF ESMF

The ESMF document will be submitted to the Ministry of Water, irrigation and Energy for their comments and approval. The disclosure of ESMF will be released on EEP's website and in the World Bank's InfoShop and announced on the Ethiopian newsletters to the public.

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ANNEX 1: Environmental and Social Clauses for the Additional Financing for Energy Access Project

1. General

a) The Contractor shall comply with any specific Environmental and Social Management Plan (ESMP) for the works he is responsible for. The Contractor shall inform himself about such an ESMP, and prepare his work strategy and plan to fully take into account relevant provisions of that ESMP.

b) The Contractor shall prepare method statements indicating the period within which he/she shall maintain status on site after completion of civil works to ensure that significant adverse impacts arising from such works have been appropriately addressed.

c) The Contractor shall adhere to the proposed activity implementation schedule and the monitoring plan / strategy to ensure effective feedback of monitoring information to project management so that impact management can be implemented properly, and if necessary, adapt to changing and unforeseen conditions.

d) Besides the regular inspection of the sites by the Supervising Engineer (SE) for adherence to the contract conditions and specifications, the Owner may appoint an Inspector to oversee the compliance with these environmental conditions and any proposed mitigation measures. The Ministry of Environment and Forests, regional environmental authorities or other relevant stake holders may carry out similar inspection duties. In all cases, as directed by the SE, the Contractor shall comply with directives from such inspectors to implement measures required to ensure the adequacy of rehabilitation measures carried out on the bio-physical environment and compensation for socio-economic disruption resulting from implementation of all works.

e) The Contractor shall implement all measures necessary to avoid undesirable adverse environmental and social impacts wherever possible, restore work sites to acceptable standards, and abide by any environmental performance requirements specified in an ESMP.

f) If the Contractor fails to implement the approved ESMP after written instruction by the Supervising Engineer (SE) to fulfill his obligation within the requested time, the Owner reserves the right to arrange through the SE for execution of the missing action by a third party on account of the Contractor.

2. Dust abatement

a) The contractor shall minimize the effect of dust on the surrounding environment resulting from earth moving 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 in the vicinity dust producing activities.

b) During the performance of the work and any operations appurtenants thereto, the contractor shall carry out proper and efficient measures, such as sprinkling with water or other means, whenever necessary to reduce the dust nuisance, and to prevent dust which has originated from his operations from damaging crops, cultivated fields, and dwellings or causing a nuisance to persons. The contractor will be held liable for any damage resulting from dust originating from his operations.

3. Noise due to construction activities

The contractor shall ensure the noise levels emanating from machinery, vehicles and noisy construction activities (e.g. excavation, blasting) are kept at a minimum for the safety, health and protection of workers within the vicinity of high noise levels and nearby communities.

The national noise limit standard for the residential area in day time is 55 dB while at night is 45dB.

4. River, Stream and Creek obstruction

a) The contractor shall ensure the existing water flow regimes in rivers, streams and other natural or irrigation channels are maintained and/or re-established where they are disrupted due to works being carried out.
b) The contractor shall take all possible steps to prevent pollution of streams, rivers and other natural water bodies / reservoirs.
c) Bitumen, oils, lubricants and waste water used or produced during the execution of works will not be released directly into rivers, streams, irrigation channels and other natural water bodies/reservoirs without prior treatments and also ensure that stagnant water in uncovered borrow pits is treated in the best way to avoid creating possible breeding grounds for mosquitoes.

5. Quarrying, earth burrowing, etc.

a) Prevent and minimize 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.

b) At the end of the construction phase, all construction sites shall be landscaped and rehabilitated to acceptable standards. The stated areas shall be first landscaped, dressed with topsoil and covered with tree planting, field sods or grass seeding.

6. Protection of archeological and historical sites

a) Upon discovery of ancient heritage, relics or anything that might or believed to be of archeological or historical importance during the execution of works, immediately suspend and report such findings to the SE so that the appropriate authorities may be expeditiously contacted for fulfillment of the measures aimed at protecting such historical or archaeological resources.

b) The contractor shall take the necessary measures for preventing that any person or equipment may damage the article or things and shall provide barricades, fences, and signals and, if necessary, protect against atmospheric agents, as directed by the engineer. Also guard service may be required by the engineer.

c) The supervising engineer shall take the following measures:

- Notify the relevant department of antiquities
- Request for representative to make site inspection
- Secession of work in the vicinity of the find until the visit of representative; and
- Decision by the department of antiquities on possible salvage or excavation within 48-72-hours of notification

7. Vegetation and wildlife

a) Discourage 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.

b) The contractor shall care, in planning, constructing, maintaining and operating temporary works such as camps, roads, spoil, stockpile and construction facilities areas, to avoid unnecessary damage to areas of particular environmental interest, such as patches of remaining forest, valuable trees and erosion sensitive areas, as well as areas in which the presence of wildlife has been noted.

c) In case some part of forest or single trees has to be removed, or where erosion problems that may affect some portion of the permanent or temporary works are expected, and in any case where in the engineer's opinion it is beneficial for the land conservation, landscaping, seeding and planting of trees, as well as executing drainages and water control works may be required to the contractor, who shall carry out the work according to the prescriptions contained in the pertinent sections of these specifications.

d) No valuable trees or crops shall be damaged or removed by the contractor during the execution of the works without the prior consent of the engineer.

e) Hunting in the proximity of camps and facilities and in general in the project area is strictly prohibited, even if allowed by local rules or regulation in force in Ethiopia and or in the project region.

8. Use of material

The contractor, in as much as possible, shall use local materials to avoid importation of foreign material and long distance transportation.

9. Worksite/Camp site Waste Management

a) All vessels (drums, containers, bags, etc.) containing oil/fuel/surfacing materials and other hazardous chemicals shall be banded in order to contain spillage. Used oil and hydraulic fluid generated on the construction sites must be collected in a closed container and stored temporarily in a safe place and sent to an authorized recycling depot.

b) All drainage and effluent from storage areas, workshops and camp sites shall be captured and treated before being discharged into the drainage system in line with applicable government water pollution control regulations.

c) The contractor shall take all possible steps to prevent pollution of streams, rivers, and other water supplies, at or in the vicinity of the site and shall comply with applicable laws, orders and regulations in force in the country of the works concerning the control and abatement of water pollution.

d) Entry of runoff to the site shall be restricted by constructing diversion channels or holding structures such as banks, drains, dams, etc. to reduce the potential of soil erosion and water pollution.

e) Construction waste shall not be left in stockpiles along the road, but removed and reused or disposed of on a daily basis.

f) If disposal sites for clean spoil are necessary, they shall be located in areas, approved by the SE, for landfill and where they will not result in material being easily washed into drainage channels. Whenever possible, spoil materials should be placed in low-lying areas and should be compacted and dressed with top soil and then planted with species indigenous to the locality.

g) The contractor shall provide all sanitary facilities (e.g. garbage collection and disposal, drinking water facilities, etc.) are provided in construction workers camps.

10. Material Excavation and Deposit

a) The Contractor shall obtain appropriate licenses/permits from relevant authorities to operate quarries or borrow areas.

b) The location of quarries and borrow areas shall be subject to approval by relevant local and national authorities, including traditional authorities if the land on which the quarry or borrow areas fall in traditional land.

c) New extraction sites:

- Shall not be located in the vicinity of settlement areas, cultural and historical sites, wetlands or any other valued ecosystem component, or on high or steep ground or in areas of high scenic value.
- Shall not be located in archaeological areas. Excavations in the vicinity of such areas shall proceed with great care and shall be done in the presence of government authorities having a mandate for their protection.
- Shall not be located in forest reserves. However, where there are no other alternatives, permission shall be obtained from the appropriate authorities and an environmental impact study shall be conducted.

- Shall be easily rehabilitated. Areas with minimal vegetation cover such as flat and bare ground, or areas covered with grass only or covered with shrubs less than 1.5m in height, are preferred.

- Shall have clearly demarcated and marked boundaries to minimize vegetation clearing and to avoid any unnecessary damage on other resources.

d) Vegetation clearing shall be restricted to the area required for safe operation of construction work. Vegetation clearing shall not be done more than two months in advance of operations.

e) Stockpile areas shall be located in areas where trees can act as buffers to prevent dust pollution. Perimeter drains shall be built around stockpile areas. Sediment and other pollutant traps shall be located at drainage exits.

f) The Contractor shall deposit any excess material in accordance with the principles of these general conditions, and any applicable EMP, in areas approved by local authorities and/or the SE.

g) Areas for depositing hazardous materials such as contaminated liquid and solid materials shall be approved by the SE and appropriate local and/or national authorities before the commencement of work. Use of existing, approved sites shall be preferred over the establishment of new sites.

11. Rehabilitation and Soil Erosion Prevention

a) To the extent practicable, the Contractor shall rehabilitate the site progressively so that the rate of rehabilitation is similar to the rate of construction.

b) Always remove and retain topsoil for subsequent rehabilitation. Soils shall not be stripped when they are wet as this can lead to soil compaction and loss of structure.

c) Topsoil shall not be stored in large heaps. Low mounds of no more than 1 to 2m high are recommended.

d) Revegetate the stockpiles with recommended grass species to protect the soil from erosion, discourage weeds and maintain an active population of beneficial soil microbes.

e) Locate stockpiles where they will not be disturbed by future construction activities.

f) The contractor shall reinstate natural drainage patterns where they have been altered or impaired.

g) The contractor shall collect toxic materials from construction areas and keep protect in designated sites until proper disposal. Backfill excavated areas with soils or overburden that is free of foreign material that could pollute groundwater and soil.

h) Identify potentially toxic overburden and screen with suitable material to prevent mobilization of toxins.

i) Ensure reshaped land is formed so as to be inherently stable, adequately drained and suitable for the desired long-term land use, and allow natural regeneration of vegetation.

j) Minimize the long-term visual impact by creating landforms that are compatible with the adjacent landscape.

k) Minimize erosion by wind and water both during and after the process of reinstatement.

l) Compacted surfaces shall be deep ripped to relieve compaction unless subsurface conditions dictate otherwise.

m) Re-vegetate with plant species that will control erosion, provide vegetative diversity and, through succession, contribute to a resilient ecosystem. The choice of plant species for rehabilitation shall be done in consultation with local research institutions, forest department and the local people.

12. Water Resources Management

a) The Contractor shall at all costs avoid conflicting with water demands of local communities.

b) Abstraction of both surface and underground water shall only be done with the consultation of the local community and after obtaining a permit from the relevant Water Authority.

c) Abstraction of water from wetlands shall be avoided. Where necessary, permission has to be obtained from relevant authorities.

d) No construction water containing spoils or site effluent, especially cement and oil, shall be allowed to flow into natural water drainage courses.

e) Wash water from washing out of equipment shall not be discharged into water courses without pre-treated.

f) Site spoils and temporary stockpiles shall be located away from the drainage system, and surface runoff shall be directed away from stockpiles to prevent erosion.

13. Traffic Management

a) Location of access roads shall be done in consultation with the local community especially in important or sensitive environments. Access roads shall not traverse wetland areas.

b) Upon the completion of civil works, all access roads shall be ripped and rehabilitated.

c) Access roads shall be watered regularly to suppress dust emission.

14. Disposal of Unusable Elements

a) Unusable materials and construction elements such as electro-mechanical equipment, pipes, accessories and demolished structures will be disposed of in a manner approved by the SE. The Contractor has to agree with the SE which elements are to be surrendered to the Client's premises, which will be recycled or reused, and which will be disposed of at approved landfill sites.

b) Unsuitable and demolished elements shall be dismantled to a size fitting on ordinary trucks for transport.

15. Repair of Private Property

a) Should the Contractor, deliberately or accidentally, damage private property, he shall repair the property to the owner's satisfaction and at his own cost. For each repair, the Contractor shall obtain from the owner a certificate that the damage has been made good satisfactorily in order to indemnify the Client from subsequent claims.

b) In cases where compensation for inconveniences, damage of crops etc. are claimed by the owner, the Client has to be informed by the Contractor through the SE. This compensation is in general settled under the responsibility of the Client before signing the Contract. In unforeseeable cases, the respective administrative entities of the Client will take care of compensation.

16. Contractor's Environment, Health and Safety Management Plan (EHS-MP)

Within 6 weeks of signing the Contract, the Contractor shall prepare an EHS-MP to ensure the adequate management of the health, safety, environmental and social aspects of the works, including implementation of the requirements of these general conditions and any specific requirements of an ESMP for the works.

The Contractor's EHS-MP will serve two main purposes:-

a) For the Contractor, for internal purposes, to ensure that all measures are in place for adequate EHS management, and as an operational manual for his staff, and,

b) For the Client, supported where necessary by SE, to ensure that the Contractor is fully prepared for the adequate management of the EHS aspects of the project, and as a basis for monitoring of the Contractor's EHS performance.

The Contractor's EHS-MP shall provide at least:-

- a description of procedures and methods for complying with these general environmental management conditions, and any specific conditions specified in an ESMP;
- a description of specific mitigation measures that will be implemented in order to minimize adverse impacts;
- a description of all planned monitoring activities (e.g. sediment discharges from borrow areas) and the reporting thereof; and
- The internal organizational, management and reporting mechanisms put in place for such.

The Contractor's EHS-MP will be reviewed and approved by the Client before start of the works. This review should demonstrate if the Contractor's EHS-MP covers all of the identified impacts, and has defined appropriate measures to counteract any potential impacts.

16.1. Health and Safety

a) In advance of the construction work, the Contractor shall mount an awareness and hygiene campaign. Workers and local residents shall be sensitized on health risks particularly of HIV/AIDS.

b) Adequate road signs to warn pedestrians and motorists of construction activities, diversions, etc. shall be provided at appropriate points.

c) Construction vehicles shall not exceed maximum speed limit of 40km per hour.

d) Contractor will assess the hazards of all jobs and ensure that workers have adequate training and protective equipment to carry out their assigned work.

16.2. Traffic safety

a) Ensure public safety, and meet traffic safety requirements for the operation of work to avoid accidents.

b) The contractor shall be responsible for the safety along the roads related to the site, and he shall take all necessary precautions for the protection of the work and the safety of the public on the roads affected by his activities.

c) Roads subject to interference by the work shall be kept open or suitable detours shall be provided and maintained by the contractor, who shall provide, erect, and maintain all necessary barricades, suitable and sufficient flashlights, flagmen, danger signals, and signs.

d) The contractor shall submit his weekly activities schedule and the locations of his work along the existing public roads to the authorities concerned, and obtain all necessary approvals prior to commencement of the respective work.

e) At the road crossings or in heavy traffic locations, the contractor shall carry out the work within the working hours as directed by the engineer, and after the completion of the work he shall immediately make the necessary backfill and pavement at the crossings.

f) The contractor shall provide temporary passes and bridges to give an access to the existing villages, houses, etc., to the satisfaction of the engineer and the authorities concerned whenever he disturbs such existing way during the execution of the works.

17. Reporting

The Contractor shall prepare monthly progress reports to the SE on compliance with these general conditions, the project ESMP if any, and his own EHS-MP. It is expected that the Contractor's reports will include information on:-

- EHS management actions/measures taken, including approvals sought from local or national authorities;
- Problems encountered in relation to EHS aspects (incidents, including delays, cost consequences, etc., as a result thereof);
- Lack of compliance with contract requirements on the part of the Contractor;
- Changes of assumptions, conditions, measures, designs and actual works in relation to EHS aspects; and
- Observations, concerns raised and/or decisions taken with regard to EHS management during site meetings.

It is advisable that reporting of significant EHS incidents be done "as soon as practicable". Such incident reporting shall therefore be done individually. Also, it is advisable that the Contractor keeps his own records on health, safety and welfare of persons, and damage to property. It is advisable to include such records, as well as copies of incident reports, as appendixes to the bi-weekly reports. Example formats for an incident notification and detailed report are given below. Details of EHS performance will be reported to the Client through the SE's reports to the Client.

18. Training of Contractor's Personnel

The Contractor shall provide sufficient training to his own personnel to ensure that they are all aware of the relevant aspects of these general conditions, any project ESMP, and his own EHS-MP, and are able to fulfill their expected roles and functions. Specific training should

be provided to those employees that have particular responsibilities associated with the implementation of the EHS-MP. General topics should be:-

- EHS in general (working procedures);
- Emergency procedures; and
- Social and cultural aspects (awareness creation)

Only qualified or trained employees should work with live power lines. The contractor shall ensure that such workers should be able to achieve the following:

- Distinguish live parts from other parts of the electrical system
- Determine the voltage of live parts
- Understand the minimum approach distances outlined
- for specific live line voltages
- Ensure proper use of special safety equipment and
- procedures when working near or on exposed energized parts of an electrical system

19. Cost of Compliance

It is expected that compliance with these conditions is already part of standard good workmanship and state of art as generally required under this Contract. The item "Compliance with Environmental Management Conditions" in the Bill of Quantities covers these costs. No other payments will be made to the Contractor for compliance with any request to avoid and/or mitigate an avoidable EHS impact.

ANNEX 2: Ethiopia's Environmental Policy of 1997

The policy was issued (through the approval by the Council of Ministers) in 1997 mainly based on the environmental concerns stipulated in the Constitution. The Policy has based itself on several guiding principles in order to ensure the consistency and sustainability of the subsequent policies and strategies for the formulation and implementation of programs.

The key guiding principles of the Policy are:

a) Every person has the right to live in healthy environment;

b) Sustainable environmental conditions and economic production systems are impossible in the absence of peace and personal security. This shall be assured through the acquisition of power by communities to make their own decisions - on matters that affect their life and environment,

c) The development, use and management of renewable resources shall be based on sustainability,:

d) The use of non - renewable resources shall be minimized and where possible their availability extended (e.g. through recycling);

e) Appropriate and affordable technologies which use renewable and non- renewable resources efficiently shall be adopted, adapted, developed and disseminated;

f) When a compromise between short - term economic growth and long- term environmental, protection is necessary, then development activities shall minimize degrading and polluting impacts on ecological and life support systems. When working out a compromise, it is better to err on the side of caution to the extent possible as rehabilitating a degraded environment is very expensive and bringing back a species that has gone extinct is impossible;:

g) Full environmental and social costs (or benefits foregone or lost) that may result through damage to resources or the environment as a result of degradation or pollution

shall be incorporated into public and private sector, planning and accounting, and decisions shall be based on minimizing and covering these costs;

h) Market failures with regard to the pricing of natural human - made and cultural resources, and failures in regulatory measures shall be corrected through the assessment and establishment of user fees, taxes, tax reductions or incentives;

i) Conditions shall be created that will support community and individual resource users to sustainable manage their own environment and resources;

j) As key actors in natural resource use and management, women shall be treated equally with men and empowered to be totally involved in policy, program and project design, decision making and implement – policy;

k) The existence of a system which ensures uninterrupted continuing access to the same piece (s) of land and resource creates conducive conditions for sustainable natural resource management;

l) Social equity shall be assured particularly in resource use;

m) Regular and accurate assessment and monitoring of environmental conditions shall be undertaken and the information widely disseminated within the population;

n) Increased awareness and understanding of environmental and resource issues shall be promoted by policy makers, by government officials and by the population, and the adoption of a "conservation culture" in environmental matters among all levels of society shall be encouraged;

o) Local, regional and international environmental interdependence shall be recognized;

p) Natural resource and environmental management activities shall be integrated laterally across all sectors and vertically among all levels of organization;

q) Species and their variants have the right to continue existing, and are, or may be, useful now and / or for generations to come;

r) The wealth of crop and domestic animal as well as micro-organism and wild plant and animal germplasm is an invaluable and inalienable asset that shall be cared for; and

s) The integrated implementation of cross - sectoral and sectoral federal, regional and local policies and strategies shall be seen as a prerequisite to achieving the objectives of this policy on Natural Resources and the Environment

Specifically, regarding the energy sector of the country, the Document stipulated the following policies.

a. To adopt an inter-sectoral process of planning and development which integrates energy development with energy conservation, environmental protection and sustainable utilization of renewable resources;:

b. To promote the development of renewable energy sources and reduce the use of fossil energy resources both for ensuring sustainability and for protecting the environment, as well as for their continuation into the future;:

c. To make institutions and industries which consume large amounts of wood fuel establish their own plantations or make contractual arrangements with plantations to meet their wood requirements;

d. To encourage government leases for private entrepreneurs to plant fuel woodlots in peri-urban areas;

e. To ensure that feasibility studies for hydroelectricity facilities and other significant generating facilities include rigorous environmental impact assessment to allow informed decision - making that maximizes benefits to the community and to the country at large and eliminates or at least minimizes damage to the natural resources base and / or to environmental well – being;:

f. To review current institutional, pricing and regulatory arrangements in the energy sector to suggest reforms that will better meet com-unity energy needs and maximize the opportunities for private commercial and community sector initiatives to develop and market environmentally sound energy sources;

g. To recognize that water resources play an important role to meet Ethiopia's energy demand and that, by generating power causes no pollution on the environment;

h. To focus extension programs on farm and homestead tree planting to ensure that each homestead grows enough trees to satisfy its wood requirements; and

i. To locate, develop, adopt or adapt energy sources and technologies to replace biomass fuels.