

E2692

MALAWI

ENERGY SECTOR SUPPORT PROJECT

**DRAFT ENVIRONMENTAL & SOCIAL MANAGEMENT
FRAMEWORK (ESMF)**

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LIST OF ABBREVIATIONS

BP	World Bank Business Procedure
°C	Degrees centigrade
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
COD	Chemical Oxygen Demand
dB	Decibel
DO	Dissolved Oxygen
E. Coli	Escherichia coli
EPA	Environment Protection Agency
ESCOM	Electricity Supply Corporation of Malawi
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental & Social Management Framework
EU	European Union
ESMP	Environmental & Social Management Plan
°F	Degrees Fahrenheit
GOM	Government of Malawi
HC	Hydrocarbon
Ha	Hectares
Km	Kilometer
kV	Kilovolt
LV	Low Voltage
m	Meter
mm	Millimeter
MERA	Malawi Energy Regulatory Authority
MNREE	Ministry of Natural Resources Energy & Environment
MV	Medium Voltage
NAAQS	National Ambient Air Quality Standards
MCC	Millennium Challenge Corporation
NEP	National Energy Policy
OP	World Bank Operational Policy
OPIC	Overseas Private Investment Corporation
OSHA	Occupation Safety and Health Administration
PAP(s)	Project Affected Person(s)
PCBs	Polychlorinated biphenyls
PM	Particulate Matter
PPE	Personal Protective Equipment
POP	Persistent Organic Pollutants
PRS	Poverty Reduction Strategy
RPF	Resettlement Policy Framework
SO ₂	Sulphur Dioxide
SS	Suspended Solids
STW	Specialized Training Workshops
SW	Solid Waste
TDS	Total Dissolve Solids
TSP	Total Suspended Particles
TN	Total Nitrogen
TSS	Total Suspended Solids
UNDP	United Nations Development Programme
UNEP	United Nations Environmental Programme
WB	World Bank

SECTION A: INTRODUCTION

1. Executive Summary

[To be inserted once document is finalised]

2. Introduction

1. Overview

This draft Environmental and Social Management Framework (ESMF) document has been prepared to describe the principles and procedures to be followed in addressing the relevant safeguards policies that will be triggered by the proposed Malawi Energy Sector Support Project, which is to be financed by the World Bank using IDA funding. The Project involves many proposed individual activities that are not fully defined in terms of location and impact area. For this reason, it is not possible at this stage of project preparation to prepare a full Environmental and Social Impact Assessment (ESIA). However, a preliminary ESIA document has been prepared to the extent possible and accompanies this draft ESMF. In addition, this draft ESMF provides a framework to manage all eventualities, as well as a detailed screening methodology and form, and a section listing possible negative impacts and proposed mitigation measures. An ESMP template is provided in the Annexes.

This draft ESMF has been prepared in parallel with the proposed project's draft Resettlement Policy Framework (RPF) and should be read in conjunction with that document. Some aspects of the documents are common, including (i) the project description and (ii) the proposed screening methodology.

Much of the material in this draft ESMF builds on the documentation drawn up by the ICF/CORE consultancy team that prepared the full feasibility study and comprehensive environmental and social documentation for the MCC Compact for Malawi.

This is a draft document that will be updated as further work is undertaken during project preparation.

2. Project Description

The project described in this document is the proposed Malawi Energy Sector Support project. The objective of the proposed project is to increase the reliability and quality of electricity supply in the major load centres in Malawi. The results anticipated by the project include:

- Reduction in electricity losses per year in the project areas
- Reduction in average interruption frequency per year in the project areas
- Reduction in peak demand of existing MV customers

The project seeks to deliver these results via four components:

- **Component 1.** The rehabilitation, upgrade and expansion of the existing transmission (maximum voltage of 33kV) and distribution network, focusing on priority sites where the most urgent works are required. The proposed investments will help address the extensive weaknesses in the grid. Physical investments will be made, including new substations (most at 66kV or below) and new distribution lines.
- **Component 2.** Feasibility studies for several potential hydropower sites over a range of capacities and geographical locations. These studies are prerequisites for expansion of Malawi's installed generation capacity as well as for diversification of generation sources. This component is limited to studies only and no physical investments will be made. Preliminary environmental and social assessment aspects will be included in the studies.

- **Component 3.** This component will invest in demand side management (DSM) and energy efficiency measures with an aim to narrow the supply-demand gap at relatively low cost in a relatively short timeframe. Activities will include (i) installing insulation blankets in existing and new water heaters, (ii) free replacement of water heating filaments larger than 2.5kW , (iii) a program combining the installation of Solar Water Heaters and remote control (via small radio receivers) to automatically switch off heaters, and (iv) a pilot program to introduce smart meters in households.
- **Component 4.** This component will provide institutional strengthening, capacity building and technical assistance to both MNREE and ESCOM to support their efforts to further develop Malawi's energy sector. This component is limited to studies only and no physical investments will be made.

Of these four components, only Components 1 and 2 are considered in this ESMF. Component 4 does not include any physical investments. Component 3 includes investments in demand-side management and energy efficiency technologies, but these investments present no environmental issues and will be installed in existing buildings. Accordingly, Components 1 and 2 are described below in more detail:

Component 1: Electricity Network Strengthening & Expansion. This component includes the rehabilitation, upgrade and expansion of priority parts of the existing distribution and transmission system, including extension of the network in selected peri-urban areas. This component will draw upon the feasibility studies prepared for the MCC Compact. The component will be divided into two sub-components:

- **Component 1a: Distribution & Transmission Upgrading and Expansion:** Activities in this sub-component include: (i) construction of new substations, (ii) upgrading of existing substations, (iii) construction of new distribution lines, (iv) rehabilitation of existing distribution lines, (v) rehabilitation of Underground Distribution Cables, and (vi) peri-urban low-voltage network expansion. The focus of the investments is on ESCOM's distribution system rather than the higher voltage parts of the system. Specifically, the substation investments are predominantly 'interface' substations between the 66 kV transmission system and the distribution system (i.e. with 11kV or 33kV as the secondary voltages).¹ The one exception is the upgrading of an existing 132/66/33kV transformer, situated at Golomoti, and one new 'greenfield' 132/33kV substation at Dwangwa. These are described further below. Similarly, all the lines to be either built or rehabilitated are sub-transmission lines at either 33kV or 11kV. The project will not construct or rehabilitate electricity lines at voltages greater than 33kV.

- **Component 1b: Low Voltage Reticulation Reinforcement and Technical Implementation Support.** Activities in this sub-component include: (i) 'technical loss audits' to determine key sources of losses in the low-voltage system, (ii) reconfiguration and extension of medium voltage overhead lines (11kV and below) supplying 'consumer substations'/distribution transformers (such as pole-mounted MV/LV step-down transformers), (iii) installation of approximately 200 new such 'consumer substations', and (iv) construction of new three phase low voltage overhead lines and conversion of single phase to three phase low voltage overhead line. These low voltage reticulation reinforcement activities will undertaken at multiple sites in the main cities (Lilongwe, Blantyre, Mzuzu and Zomba), primarily in those areas that have the oldest network or have experienced the greatest load growth. The precise locations will be determined during project implementation following detailed survey work.

¹ With the exception of one 132/66/33kV transformer, situated at Golomoti, and one new 'greenfield' 132/33kV substation at Dwangwa.

Component 2: Hydroelectric Power Generation Feasibility Studies. This component includes financing for full feasibility studies at several sites in Malawi. However, there will be no physical investments. The feasibility studies will include two sites with potential capacity of over 100MW on the major rivers in Malawi, namely Lower Fufu on the North Rukuru river and Mpatamanga on the Shire river, as well as one smaller site situated at Chingonda on the Dwambazi River.

- The **Lower Fufu** site study will include the full technical, environmental, social, and economic aspects. The technical aspects will be carried out to the level of full project design. The full Environmental and Social Impact Assessment (ESIA), with associated mitigation/management plans, will be carried out in parallel with, but independent of the technical study (i.e. two separate contracts). The two studies will be closely coordinated. The goal is to complete this feasibility study and the full environmental/ social assessment to the point of readiness for financing.
- The **Mpatamanga** and **Chingonda** sites will be included in the project for a technical, economic and preliminary environmental & social assessment. The technical aspects will be carried out to the level of preliminary project design. The ESIA will be carried out at the preliminary level, rather than the full impact assessment. The studies will be carried out under one contract, and will not include full project design.

In addition, this component will finance a pre-feasibility study for a new 'inland' transmission line that would run north-west from Lilongwe via Kasungu to Mzuzu (approximately 350km), including the associated environmental and social impact studies.

3. Relevant Standards

World Bank Safeguard Policies Possibly Triggered

This section discusses the safeguard policies of the World Bank and their applicability. The World Bank's environmental and social safeguard policies are fundamental to its support to sustainable poverty reduction. These policies provide guidelines in the identification, preparation and implementation of programs and projects funded by or supported by the Bank.

The safeguard policies provide the opportunity for building ownership among local populations for programs and projects that are being implemented; they have often set the platform for the participation of stakeholders in project design. The full set of World Bank's Safeguard policies include:

3. Environmental Assessment (OP4.01, BP 4.01, GP 4.01)
4. Natural Habitats (OP 4.04, BP 4.04, GP 4.04)
5. Forestry (OP 4.36, GP 4.36)
6. Pest Management (OP 4.09)
7. Physical Cultural Resources (OP 4.11)
8. Indigenous Peoples (OP 4.10)
9. Involuntary Resettlement (OP/BP 4.12)
10. Safety of Dams (OP 4.37, BP 4.37)
11. Projects on International Waters (OP 7.50, BP 7.50, GP 7.50)
12. Projects in Disputed Areas (OP 7.60, BP 7.60, GP 7.60)

As described above, the project is expected to rehabilitate, upgrade and expand the existing power grid, focusing on the distribution network, as well undertake feasibility studies for new hydroelectric power generation and transmission lines. Considering the type and nature of these activities, and the requirements of the Bank's safeguard policies, the following Bank policies might be triggered:

1. OP 4.01 Environmental Assessment
2. OP 4.04 Natural Habitats
3. OP 4.11 Physical Cultural Resources
4. OP 4.12 Involuntary Resettlement
5. OP 7.50 Projects on International Waters

Environmental Assessment (OP 4.01, BP 4.01, GP 4.01)

This policy requires an environmental and social assessment ('ESIA') of projects proposed for World Bank financing to ensure that these projects are environmentally sound and sustainable, and that decision-making is improved through appropriate environmental & social screening, analysis of actions and mitigation of their likely environmental impacts and monitoring.

This policy is triggered if a project is likely to have potential adverse environmental and social impacts in its area of influence. As a result, the ESIA process usually takes into account parameters related to

natural environment (air, water, and land), human health and safety, social aspects (involuntary resettlement, indigenous people, and cultural properties) and transboundary and global environmental aspects.

The construction and rehabilitation of various types of substations and distribution lines are likely to have some adverse environmental and social impacts. However, the locations of these activities are not identified yet for the most part. Therefore, the ESIA requires that an Environmental and Social Management Framework (ESMF) is established.

As a condition for the Bank appraisal of the power sector project, the policy obligates the Bank and Government of Malawi to disclose the ESMF report as a separate and standalone document. This draft ESMF serves this purposes, and will continue to be improved and refined following the initial disclosure. The disclosure must precede the appraisal of the project. The disclosure should also be both in Malawi at a location accessed by the general public and local communities, and at the Infoshop of the World Bank.

Natural Habitats (OP 4.04, BP 4.04, GP 4.04)

This policy recognizes that the conservation of natural habitats is essential to safeguard their unique biodiversity. Natural habitats comprise terrestrial, freshwater, coastal, and marine ecosystems. They include areas lightly modified by human activities, but retaining their ecological functions and most native species. The Bank supports cause significant conversion (loss) or the protection, management, and restoration of natural degradation of natural habitats. The Bank supports, and expects borrowers to apply precautionary approach to ensure environmentally sustainable development. This policy will be triggered by any project that will have negative effects on natural habitats. At this stage, it is not yet known if the proposed project will have any such negative effects. *This is trigged because of scale and this ESMF is designed to addressthe specific considerations of this policy*

Involuntary Resettlement (OP/BP 4.12)

The objective of this policy is to avoid and minimize involuntary resettlement, and ensure that the displaced populations are compensated by improving their former living standards. The involuntary resettlement is an integral part of project design and should be dealt with at the earliest stages of the project preparation. It encourages community participation in planning and implementing resettlement and in providing assistance to affected people, regardless of the legality of the title of land. This policy is triggered not only if physical relocation occurs, but also by any loss of land resulting in: relocation or loss of shelter; loss of assets or access to assets; loss of income sources or means of livelihood, whether or not the affected people must move to another location.

A draft Resettlement Policy Framework (RPF) has been prepared in compliance with OP 4.12. This draft ESMF should be read in conjunction with that document. The draft RPF outlines the principles and procedures to be applied in the event that any World Bank funded projects/subprojects involve land acquisition or displacement and thus require the mitigation of potential adverse social impacts. The OP 4.12 is not usually triggered because people are being affected by physical relocation or resettlement; it is more often triggered because the program activity causes land acquisition, whereby a physical piece of land is needed and people may be affected because they are cultivating on that land, they may have buildings on the land, they may be using the land for water and grazing of animals or they may otherwise access the land economically, spiritually or any other way which may not be possible during and after the sub project is implemented. Therefore, people are in most cases compensated for their loss (of land, property or access) whether in kind or in cash or both. Where there is land acquisition, impact on assets, and/or loss of livelihood, the RPF guidelines must be followed and, depending on the outcome of the screening process, a full or abbreviated RAP completed prior to implementation of the project activities.

OP 4.12 also requires the RPF to be disclosed both in Malawi and at the World Bank Infoshop of before appraisal. Where there are differences between the laws of Malawi and the Bank OP 4.12, the latter take precedence, given the Bank financing proposed for the project. These issues are discussed further in the draft RPF.

Projects on International Waters (OP 7.50, BP 7.50, GP 7.50)

This policy applies when potential international water rights may be an issue, for sub projects on the following type of international waterways:

- a. Any river, canal, lake, or similar body of water that forms a boundary between, or any river or body of surface water that flows through, two or more states. Lake Malawi (also known as Lake Nyasa), is an African Great Lake and the southernmost lake in the Great Rift Valley system of East Africa. This lake, the third largest in Africa is located between Malawi, Mozambique, and Tanzania, and forms part of the larger Zambezi watershed.
- b. Any tributary or other body of surface water that is a component of any waterway described in (a) above.
- c. Any bay, gulf, strait, or channel bounded by two or more states or, if within one state, recognized as a necessary channel of communication between the open sea and other states, and any river flowing into such waters.

The policy applies to water and energy/power type projects funded by the Bank. Projects on international waterways may affect relations between the Bank and its borrowers and between states (whether members of the Bank or not). The Bank recognizes that the cooperation and goodwill of riparians is essential for the efficient use and protection of the waterway. Therefore, it attaches great importance to riparians’ making appropriate agreements or arrangements for these purposes for the entire waterway or any part thereof. The Bank stands ready to assist riparians in achieving his end. Given the nature of the project, this policy requires the Government of Malawi, if it has not already done so, to formally notify riparians – across the entire Zambezi watershed – of the proposed project and its details for the activities that are related to international waterways.

Physical Cultural Resources OP 4.11

Cultural property includes sites having archaeological (prehistoric), palaeontological historical, religious and unique natural values. The Bank will normally decline to finance a sub project that will significantly damage non-replicable cultural property, and will assist only those sub projects that are sited or designed so as to prevent such damage.

It is not anticipated that the proposed project will adversely affect sites having archeological, paleontological, historical, religious, or unique natural values as defined under the OP 4.11. The site visits undertaken as part of the preparation of this draft ESMF did not provide any indications that any such sites would be adversely affected. However, a screening mechanism is nonetheless proposed to ensure that any such sites are identified and avoided or impacts are mitigated, in line with the cultural resources policy. Awareness of possible chance finds will be raised among the public, the project contractors and operators, and chance-find procedures will be included in construction contracts.

Summary of Bank Safeguard Policies Possibly Triggered By the Project’s Activities

Safeguard Policy Possibly Triggered	Associated Policy Requirement	Party	Timeframe Implementation of Action
OP 4.01: Environmental Assessment	1. Preparation of ESMF 2. Preparation of ESIA for specific activities	1. GoM to prepare ESMF 2. GoM/ESCOM to prepare ESIA	1. ESMF to be approved by WB and Malawi Environmental Affairs Department & disclosed in Malawi & Bank Infoshop prior to appraisal date. 2. ESIA to be approved by WB and MNREE and disclosed in Malawi and in the Bank Infoshop before

Safeguard Policy Possibly Triggered	Associated Policy Requirement	Party	Timeframe Implementation of Action
			implementation.
OP 4.04 Natural Habitats	Conservation of natural habitat	GoM/ESCOM	1. If relevant, before contract award
OP 4.12: Involuntary Resettlement	1. RPF preparation 2. If necessary, full or abbreviated RAPs preparation	1. GoM to prepare RPF 2. RAPs by GoM/ESCOM as necessary	1. RPF to be approved by Bank and Malawian authorities & disclosed in Malawi & Bank Infoshop prior to appraisal date. 2. RAPs to be approved by the WB and respective District officials & disclosed in Malawi and the Bank Infoshop before implementation.
OP 7.50: Projects on International Waters	Notification of Riparian Countries	GoM	Before appraisal of project.
OP 4.11: Physical Cultural Resources	Cultural property	1. If necessary, in final ESMF by GoM 2. Chance Find Procedure in construction contracts	If relevant, before contract award

4. Legal Requirements And Environmental & Social Policies

a. Relevant International Treaties / Conventions

Legislation in Malawi is the prerogative of its unicameral parliament, which holds all legislative powers. The Executive and Judiciary may enact subsidiary legislation under power of the Legislative delegates. Common law and customary law also are applied in Malawi, although with due regard to the principles and provisions of the Constitution of 1994, as required by article 10 (2) of the Constitution (Kapindu 2009). The Constitution also reserves a role for local governments, and the 1998 Local Government Act and National Decentralization Policy establish the basis for district assemblies, comprising elected councilors and non-voting members that represent various local interests. The Executive gradually has been transferring responsibilities and resources to the district assemblies in areas such as land planning and natural resources (Commonwealth Local Government Forum, Undated).

Malawi's Constitution states that customary international law is part of the laws of the Republic. International agreements require an Act of Parliament to become enforceable under domestic law (Kapindu, 2009). The table below lists international environmental treaties to which Malawi is a party.

Title	Year
International Treaty on Plant Genetic Resources for Food and Agriculture	2002
Stockholm Convention on Persistent Organic Pollutants	2001
Kyoto Protocol to the United Nations Framework Convention on Climate Change	1997
International Plant Protection Convention – New revised text approved by Resolution 12/97 of the 29th Session of the Food and Agriculture Organization Conference in November 1997—Declaration	1997
United Nations Convention to Combat Desertification in Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa	1994
Montreal Protocol on Substances that Deplete the Ozone Layer	1987
Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer (London Amendment)	1990
Convention on Biological Diversity	1992
United Nations Framework Convention on Climate Change	1992
Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal	1989
Vienna Convention for the Protection of the Ozone layer	1985
Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar)	1971
Convention on the International Trade in Endangered Species of Wild Flora and Fauna (CITES)	1973
Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques	1976

Source: MCC Compact feasibility study

13. Relevant Malawi Environmental Law: Legislation and Regulations

The basis for environmental legislation is established in the 1994 Constitution of the Republic of Malawi in section 13(d), which attributes to the State the responsibility to manage the environment responsibly to prevent degradation, provide a healthy living and working environment for the people of Malawi, recognize the rights of future generations through sustainable development, and conserve and enhance Malawi’s biological diversity. Malawi’s energy sector is governed by four acts passed in 2004: the *Energy Regulation Act*, *Rural Electrification Act*, *Electricity Act*, and *Liquid Fuels and Gas Act*, together known as the Energy Laws. The Energy Laws established MERA (Malawi Energy Regulatory Authority) with powers to regulate the energy industry, established a Rural Electrification Fund and provisions for managing the fund and regulating the generation, transmission, distribution, sale, import, export, use, and safety of electricity, as well as provisions for a liberalized market for liquid fuels and gas. MERA also has the responsibility in conjunction with other agencies to formulate measures to minimize the environmental impact of the energy undertakings and enforce such measures by including appropriate conditions in licensing. The Electricity Act establishes provisions for notifying and compensating private land owners whose lands are affected by electricity licensees. Section 39 of the Electricity Act allows easements without compensation for placement of transmission lines and distribution lines as long as a 30 days’ notice is given and no structures are taken. Compensation is required, however, if any structures are affected and for any losses or damages caused. Environmental and natural resource policies have been under review since the 1990s, and currently new policies and legislation are prepared in a consultative process with input from local experts and stakeholders (Spong and Walmsley 2003). The *National Environmental Action Plan (NESIAP)* of 1994 served as an instrument for national environmental planning and is the basis for the *National Environmental Policy (NEP)* of 1996, revised in 2004. Also the *Environment Management Act of 1996* provided legal support for environmental policies.

The 1994 *NESIAP*, developed through a participatory process, was aimed at identifying environmental problems that needed to be addressed and possible solutions. Among the key issues identified were soil erosion, deforestation, water degradation, depletion of fish resources, and human habitat degradation. The *NESIAP* identified the need to strengthen the environmental authority for implementing proposed solutions and anticipated that the participatory process would be followed by the elaboration of District Environmental Action Plans that would dovetail into the *NESIAP*. The 2004 *NEP* includes a requirement that districts elaborate and update a District Environmental Action Plan every 5 years. The 2004 revised *NEP* provides guidance and sets standards for developing sector policies on the environment and natural resources. The *NEP* includes environmental goals and strategies for land, water, forestry, fisheries, agriculture, energy, and other sectors. Its goal for the energy sector is “to meet national energy needs with increased efficiency and environmental sustainability” (section 5.6). Among the guiding principles to reach this goal, the *NEP* states that “environmental externalities of all energy sources shall be identified and incorporated into policy design and project costing” and includes among its strategies to increase rural electrification programs reducing pressure on fuel wood

and to subject all energy projects to a stringent ESIA. The Environmental Affairs Department (ESIAD) has entered into an agreement with the Malawi Bureau of Standards to develop environmental standards for water, air, soil, and noise (Spong and Walmsley 2003).

Land

Siting new substations and power lines can displace residences and businesses and would require compensation. Land in Malawi can be private, public, or owned by the Government. Private land can be held by individuals under “freehold tenure” (ownership) or by Traditional Authorities, communities, families and individuals under customary law. Public land can be held in trust and managed by the Government or by Traditional Authorities, but must be openly used or accessible to the public at large. Government land is typically used for a specific purpose such as schools, hospitals, or government buildings. According to the *1965 Land Act*, land “shall not be assured to or for the benefit of, or acquired by or on behalf of any body corporate, unless such body corporate is authorized by a license issued by the President to hold lands in Malawi” (Part II, Article 4). The Government may expropriate land for government use or redevelopment, but must pay a fair compensation to the land holder. The *1971 Land Acquisitions Act* establishes procedures for acquisition of lands, including surveying of land, assessment of the land and its contents, including crops, trees and built structures, and for compensation of displaced persons.

The *Malawi National Land Policy of 2002* states that customary land tenure was treated in the past as a subset of public land and that customary land was taken by the state without adequate compensation. Despite attempts in 1967 to improve land legislation through the *Registered Land Act* and the *Customary Land Development Act*, inadequate compensation remained the case due to weak land administration. The Malawi National Land Policy calls for a new comprehensive land law that will make local and district governments the principal agents for land administration and recognize customary land as being under the jurisdiction of Traditional Authorities and governed by customary law. The Policy also calls for fair compensation for use of customary lands and gender sensitivity in the provision of access to land. Environmental management provisions are included in the National Land Policy on issues of urban management of solid and liquid wastes and protection of sensitive areas and community forests, among other provisions. An ESIA is required for lakeshore developments, mining operations, and any major land development.

Water and Irrigation

Water resources could be affected by discharges, stormwater runoff, spills and improper waste disposal. The *Water Resources Act of 1969* establishes that all water resources are vested in the President. The Minister (currently the Minister of Irrigation and Water Development) has the authority to grant the right to “divert, dam, store, abstract, or use public water from such sources in such quantity, for such period, whether definite or indefinite, and for such purpose as may be specified in the water right subject to such terms and conditions as he may deem fit.” The Minister is advised by a Water Board, who reviews requests for water rights and provides the Minister with recommendations. Pollution of water resources is an offence punishable by fine and imprisonment. A new Water Resources Act is being developed and the current draft establishes that all water resources are vested in the State and that beds and banks of watercourses and lakes and the adjacent strips are public land. A National Water Resources Authority (Authority) would be established to manage these resources under the direction of a board appointed by the Minister. Abstraction and use of water from a water resource would require a license granted by the Authority. When necessary, this license could be combined with a permit. Permits would be required for drilling boreholes to explore groundwater and for discharging effluents. A license also would be required for any blockage of watercourses (such as dams). The Water Resources Act also would authorize the Minister to prescribe standards for effluent quality and to set charges for water use and effluent discharges, and give State schemes priority for the use of water resources. The Authority also would be able to designate catchment (watershed) areas, develop management strategies for these areas, and establish Catchment Management Committees to provide advice on the use of water resources from the designated areas. The *National Water Policy of 2005* sets the broad goal of sustainable management and utilization of water resources and establishes several guiding principles for reaching this goal, including decentralized and participatory management, demand-driven approaches to water development, polluter-pay approaches to pollution control, incorporation of disaster preparedness and climate change considerations in water planning. Also,

agricultural and infrastructure construction activities are not allowed below the 477-meter above-mean-sea-level contour line along Lake Malawi and below the 100-year flood-water level along rivers (except with authorization from the Minister). Specific goals and strategies are also defined for water utilization for various purposes, including rural and urban water services, agriculture and irrigation, fisheries, navigation, and eco-tourism. A specific goal of encouraging the energy sector to invest in water resource development is included.

An Integrated Water Resources Management and Water Efficiency Plan, 2008–2012 is also in place. Based on a participatory gap analysis, key water resource management issues were identified and an implementation plan was developed with roles for Ministers, the National Water Resource Authority, Catchment Management Authorities, District Assemblies, and Village Development Committees. Waterworks (for supplying water for domestic, public, and business use) also must comply with the *Waterworks Act of 1995* and are governed by a Water Board appointed by the Minister. The *Waterworks Act* establishes penalties for pollution to waters by which waterworks are supplied. The *Irrigation Act of 2001* governs irrigation. This Act creates a fund for “development and management of irrigation and drainage” (Part VI, Art. 28), a Malawi Irrigation Board to advise on policy matters related to irrigation and drainage, and guidelines for local community participation. The *Irrigation Act* establishes penalties for negative impacts to catchment areas of a river or public watercourse supplying water to an irrigation scheme or farm. The Malawi Standards Board has established standards for borehole and shallow-well water quality (2005), tolerance limits for domestic/sewage effluent discharges into inland surface waters (2005), and specifications for drinking water (2005).

Forestry and Vegetation

Establishment of ROWs would require taking forest and vegetation resources. The *Forestry Act of 1997* establishes a Director of Forestry under the Minister responsible for forestry matters (currently Minister of Natural Resources, Energy, and Environment). The Director and subordinate officers may inspect, search, and seize forest resources whenever the Act is believed to have been violated. The Act also establishes a Forestry Management Board consisting of several government officials and other members appointed by the Minister to provide advice on forestry matters. The Minister has authority to designate forest reserves and protected forest areas. Customary land may also be protected if a village headman designates it as a village forest area (with the advice of the Director of Forestry). No litter or noxious waste may be deposited in forest reserves, protected forest areas, or village forest areas. The Director of Forestry issues licenses for commercial processing of wood and other forest products, for removal of indigenous wood from private lands, and permits for the export or import of forest products. Licenses are also required for use of products or land in forest reserves and protected areas and for use of indigenous timber for charcoal. The Act also establishes the Forest Development and Management Fund for the “conservation, augmentation and management of forest resources and forest land in Malawi.” (Part IX, Article 58). Malawi also has a National Forestry Policy (1996) and a National Forestry Program (2001) that together establish goals and coordinate actions aimed at the sustainable management of forest resources and the improvement of livelihoods.

The *Plant Protection Act of 1970* and the *Noxious Weed Act of 1970*, “have provisions for the prevention of the introduction of alien weeds, invertebrate and microbial pests and provide for the eradication of pests, diseases and weeds that are destructive to plants and other habitats. These Acts further prevent the importation, culturing, distribution, selling and exportation of any plant forms and growth media such as rooting compost and soil without an official permit issued by the National Plant Protection Services.” (Ministry of Mines, Natural Resources and Environment, Environmental Affairs Department 2005).

Fisheries and Wildlife

Fisheries and wildlife could be impacted through impacts to their habitats. The *Fisheries and Management Act of 1997* establishes the position of Director of Fisheries, under the Minister (currently the Minister of Natural Resources, Energy, and Environment). The Director registers fishing vessels and grants fishing licenses and permits for research and aquaculture. The Act also establishes a fund for conservation, development, promotion, management, and administration of fisheries and fish habitats; authorizes officers to arrest violators of the Act, and establishes penalties for offenses against

the Act. The *National Parks and Wildlife Act of 1992, as amended in 2004*, aims at protection and conservation of wildlife, control of dangerous animals and trading of wildlife species and specimens, promotion of local community participation and private-sector involvement, and the protection and management of protected areas. The Act establishes a Director responsible for managing parks and wildlife and authorizes the Director to enter into wildlife management agreements with communities and the private sector for protection and conservation of wildlife. Officers serving under the Director and police officers are authorized to search, seize, and arrest whenever a violation of the Act is suspected. The Act also establishes a Wildlife Research and Management Board, comprising government officials and representatives of civil society, to advise the Minister (currently the Minister of Tourism, Wildlife, and Culture) and a National Parks and Wildlife Fund for managing national parks and wildlife reserves. Under the Act, any person may request through the Board a wildlife impact assessment of an activity. The Minister decides on whether the Board should conduct or arrange for such an impact assessment. The Act also authorizes the Minister to declare any area of land or water to be a National Park or a Wildlife Reserve and to establish regulations for managing such areas. The Director must issue every year a list of protected species of animals (game species). Licenses are required for hunting or taking game species. Other licenses established by the Act are bird licenses, hunting licenses, special licenses (e.g., for research) and visitor licenses, because typically only residents of Malawi may be granted bird and game licenses. Provisions are also established for methods of hunting and for commerce and trade of wildlife. The 2000 Wildlife Policy emphasizes the importance of cooperation with local communities, nongovernmental organizations, and the private sector in the conservation and management of Malawi's wildlife. Principles and strategies are established for management of wildlife in protected areas, customary and private land, and wetlands.

Waste

Improper waste disposal can impact various environmental and social resources. Under the *Environment Management Act of 1996*, the Minister (currently the Minister of Natural Resources, Energy, and Environment) is authorized to regulate the management, transportation, treatment and recycling, and safe disposal of waste, and to establish environmental quality standards for waste. Licenses for handling, storing, transporting, classifying, and destroying waste are also granted by the Minister or by the Director of Environmental Affairs, if the Minister delegates this task. The Director of Environmental Affairs may also issue environmental protection orders requiring the removal and disposal of waste by those against whom the orders are made. Permits for import, export, and transport of hazardous wastes or substances are issued by the Minister. The Malawi Standards Board has issued guidelines for design and management of solid waste disposal sites. Under the Environment Management Act, no person is allowed to "discharge effluent or emit any gas or other gaseous substances into the environment except under a license issued by the Minister." (Part VIII, Article 43). The Minister may also establish fees for monitoring, cleaning up, removing, or disposing of pollutants. Infractions of the Act related to waste are punishable with fines and up to 10 years in prison. The Malawi Standards Board has established standards for the handling, transportation, and disposal of solid waste (2002), for the design of solid waste disposal sites (2005), and for the management of solid waste disposal sites (2005).

Other Relevant Acts and Policies

The *Monuments and Relics Act of 1991* allows the Minister to designate monuments and relics as "protected" and to impose penalties for damage or disturbance, including payment for repair and removal of the cause of damage or disturbance. A permit is required for archeological excavation and a license is required for dealing in monuments and relics. The 2004 National Environmental Policy lists as a goal "to integrate gender, youth and children concerns in environmental planning decisions at all levels to ensure sustainable social and economic development" (section 4.8). The Ministry of Gender, Child Welfare, and Community Services issued a *National Gender Policy* in 2000, developed in a consultative process and aimed at mainstreaming gender in Malawi's national development process. Several thematic areas for policy were identified and stakeholders were instructed to designate focal points to receive training and aid in implementation and monitoring. These focal points were grouped in a Gender Policy Implementation Committee. Units were also established under the Ministry to aid other Government offices and Parliament on gender issues. The *Occupational Safety, Health and*

Welfare Act of 1997 establishes standards for environmental health and safety in the workplace; and various acts regulate labor (*Labour Relations Act of 1996; Employment Act of 2000; Workers Compensation Act 2000*). Malawi has legislation and policies dealing with infectious diseases such as malaria and HIV/AIDS. The *1948 Public Health Act* required that local authorities be notified of infectious diseases and gave the Minister broad authority to impose measures to control the spread of such diseases. More recent legislation and policies have focused on providing support to vulnerable populations, improving case management, and prevention. The *2010–2012 Malawi HIV and AIDS Extended National Action Framework* (NAF, Draft 2009) sets as its main priority prevention and behavior change. This includes outreach for high-risk professional groups such as transport workers. The Malawi Standards Board established standards for industrial noise affecting residential areas (2005), general requirements for pesticides (1988) and safety procedures for disposal of pesticides and toxic waste (2005), specifications for asbestos-cement drain and sewer pipes, and requirements for combating child labor (2002)

Required Permits and Approvals

Environmental legislation in Malawi establishes licenses and permits required for various types of projects and are managed by ministries and environmental authorities. The table below shows licenses and permits identified in the review of legislation and literature that may be applicable to this project.

Licenses and Permits

Department	Type
Malawi Energy Regulatory Authority	<ul style="list-style-type: none"> Licenses for energy generation, transmission, distribution and rural electrification
Ministry of Natural Resources, Energy, and Environment/Environmental Affairs Department	<ul style="list-style-type: none"> EIA certificates Licenses for handling, storing, transporting, classifying and destroying waste License for effluent discharges
Ministry of Lands, Housing, and Urban Development	<ul style="list-style-type: none"> Land leases
Water Resources Board	<ul style="list-style-type: none"> License for water use Permit for effluent discharge
Ministry of Irrigation and Water Development/Water Board	<ul style="list-style-type: none"> Permits for water supply and sewer connections
Director of Forestry	<ul style="list-style-type: none"> License for removal of indigenous wood License for use of land in forest reserves and protected areas
Ministry of Tourism, Wildlife, and Culture/ Director (of parks and wildlife)	<ul style="list-style-type: none"> License for taking protected species (hunting license)
National, District, or Local Commissioners and Planning Committees	<ul style="list-style-type: none"> Development Permissions

Source: MCC Compact feasibility study

SECTION B: DRAFT ESMF

1. Environmental & Social Screening Of Projects

14. Screening Process

Development projects have biophysical, as social and economic impacts. Sufficient understanding of these factors is necessary for the initial screening decision. It is therefore, important to establish mechanisms to identify project activities which may require a more detailed ESIA to be undertaken, and this process of selection of projects is referred to as "Screening".

The environmental and social screening process is a tool designed to standardise the process of projects / programs implementation. The main objective of the screening process is to identify and highlight environmental and social issues that need to be taken into account in further decisions, planning, and design of a project, to assist in the sustainable implementation of the project. Screening must therefore be carried out at an early stage of an individual project activity – at the detailed design stage where possible. The information gathered via the screening process is of importance both to the project’s Implementing Agencies (IAs), namely the Ministry of Natural Resources, Energy and Environment (MNREE) and ESCOM, as well as to the World Bank.

The background information of each activity is therefore obtained in a prescribed format for screening of the project. The major issues related to the project required for screening are summarised in the table below:

Background Information for Screening of Projects	
Description	Impacts
<p>Project aims / objectives Type and quantity of energy Activities / responsibilities: Major Project stages.</p> <p>List the resources</p> <p>Location Geographical location of the Project.</p> <p>Project Area The Project area including buildings, infrastructure, vegetation and land use.</p> <p>Reasons for selection of locality</p> <p>Alternative Project localities considered</p>	<p>The Biological Environment</p> <ul style="list-style-type: none"> • The Natural Environment • Protected Areas • Invasive Species <p>The Physical Environment</p> <ul style="list-style-type: none"> • River Systems • Geology / Soils • Landscape / Aesthetics • Pollution <p>The Social Environment</p> <ul style="list-style-type: none"> • Beneficiaries • Land Use, Land Acquisition, Resettlement and In-Migration • Loss of Crops, Trees and Structures • Health and Safety • Socio-Economic Status • Historical, Archaeological or Cultural Heritage Sites

Annex 2 to this draft ESMF presents a detailed screening form that can be used for this purpose. As set out in more detail in the Institutional Arrangements section below, ESCOM’s Environmental and Social Management Unit (ESMU) has particular responsibility for the screening process set out in this ESMF, the categorization of results and the determination of the necessary follow-up actions. While external consultants can assist the ESMU in this task, this does not remove the ESMU’s overall responsibility in this regard.

Government of Malawi ESIA Process

In addition, the Government of Malawi has developed its own approach to environmental and social screening of projects. This is summarised in the box below:

GOM ESIA Process

In 1996, the Environment Management Act authorized the Minister (currently the Minister of Natural Resources, Energy, and Environment) to specify the types and sizes of projects that require an ESIA; prescribe environmental quality standards for air, water, soil, noise, vibration, radiation, effluent, and solid waste; declare areas to be environmental protection areas; restrict access to genetic resources of Malawi; grant licenses for waste disposal; issue permits for import or export of hazardous waste; issue licenses for effluent discharges and gas emissions; and designate environmental inspectors. The Act also created the ESIAD under the Minister and gave ESIAD the responsibility to administer the ESIA process and approve ESIAs. The 1997 *Guidelines for Environmental Impact Assessment* issued by the Ministry of Forestry, Fisheries, and Environmental Affairs (now the Ministry of Natural Resources, Energy, and Environment) established a list of project types for which an ESIA is mandatory (Prescribed Project List A) and a list for which an ESIA could be required (Prescribed Project List B). Whether a project appears on list A or B depends on its type, size, and location.

The ESIA process starts with a licensing authority's determination of whether a project requires environmental analysis under the Environment Management Act and, if necessary, request for a Project Brief from the developer. The Project Brief should contain sufficient information on the project to enable a determination to be made regarding the need for an ESIA. This is the screening stage. If an ESIA is required, the development of the ESIA starts with a scoping stage where the developer and supporting experts identify principal issues to be addressed. The developer then proceeds to conduct the assessment. The Guidelines require the participation of the public in the ESIA process and establish the maximum number of working days to be spent by the Director in determining the need for an ESIA and in reviewing terms of reference and ESIA documents. When the developer submits a draft ESIA to ESIAD for review, the draft ESIA also must be made available to the public for comment. After any necessary revisions and approval of the ESIA, the Director of Environmental Affairs issues a certificate to the developer, including any conditions for project implementation.

ESIA reports must include:

- A detailed description of the project;
 - A description of the segment or segments of the environment the project would likely affect;
 - A description of the technology, method, or process to be used for implementing the project;
 - Reasons for selecting the proposed site;
 - The likely impact the project would have on the environment and its direct, indirect, cumulative, short-term, and long-term effects on the environment;
 - Measures proposed for eliminating, reducing, or mitigating anticipated adverse effects of the project on the environment;
-
- An indication of whether the environment of any other country would likely be affected by the project;
 - An outline of any gaps, deficiencies, and adverse environmental concerns arising from the assessment; and
 - A description of the methods used to compile the information.

Screening Form & Screening Criteria

The screening process is also designed to meet the screening requirements of the World Bank as the donor of this proposed project. The screening form proposed in this draft ESMF is designed to provide the necessary information to the Implementing Agencies (IAs) to determine whether or not an activity would likely result in significant adverse environmental / social impacts, during either the construction or operational phase of a project, and to define the extent a full environmental and social impact assessment (ESIA) is required. For example, further action may require a more detailed analysis of environmental / social issues, potential impacts, and/or possible mitigation measures / alternatives.

The screening criteria which determine whether a full ESIA may be required are of two broad types:

- **Threshold Criteria.** This method of screening establishes the thresholds for key features of a project, or an environmental parameter which exceeded the thresholds, which would require an

ESIA. Such thresholds can range from environmental factors such as the size of agricultural land used for a development project, location, cost, outputs, infrastructure demands, national standards for air, water and noise.

- **Impact Criteria.** These impacts are divided into three broad categories, reflecting various degrees of potential impact on the environment, determined on the basis of past experience with similar forms of development.

The table below summarises the main specific criteria under both of these criteria types:

Screening Criteria	
<i>Threshold criteria</i>	<i>Impact criteria</i>
<ul style="list-style-type: none"> • Size • Location • Output • Cost/finance • Environmental effects 	<ul style="list-style-type: none"> • Significant but easily identifiable impacts • Significant impacts • Sensitive area

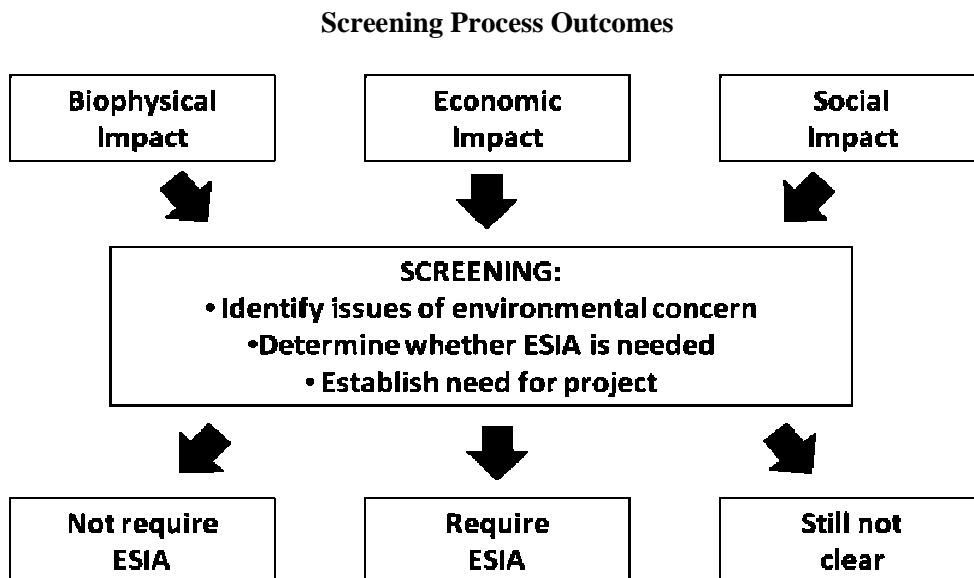
The Screening Form proposed for this project, which incorporates the main issues identified above, is attached as Annex 2 to this draft ESME.

Screening Outcomes

On the basis of the initial information provided in the screening form, the screening process results in proposed project activities being divided into the following three categories:

- Project clearly requiring an ESIA
- Project clearly not requiring an ESIA
- Project for which the need of application of an ESIA is not clear, but for which an Environmental and Social Management Plan (ESMP) will likely be sufficient.

The following figure summarises the screening process and its outcomes :



It should be noted that the environmental screening process does not itself involve a full ESIA. In essence, the screening process simply requires the implementing agency (IA), in this case ESCOM or

MNREE, to prepare a short report listing the various environmental and social issues which may arise in the context of the proposed activity, and outlining how those various issues are to be addressed. As the process helps determine whether or not a detailed ESIA or ESMP is required, it helps the IAs and stakeholders to save time, resource and related formalities.

ESIA Categories of Projects in Malawi

The 1997 Guidelines for Environmental Impact Assessment issued by the Ministry of Forestry, Fisheries, and Environmental Affairs (now the Ministry of Natural Resources, Energy, and Environment, MNREE) established a list of project types for which an ESIA is mandatory (Prescribed Project List A) and a list for which an ESIA could be required (Prescribed Project List B). Whether a project appears on list A or B depends on its type, size, and location, in line with the screening process described above.

World Bank Environmental & Social Screening Categories

All major donors, including the World Bank, also screen projects presented for financing to decide whether and at what level an ESIA is required. The World Bank's Operational Policy OP/BP 4.01 Environmental Assessment (January 1999-updated March 2007) 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 project-affected persons (PAPs)/groups and local NGOs are taken into account. It outlines the contents of environmental assessment reports and environmental management plans and screens projects into 4 categories.

- **Category A:** Projects likely to have significant adverse environmental impacts and requiring a full ESIA including a detailed Environmental and Social Management Plan (ESMP).
- **Category B:** The potential environmental impacts are less than those of Category A projects and are usually site-specific, few if any are irreversible and in most cases mitigatory measures can be designed more readily than for category A projects. The scope of ESIA is narrower than that for Category A projects.
- **Category C:** A project is classified as Category C if it is likely to have minimal or no adverse environmental and social impacts. Beyond screening, no further ESIA action is required.
- **Category FI:** A project is classified as Category FI if it involves investment of Bank funds through a financial intermediary, in project activities that may result in adverse environmental impacts.

The normal screening process is applied to all project activities to ensure that the implementing agencies carry out appropriate ESIA for each activity, in line with the categories above. Compliance with this Safeguard Policy is a requirement of all World Bank funded projects to determine the level of environmental assessment required by the Bank.

15. Preliminary Screening Results

Preliminary screening results for the investments to be included under the World Bank Project have relied upon: (a) actual site visits conducted by the World Bank team, (b) site visit reports and accounts by ESCOM's management team, and (c) the safeguards chapters of the ICF/CORE feasibility studies financed by MCC, which cover the activities in Component 1 of the proposed project.

The outcome of these site visits and assessments indicate that the project is likely to have minimal environmental and social impacts. However, because the final location of project activities has not yet been determined (for example, routes of 33kV/11kV distribution lines), the project has been classified as **Category B**. The results of the preliminary environmental and social screening of the specific sites that are proposed for financing under the project are presented below.

For **Component 1 (Electricity Network Strengthening & Expansion)**, following a preliminary review of the sites included under this component (see Annex 1 for a full list of possible project sites),

including visits by both the ICF/Core Feasibility Study team and the WB team, the following findings were made:

- **Triggering OP/BP 4.12 related to involuntary displacement and land acquisition.** Site visits undertaken as part of the preparation of this draft RPF – both to sites where precise locations are known (i.e. substations) and to areas where precise locations will only be determined during project implementation (e.g. distribution line routes, peri-urban network expansions) – indicate *a priori* that displacement and land acquisition are likely to be minimal and their impact can be easily mitigated where applicable. At this stage, it appears that no resettlement of households will be needed under the project, hence the focus on displacement and land acquisition. However, there remains a need to trigger OP/BP 4.12 related to involuntary displacement and land acquisition. This topic is discussed in more depth in the accompanying draft RPF document.
- **New Substations.** Four new substations are included in the proposed project, as set out below. Only one of these, New Dwangwa, incorporates a transmission-system level voltage; all the others will be operating at distribution level voltages. Based on site visits made to the sites², none of the proposed new sites would affect structures or tree crops, only agricultural land or bush. It is estimated that, in total, the land area affected will be less than 2.5 hectares. From an environmental perspective, as these are new substations, the design and implementation will incorporate all necessary environmental safeguards aspects, including appropriate hazardous waste-management techniques. These will also form part of the project’s Environmental and Social Management Plan (ESMP), which will be incorporated into the ‘supply and install’ contracts of the contractors undertaking the works. See Annex 3 for the ESMP template.

Substation Name	Land Area (hectares) ¹
New Dwangwa 132/33kV	1.1
Katoto 33/11 kV	0.80
Bangwe 33/11 kV	0.25
Kauma 33/11 kV	0.25

Source: ICF/CORE feasibility studies, WB engineering assessment

¹ Land area indicates the amount of land to be acquired by ESCOM and might include land for future expansion.

- **Upgrading Existing Substations.** Upgrading of five existing substations is included in the proposed project. Only one of these, Golomoti, incorporates a transmission-system level voltage; all the others will be operating at distribution level voltages. Site visits have been made to the sites as part of the preparation of this draft ESMF.³ None of these other substation projects requires the acquisition of new land. These substations already occupy sufficient area to accommodate rehabilitation activities and associated waste-management requirements. The other environmental issue identified in this preliminary assessment relates to **Poly-Chlorinated Biphenyls (PCBs)**. PCBs have been used historically as additives to insulating oils in electrical equipment because of their unique physical and chemical properties. However, PCBs are a major environmental concern worldwide. They are only one of 12 chemicals covered by the Stockholm Convention on Persistent Organic Pollutants to which Malawi became a signatory in 2001.
- Based on data provided by ESCOM, two of the substations within the Bank’s project have been identified to contain transformers with PCBs – **Fundis Cross** and **Chinyama**. Procedures of how to identify, handle, store and eliminate them, including the associated costs, will be delineated as

² As part of the preparation of this draft ESMF, all project sites have been visited by the ICF/CORE feasibility study team, including preliminary environmental and social safeguards assessments. In addition, the New Dwangwa, Kauma and Bangwe sites were inspected in person by the WB team.

³ As part of the preparation of this draft ESMF, all project sites have been visited by the ICF/CORE feasibility study team. In addition, the Golomoti and Nkula sites were inspected in person by the WB team.

part of the project documentation, specifically in the project's ESMP, to be implemented by the contractors. (See ESMP template in Annex 3). More detail on PCB handling requirements is included under the Hazardous Waste Management section below.

Substation Name	Voltage Level
Golomoti	132/66/33kV
Chinyama	66/33kV
Fundis Cross	66/33kV
Nkula	66/33kV
Balaka & Chingeni (co-located)	66/33/11kV & 66/33kV respectively

Source: ICF/CORE feasibility studies, WB engineering assessment

- 33kV/11kV Distribution Lines.** The table below shows the new 33/11kV distribution lines to be constructed via the project. The lines are 33kV in rural areas or 11 kV in urban/peri-urban areas, and are normally mounted on single poles, requiring a 7.5m wayleave. These distribution lines would be supported on wooden poles, which have smaller footprints than the steel lattice towers used for transmission lines. While the start and end points of the lines are known, line routing will not be determined until the preliminary design phase of project implementation.

Region	Name	Estimated Length (km)
North	Karonga - Mzuzu road OHL	5
	Luwinga - T/hill - Mzuzu OHL	15
	Luwinga - Choma Poultry OHL	6
Central	FMB - Kaning'ina (New) OHL	5
	Area 25 - Lumbadzi (Kamuzu Int. Airport) OHL	12
South	Bangwe 205 - Nguludi Turn off OHL	5
	Mapanga - Chiladzulu 33 kV OHL	1.4
		~ 50

Approximately 37 ha⁴ of land would be affected by these distribution line projects. This estimate does not include the low-voltage lines from the distribution substations, where no wayleave is required. Much of this land is non-arable as distribution lines tend to be located in more settled areas; as such, this land will not have been allocated for use and thus will require no compensation. Further information regarding the land acquisition and compensation aspects of these activities is included in the accompanying draft RPF. While the final line routes will not be known until detailed design work is completed, the preliminary assessments undertaken to date have not identified any specific environmental safeguards issues relating to OP 4.04 Natural Habitats or OP 4.11 Physical Cultural Resources at this stage.

The project also envisages rehabilitation of existing distribution lines. This will include replacement of existing poles with new poles at the same pole sites and re-stringing of conductors. As such, these rehabilitation activities are not assessed as having any social or environmental safeguards issues and are not considered further in this draft ESMF.

- Low Voltage Distribution Lines.** Component 1a of the project will include extension of the peri-urban low-voltage grid to new households. Component 1a includes reconfiguration, rehabilitation and extension of the existing low-voltage reticulation, including lines at 11kV and below that supply distribution transformers (such as pole-mounted MV/LV step-down transformers), installation of approximately 200 new distribution transformers, construction of new three phase low voltage (400v / 220v) overhead lines and conversion of single phase to three phase low voltage overhead line. The total amount of new low-voltage lines will not be known until preliminary

⁴ Approximately 50km of 11/33 kV lines with a 7.5m wayleave.

design work is undertaken, but is anticipated to exceed 300 kilometres of new distribution lines. The majority of this work will occur within within the major cities of Blantyre, Lilongwe, Mzuzu and Zomba.

As with the 33kV/11kV distribution line activities, further information regarding the land acquisition and compensation aspects of these activities is included in the accompanying draft RPF. Again, while the final line routes will not be known until detailed design work is completed, the preliminary assessments undertaken to date have not identified any specific environmental safeguards issues relating relating to OP 4.04 Natural Habitats or OP 4.11 Physical Cultural Resources at this stage.

- **Underground Cables.** None of the underground cables activities involve the laying of new cables, but are limited to rehabilitation and repair of existing gcables. Accordingly, there are no land acquisition or displacement of activities to consider for this set of activities, and they are not considered in this draft ESMF.

Regarding **Component 2 (Hydroelectric Power Generation Feasibility Studies)**, as described in the Project Description section above, this component of the project includes financing for feasibility studies needed for evaluation of promising sites for eventual development of an additional 200 – 400 MW of new hydropower generation capacity. The feasibility studies will include technical, environmental, social, and economic assessment of each selected site and development of the necessary environmental and social mitigation/management plans. However, there will be no physical investments at any of the sites.

Nonetheless, it is best practice to ‘pre-screen’ the environmental and social nature of proposed sites, where known, to determine if any of the sites present, *a priori*, environmental and social issues such that devoting IDA resources to a full study would be inappropriate. To this end, a team composed of the Bank’s energy, environment & social specialists, MNREE experts and ESCOM specialists have considered the following sites as part of the preparation of this draft ESMF. (See the Project Description section above for full details).

- **Lower Fufu on the South Rukuru river.** The review was limited to a desk review of available reports, satellite imagery reconnaissance, and discussion with knowledgeable Energy and Water Ministries staff, as well as ESCOM personnel. From this information, the site is found suitable for financing a full feasibility study and separate and independent full ESIA.
- **Mpatamanga on the Shire river.** The team visited the site of the proposed Mpatamanga facility and inspected the downstream and upstream reaches of the Shire River potentially affected by this development for environmental and social considerations. In addition, a preliminary topographical modeling was undertaken of the area that would be flooded by construction of the dam. This showed that minimal physical resettlement or relocation would be required in the rural area along the Shire river that lies between the proposed Mpatamanga site and the existing Tedzani hydropower station upstream. From this information, the site is found suitable for financing a combined feasibility study (to preliminary design level) and a preliminary ESIA.
- **Chizuma and Chasomba on the Bua River.** The team visited the site of the proposed Chizuma site and reviewed the Chasomba site via satellite imagery. It was discovered that both sites are located in the Nkhotakota Nature Reserve. In addition, the development of sites would require a disproportionately large amount of civil works, including extensive canal digging within the Reserve in the case of Chizuma. Any development at these sites is likely to cause potentially significant disturbance of the natural habitat and the environment. While a full feasibility study could identify and quantify the extent of this impact, visit of the lower site by the Bank experts indicates that seeking other alternative sites for financing a feasibility study would be more prudent and represent a better use of the available funds. It was therefore decided not finance a feasibility study of these sites in the proposed project.

- **Chimgonda on the Dwambazi River.** This site was assessed by a desk review of available reports and satellite imagery reconnaissance. The site does not have the environmental issues associated with the **Chizuma** and **Chasomba** sites, and appears to be suitable for a feasibility study with associated preliminary ESIA via the proposed project.
- **Transmission Backbone.** Given the proposed development of the Lower Fufu site in the north of Malawi, it is technically important to study the proposed ‘transmission backbone’ which will allow evacuation of the power from the site. This would be via a pre-feasibility study for a new ‘inland’ route would run north-west from Lilongwe via Kasungu to Mzuzu (approximately 350km), including the associated environmental and social impact assessment. The ToRs for the consultant undertaking the study would underline the importance of avoiding negative social or environmental impacts to the extent possible when evaluating possible line routes. The final decision on financing this study via the proposed project will be made once the recommendations of the ‘Integrated Resource Plan’ for Malawi (equivalent to an update of the power system ‘Master Plan’) are received by March 2010.

Summary of Preliminary Screening Results

Given the PCB issues identified above for the existing **Fundis Cross** and **Chinyama** substation sites, substation rehabilitation will entail the highest estimated environmental costs. Overall, however, environmental impacts and land acquisition / displacement requirements of the proposed projects are assessed as being limited and manageable, provided potential impacts and requirements for compensation are minimized by careful consideration during the design phase. Finally, in line with normal WB guidelines, any environmental costs identified in the sections above will be incorporated into the Environmental, Health and Safety clauses of the project’s ESMP to be implemented by the contractors during project implementation (see Annex 3 for the ESMP template). Hence the project ESMP, once finalised, needs to be included in the bidding documents and contracts of the contractors. The costs of the project ESMP are part of the contractor’s contract. However, where ESCOM itself acts as the contractor for the proposed project activities – as will be the case for Component 1a (Reinforcement of Low Voltage Reticulation – see the project description above), all the relevant clauses will also apply in full.

16. Preliminary Consultations

Initial but limited public consultations with Project-Affected Persons (PAPs) have been undertaken by ESCOM. [These consultations were conducted in 2010 with headmen around some of the proposed substation sites and the proposed new transmission lines associated with the list of projects in the feasibility studies, in connection with efforts to identify new rights of way.] In addition, limited consultations have been undertaken in the context of the preparation of the full feasibility study and environmental and social documentation by the ICF/CORE consultancy team. A summary of the key findings is given in Annex 4.

It should be recalled that the proposed project will only finance investments at four known new sites – that is, the new substation sites at Dwangwa, Katoto, Bangwe and Kauma. (Other known sites for project activities are within existing substations, where public consultations will not be required). The sites of all other new investments are not yet known – that is, the routes of new 33kv, 11kV and low-voltage distribution lines. Public consultations have hence been necessarily limited at this stage of project preparation.

Now that the draft ESIA has been prepared (see the accompanying document), there will be further consultations as the project preparation process continues. In addition, consultation will be carried out during the preliminary design phase, when the project Consulting Engineer, acting on behalf of ESCOM, will work with their internal safeguards staff and representatives of the implementing agency (including the ESMU) to ensure that the need for resettlement is minimized to the extent feasible. A

more detailed exposition of the public consultation process is set out in the draft RPF document that accompanies this draft ESMF.

2. Possible Adverse Impacts and Mitigation Measures

b. Overview

The potential environmental and social impacts that may be associated with the implementation of the proposed project can be minimized by careful site and/or right of way selection, planning and staging of construction activities, adopting proper management practices during operation and relying on effective environmental monitoring and training to support management decisions. This section proposes several potential impact-mitigation or control measures that will help to reduce or eliminate to the extent possible many of the possible negative impacts. Mitigation measures are intended to reduce the effect of potentially significant impacts on the environment or social context. Thus, they are highly dependent on the significance of the predicted impact, the nature of the impact (permanent vs. temporary), or the phase of the project (construction vs. operation). Accordingly, the mitigation measures presented below will need to be further refined and updated as project preparation progresses.

This section is divided into two main sub-sections. The first section describes general project implementation measures that are applicable to all construction and rehabilitation activities. The second section describes project implementation measures that are specific to the transmission and distribution activities in Components 1a and 1b of the project. The proposed environmental, health and safety measures are in line with the World Bank Group General Environmental, Health and Safety Guidelines and the Electric Power Transmission and Distribution Guidelines.

c. General Measures for Construction and Rehabilitation Activities

Below is a discussion of the mitigation measures for the impacts associated with the rehabilitation and construction phases, which are generally consistent for all power sector project activities due to the similarity of the works involved. Due to the localized and temporary nature of rehabilitation and construction works, fast recovery is likely to take place especially if the project is small or if field activities are accomplished in stages, where only small parcels are disturbed at a time.

Air Emissions

Construction and rehabilitation activities are usually associated with the release of escaped particulate matter (PM) generated from land clearing, excavation and movement of earth materials, cut and fill operations, contact of construction machinery with bare soil, and exposure of bare soil and soil piles to wind. In general, control techniques for minimizing PM emissions during construction generally involve watering of surfaces, chemical stabilization, or reduction of surface wind speed with windbreaks or source enclosures. Furthermore, surface improvements offer long term control techniques. These include covering the road surface with a new material of lower silt content, such as covering a dirt road with gravel or slag. Also, regular maintenance practices, such as grading of gravel roads, help to retain larger aggregate sizes on the traveled portion of the road and thus help reduce emissions. The amount of emissions reduction is tied directly to the reduction in surface silt content. Other mitigation measures include, maintaining good housekeeping practices throughout the construction phase. These low cost measures include:

- Proper site enclosure through appropriate hoarding and screening
- On-site mixing and unloading operations
- Proper handling of cement material
- Maintaining minimal traffic speed on-site and on access roads to the site
- Covering all vehicles hauling materials likely to give off excessive dust emissions

- Ensuring adequate maintenance and repair of construction machinery and vehicles
- Avoiding burning of material resulting from site clearance
- Covering any excavated dusty materials or stockpile of dusty materials entirely by impervious sheeting
- Proper water spraying when necessary
- The provision of water troughs at entry and exit points to prevent the carryover of dust emissions, beyond the construction site

In addition to PM generation, other types of pollutants are expected as a result of construction activities. These pollutants comprise CO₂, CO, NO_x, SO_x, and HC and are mainly emitted by truck traffic and on-site equipment such as concrete trucks, dump trucks, excavators and backhoes. Measures to reduce truck traffic emissions include proper truck maintenance and the adoption of a traffic management plan while avoiding congested routes. Concerning on-site construction equipment, proper maintenance procedures and the quality of diesel fuel used are important to reduce emissions. In addition, equipment should be turned off when not in use, which would reduce power needs and emissions of pollutants. The supervising consultant will have the responsibility of ensuring the implementation of these measures by the contractor.

Noise

As revealed by the impact analysis, noise levels emitted during the construction and rehabilitation phases may significantly exceed international noise level standards. Hence, mitigation measures are required during this phase. Typical mitigation measures that need to be enforced during construction to minimize noise levels are:

- Enclosing the site with barriers/fencing
- Effectively utilizing material stockpiles and other structures, where feasible, to reduce noise from on-site construction activities
- Choosing inherently quiet equipment
- Operating only well-maintained mechanical equipment on-site
- Keeping equipment speed as low as possible
- Shutting down or throttling down to a minimum equipment that may be intermittent in use, between work periods
- Utilizing and properly maintaining silencers or mufflers that reduce vibration on construction equipment during construction works
- Restricting access to the site for truck traffic outside of normal construction hours
- Proper site logistics and planning
- Limiting site working hours if possible
- Scheduling noisy activities during the morning hours
- Informing the locals when noisy activities are planned
- Enforcing noise monitoring

The noise control measures will be included within the construction contracts and be considered as requirements from contractors. The supervising consultant will have the responsibility of ensuring the implementation of these measures.

Solid Waste

During the construction and rehabilitation phases, there will be generation of construction debris as a result of various construction activities. The generated materials can be used for reclamation purposes whenever applicable. Nevertheless, care should be taken to ensure the absence of contaminated fill material and the adequacy of the physical and chemical properties of such material to limit potential adverse impacts on water and soil and ensure the safety of the project. Construction and demolition wastes can also be minimized through careful planning during the design stage, whereby reducing or eliminating over-ordering of construction materials will decrease waste generation and reduce project costs (cost of surplus materials). The contractor should carry out sorting of construction and demolition wastes into various categories and adopt re-use/recycle on site whenever deemed feasible.

Chemical wastes generated during the construction phase include containers that were used for storage of chemical wastes on site, the chemical residue as well as contaminated material. Furthermore, rehabilitation of fuel storage facilities may involve the removal of contaminated soils around fuel dispensers, piping, and tanks, as well as bulky, inert and contaminated solid waste items such as damaged tanks and sunken barges. In addition, dredging activities at hydrocarbon contaminated harbors will produce polluted dredging sludge that should also be handled as chemical waste. These materials should be segregated and properly stored and disposed of as hazardous waste. Storage should take place in a separate area that has an impermeable floor, adequate ventilation and a roof to prevent rainfall from entering. In addition all chemical wastes should be clearly labeled in English and Malawian, stored in corrosion resistant containers and arranged so that incompatible materials are adequately separated. The contractor should have a prior agreement with the EPA for the disposal of hazardous waste generated on-site.

General refuse generated on-site during the construction phase should be stored in enclosed bins or compaction units separate from construction and chemical wastes. An agreement should be drafted between the contractor and the solid waste collector in the county where the project is being implemented to identify collection sites and schedule the removal to minimize odour, pest infestation and litter buildup. The burning of refuse on the construction site should be strictly prohibited and penalized. General refuse is generated largely by food service activities on site, so reusable rather than disposable dishware should be promoted if feasible. Aluminium cans may be recovered from the waste stream by individual collectors if they are segregated and made easily accessible, so separate, labeled bins for their storage should be provided if feasible.

Finally, a PCB Management Plan needs to be formulated and implemented by the contractor, whenever rehabilitation activities involve the replacement and handling of PCB containing transformers and capacitors. The PCB Management Plan should comprise of the steps set out below.

Please note that these steps are additional to the guidelines set out in the specific Hazardous Waste Management section below.

Identification and removal of PCB contaminated material, whereby a comprehensive inventory of transformers containing PCB-contaminated oil, PCB contaminated capacitors and other material should be prepared prior to the initiation of the rehabilitation activities.

Decontamination of PCB items: Certain PCB waste such as contaminated containers & contaminated components removed from PCB equipment shall be subjected to decontamination procedures to reduce the PCB concentration below 50 ppm. This would then make the waste suitable for disposal at landfill sites. To decontaminate a PCB item, the contents should first be thoroughly drained. A solvent such as kerosene or turpentine should then be used to fill the item. At least 18 hours should be allowed to elapse before the item is drained. This rinsing procedure is repeated at least three times and the last rinse should be checked to ensure that PCB concentration is less than 50 ppm. The solvent may be reused for rinsing purposes till its PCB content is within the permissible limit of 50 ppm. The contaminated solvent is then disposed off as PCB waste. All decontaminated articles should be

properly labeled "DANGER- HAD CONTAINED CHEMICAL WASTE" in both English and the local language.

Packaging, labeling & handling of PCB waste: PCB liquid waste should be filled in adequately sealed and properly labeled steel drums in good condition. The drums should be clearly marked 'DANGER - CHEMICAL (PCB) WASTE' in both English and the local language along with the chemical waste label. The drums should never be fully filled and a 100 mm air space should be allowed between the top of the drums and the level of liquid contents. Solid PCB waste should be packed in heavy duty and leak proof polythene sacks and placed into new or good conditioned steel drums, fitted with removable lids. The drums should be properly sealed and labeled 'DANGER CHEMICAL (PCB) WASTE' in both English and the local language along with the chemical waste label. Large PCB capacitors which do not fit into drums should be inspected for leakage before packing. If they are in poor condition, they shall be packaged in heavy duty and leak proof polythene sacks which should then be stored in large steel containers surrounded by noncombustible absorbent material such as vermiculite. Scrap capacitors and their containers should be properly labeled and clearly marked 'DANGER CHEMICAL (PCB) WASTE' in both English and the local language together with the chemical waste label. The capacitors should be stored with terminals positioning upwards so as to prevent leakage.

Transport: PCB waste should be transported by vehicles in good condition under the supervision of experienced personnel and in compliance with the following conditions:

- All loading & unloading operations should be carried out with care to avoid any damage which may result in leakage & spillage.
- The drums /equipments must be clearly marked 'DANGER CHEMICAL (PCB) WASTE' in both English and the local language along with the chemical waste label.
- The drums or equipment must be loaded and fastened securely so that they are in an upright position and do not move about or fall off the vehicle.
- Drain spouts, cooling tubes, and bushings of transformers should be adequately protected to prevent damage during transport.
- Vehicle should have hazard warning panels clearly marked with indelible ink against retro reflective background.
- Vehicles must be equipped with safety gear including an appropriate fire extinguisher for emergency use and a spill clean-up kit consisting of a spade, absorbent material and spare drums.
- The complete load should be covered with a tarpaulin to prevent rainwater from contact with drums/equipment. Suitable bundling could be provided by placing sand bags around the cargoes.

Emergency response: As a strategy to reduce risks associated with PCB articles and PCB wastes, emergency containment and cleanup procedures for accidental release of PCB into the environment due to a spill or fire shall be formulated appropriate for their particular situations. The procedures shall cover all relevant areas including:

- spill response
- protective equipment
- cleanup procedures
- storage and disposal of contaminated material

- staff training
- regulatory authorities emergency contacts

PCB liquids do not burn easily but the vapor can be extremely irritating. Some decomposition products of PCBs are highly toxic. In the case of a fire outbreak, the fire department should be contacted immediately and informed that fire involves PCBs . Foam or dry chemicals should be used to extinguish the fire rather than water, to minimize contaminated run off.

Storage: PCB wastes have to be properly stored before disposal arrangements are made. An indoor storage site is preferable to outdoor one because it eliminates the danger of contaminated rainwater run-off. An ideal location will be the one having a noncorrosive atmosphere, good ventilation, normal room temperature of 25 C or less, dry surfaces and impermeable floor with no drains. If outdoor storage is chosen, then suitable fencing and impermeable floor should be provided. A roof or similar covering is a must for outdoor locations. In case of liquid PCB waste, precaution should be taken to keep items in closed areas adequate to contain any spillage or leakage. If spillage or leakage does occur, immediate action is required to contain spillage by using suitable oil absorbing material such as vermiculite or sand . Further, the following measures should be followed when storing PCB-contaminated material, including:

- Do not stack containers of PCB waste one over the other
- Place metal drip trays under rain spouts on transformers
- Allow aisles between container and equipments to facilitate regular inspection
- Keep first aid & safety equipments handy
- Provide adequate fire-fighting equipment
- Keep record of all items entering and exiting the storage area
- Do not store with flammable goods in same location.

Disposal: A cost effective technology has not yet been developed for destruction of PCBs. The only safe destruction technique known is high temperature incineration (1,200 °C for 2 seconds). However, this technique is controversial as it does not preclude the possibility of derivative emissions (dioxin & furan), chemical degradation, biodegradation and is complicated and expensive and not commercially viable. Low level contaminated wastes can be disposed of in a properly engineered and operated secure landfill, designed to prevent seepage. A synthetic liner compatible with PCB waste with low permeability, durability and chemical resistance provides the best solution for this purpose. Landfills or abandoned sites without any potential resource nearby are preferred. Necessary measures should be taken to prevent future use of the site.

Surface Water Quality

During land-based construction activities, the primary sources of potential impacts to water quality will be from pollutants in site runoff, which may enter surface waters (marine and river) directly or through the storm drain system. As such, the surface run-off from the construction site should be directed into storm drains via adequately designed sand/silt removal facilities such as sand traps, silt traps and sediment basins. Channels, earth bunds or sand bag barriers should be provided on-site to properly direct stormwater to silt removal facilities before discharge into the surrounding waters. Silt removal facilities should be maintained whereby deposited silt and grit are regularly removed after each rainstorm to ensure that these facilities are functioning properly at all times. In addition, the rainwater pumped out from trenches or foundation excavations should be discharged into storm drains via silt removal facilities and not directly to the aquatic environment. Open stockpiles of construction materials on site should be covered with tarpaulin or similar fabric during rainstorm events to prevent

the washing away of construction materials, while earthworks should be well compacted as soon as the final surfaces are formed to prevent erosion especially during the wet season.

Water used in vehicle and plant servicing areas, vehicle wash bays and lubrication bays should be collected and connected to foul sewers via an oil/grease trap. Oil leakage or spillage should be contained and cleaned up immediately. Spent oil and lubricants should be collected and stored for recycling or proper disposal. In addition, all fuel tanks and chemical storage areas should be provided with locks. The contractor should also prepare guidelines and procedures for immediate clean-up actions following any spillages of oil, fuel or chemicals.

Finally, sewage from toilets, kitchens and similar facilities should be contained in sanitary cesspools before being transported by trucks to a nearby wastewater treatment plant. As for the wastewater generated from concreting, plastering, internal decoration, cleaning work and other similar activities, it should undergo large object removal by bar traps at drain inlets.

When rehabilitating areas where, at present, oil storage are located and sites are hydrocarbon contaminated, it is necessary to clean up the site completely before starting any rehabilitation activities. A rapid environmental audit will need to be conducted to identify the action plan for site clean-up.

Soil and Groundwater

During the construction phase, accidental discharge of on-site wastewater and chemicals can adversely affect groundwater and soil in the area. Mitigation measures include proper storage of chemicals on site and the installation of natural or synthetic liners beneath chemical storage tanks. Equally important measures include proper surface drainage during both the construction and operation phases, minimization of on-site water and chemical usage (oil, lubricants and fuel), as well as limiting the exposure of the soil to accidental releases of pollutants. Chemicals used on-site should preferably be non-toxic and readily biodegradable.

Flora and Fauna

To minimize stream pollution by sediments, first it is recommended to reduce or prevent soil erosion from the construction site by:

- Scheduling construction/ rehabilitation to avoid heavy rainfall periods (i.e., during the dry season) to the extent practical
- Contouring and minimizing length and steepness of slopes
- Mulching to stabilize exposed areas
- Re-vegetating areas promptly
- Designing channels and ditches for post-construction flows
- Lining steep channel and slopes (e.g. use jute matting)
- Reducing or preventing off-site sediment transport through use of settlement ponds, silt fences, and water treatment, and modifying or suspending activities during extreme rainfall and high winds to the extent practical
- Restricting the duration and timing of in-stream activities to lower low periods, and avoiding periods critical to biological cycles of valued flora and fauna (e.g., migration, spawning, etc.)
- For in-stream works, using isolation techniques such as berming or diversion during construction to limit the exposure of disturbed sediments to moving water

To minimize the impacts of dredging activities, the following mitigation measures should be executed by the contractor:

- Adoption of construction sequencing and work procedures to minimize streambed disturbance
- Control of the rate of dredging to minimize the sediment loss rate
- Use of tightly closing grabs during dredging, to restrict the loss of fine sediment to suspension
- Careful loading of barges to avoid splashing of material
- Use of barges for the transport of dredged materials that are fitted with tight bottom seals in order to prevent leakage of material during loading and transport
- Filling of barges to a level which ensures that materials do not spill over during loading and transport and that adequate freeboard is maintained to ensure that the decks are not washed by wave action
- Control of the speed of the trailer dredger within the works area to prevent propeller wash from stirring up the seabed sediments
- Building of suitable barriers to intercept the transport of SS away from the project area
- Scheduling dredging activity during periods that don't interfere with fish spawning or intense migration

If the dredged sludge is removed from hydrocarbon polluted harbors, it should be handled and disposed of as chemical waste. As for vegetation damage and habitat loss associated with the installation of power transmission lines and towers in forest areas, the following mitigation measures are recommended:

- Select right-of ways to avoid important natural areas such as wild lands and sensitive habitats
- Utilize appropriate clearing techniques (hand clearing vs. mechanized clearing)
- Maintain native ground cover beneath lines
- Replant disturbed sites
- Manage right-of-ways to maximize wildlife benefits

Traffic

Typical primary measures adopted to mitigate traffic impacts during the construction and rehabilitation phases include the proper dissemination of information regarding the construction schedule, as well as providing alternate routes when needed and when feasible during all phases of construction. In this respect, proper planning and development of a traffic control plan that takes into account the reservations and inputs of local stakeholders is essential to minimize the effects and inconvenience of construction activities on commuters as well as ensure the safety of motorists, pedestrians and workers in the vicinity of construction zones. The basic principle in the development of traffic control plans is that motorists should be guided through construction zones in a clear and safe manner. This should be done through adequate warning, signing, delineation and channeling at least 500 m down and up-gradient from the construction site. These measures will provide motorists with positive guidance prior to and through the work zone. Preliminary routing schemes covering various construction phases must be developed and communicated early on to the public. In addition, limiting the movement of heavy

machinery during the construction phase to off-peak hours and providing prior notification are crucial measures to minimize the potential negative impacts of traffic.

At the bidding stage, the contractor must include a traffic re-routing plan for the construction phase. The construction period should take into consideration the possibility of night construction provided it does not disturb neighboring residents and commercial facilities. The tender documents will require contractors to present detailed plans for utility relocation (whenever applicable) that is approved by concerned agencies before excavating the site. Without compromising safety of workers, pedestrians, or vehicles, traffic roads will be re-opened as early as possible in order to minimize the impact on traffic during the construction period.

Health and Safety

During construction and rehabilitation activities, health and safety at the site are considered primarily in terms of accident occurrence (direct and indirect) to workers on-site, pedestrians, and machine operators or passengers. In the absence of national health and safety guidelines for construction projects, contractors need to follow international guidelines and procedures to ensure worker and community health and safety. Occupational health and safety measures should include:

- Restriction of access to the construction site by proper fencing whereby site boundaries adjoining roads, streets or other areas accessible to the public should undergo fencing not less than 2.4 m high from ground level along the entire length except for a site entrance or exit
- Establishment of buffering areas around the site
- Provision of guards on entrances and exits to the site
- Installation of warning signs at the entrance of the site to prohibit public access
- Provision of training about the fundamentals of occupational health and safety procedures
- Provision of appropriate personal protective equipment (PPE) (impermeable latex gloves, working overalls, safety boots, safety helmets, hearing protecting devices for workers exposed to noise levels exceeding 90 dBA⁵, and lifesaving vests for construction sites near water bodies)
- Ensuring that workers can swim and that lifesaving rings are available at the worksite, near water
- Ensuring that the protective material is being used wherever it is required
- Ensuring that especially sensitive or dangerous areas (like areas exposed to high noise levels, areas for especially hazardous work etc.) are clearly designated
- Ensuring that all maintenance work necessary for keeping machines and other equipment in a good state will be regularly carried out.
- Ensuring that the workers (and especially those doing hazardous work or otherwise exposed to risks) are qualified, well trained and instructed in handling their equipment, including health protection equipment.
- Provision of adequate loading and off-loading space
- Development of an emergency response plan

⁵ The maximum allowable 8-hour occupational noise standard set by OSHA

- Provision of on-site medical facility/first aid
- Provision of appropriate lighting during night-time works
- Implementation of speed limits for trucks entering and exiting the site
- Regarding hazardous substances, the following measures should be implemented by the contractor:
 - Ensuring that hazardous substances are being kept in suitable, safe, adequately marked and locked storing places
 - Ensuring that containers of such substances are clearly marked, and that material safety data sheets are available
 - Ensuring that all workers dealing with such substances are adequately informed about the risks, trained in handling those materials, and trained in first aid measures to be taken in the case of an accident.
 - Designating an area where contaminated materials and hazardous waste can be stored for proper disposal according to environmental guidelines.
- Regarding waterborne and water-related diseases substances, the following measures should be implemented by the contractor:
 - The adoption of good housekeeping practices for ensuring hygiene on site
 - The elimination of pools of stagnant water, which could serve as breeding places for mosquitoes
 - The provision of bednets for workers living on site. Ideally, these nets should be treated with an insecticide
 - The appropriate elimination of waste of all types, including wastewater
- Regarding other communicable diseases, particularly sexually-transmitted diseases (such as HIV/AIDS) which are of concern due to labor mobility, the following measures should be implemented by the contractor:
 - Providing surveillance and active screening and treatment of workers
 - Preventing illness among workers in local communities by:
 - Undertaking health awareness and education initiatives, for example, by implementing an information strategy to reinforce person-to-person counseling addressing systemic factors that can influence individual behavior as well as promoting individual protection, and protecting others from infection, by encouraging condom use
 - Training health workers in disease treatment
 - Conducting immunization programs for workers in local communities to improve health and guard against infection

- Providing health services
- Providing treatment through standard case management in on-site or community health care facilities. Ensuring ready access to medical treatment, confidentiality and appropriate care, particularly with respect to migrant workers
- Promoting collaboration with local authorities to enhance access of workers families and the community to public health services and promote immunization

The contractor is responsible for observing local safety regulations and taking all necessary measures to safeguard personnel working on site. In particular, the contractor should ensure that only persons who are properly trained are employed and that the correct tools and procedures are used. The contractor should provide a safety specialist responsible for the preparation, implementation and maintenance of a comprehensive safety program, which will be periodically evaluated. The responsibility of the safety specialist includes performing safety training and conducting safety inspections, sessions and practice. She/he will also be responsible for the investigation of accidents. A safety committee should be formed and regular safety meetings should be organized. All safety equipment and tools should be provided and maintained by the contractor.

In addition, for the rehabilitation and/or construction of fuel supply facilities, fire-fighting equipment such as dry powder extinguishers should be provided within the premises of the site. Moreover, fire fighting and leak checks training drills for the construction staff should be conducted. Note that smoking as well as litter or weed build up should be prohibited in the area as these may pose fire risks.

Socio-Economics

To mitigate negative socio-economic impacts, the following measures should be observed:

- Select project sites and rights-of-way (ROW) to avoid important social, agricultural, and cultural resources and avoid areas of human activity
- Utilize alternative designs to reduce land and ROW width requirements and minimize land use impacts
- Ensure a high rate of local employment to minimize influx of foreign contract workers
- Manage resettlement in accordance with World Bank Procedures, as set out in the accompanying draft RPF for this proposed project.

Landscape and Visual Impacts

Visual impacts during the construction activities are unavoidable but are of a short-term. During the construction phase, the site will witness heavy construction activities that will be associated with the presence of a multitude of heavy construction equipment, and construction spoils. As such, the site should be enclosed with non-transparent fencing to minimize the visual impacts on nearby areas. Construction equipment, construction materials, and transport vehicles should be prohibited from parking outside the fenced boundary of the construction site.

Physical Cultural Resources

At the planning stage, appropriate project siting should be conducted to avoid physical cultural resources and touristic sites. Prior to construction of new facilities, a field survey of physical cultural resources should be conducted and procedures to deal with 'Chance Finds' should be established, particularly where excavation works will take place. Construction teams should be trained on the 'Chance Find Procedures'.

d. Specific Measures for Power Transmission and Distribution Aspects

The electricity power transmission system includes transmission and distribution lines, their rights of way (ROW), switchyards, sub-stations and access or maintenance roads. The principle structures of the lines include the line itself, conductors, towers and supports etc. The width of the ROW ranges from 12 to 100 meters depending on voltage. Below are the mitigation measures for the major environmental and social impacts associated with the operation of power system structures. As set out in detail in the draft ESMF, the proposed project does not include any power lines with a voltage exceeding 33kV, and there is only one new substation (at New Dwangwa) which will operate at voltages greater than 66kV.

Land Resources

To mitigate loss of land use and natural habitat fragmentation, the following mitigation measures are recommended:

- Select the ROW to avoid important social, agricultural, and cultural resources;
- Route ROWs away from natural habitats and protected areas;
- Provide access control;
- Utilize alternative tower designs to reduce ROW width requirements and minimize land use impacts;
- Adjust the length of the span to avoid site-specific tower pad impacts;
- Manage resettlement in accordance with World Bank procedures.
- Noise
- Measures to mitigate noise impact should be addressed during project planning stages to locate rights-of-way away from human receptors, to the extent possible. Use of noise barriers or noise canceling acoustic devices should be considered as necessary.

Fauna and Flora

The construction and maintenance of the ROWs may have a significant impact on terrestrial habitats, particularly in Malawi. Recommended mitigation measures include:

- Selecting transmission and distribution rights-of-way, access roads, lines, towers, and substations to avoid critical habitat through use of existing utility and transport corridors, whenever possible;
- Installing transmission lines above existing vegetation to avoid land clearing;
- Avoiding construction activities during the breeding season and other sensitive seasons or times of day;
- Re-vegetating disturbed areas with native plant species;
- Removing invasive plant species during routine vegetation maintenance;
- Regular maintenance of vegetation within the rights-of-way to avoid disruption to overhead power lines and towers. This should be achieved through the implementation of an integrated vegetation management approach (IVM). The selective removal of tall-growing tree species and the encouragement of low-growing grasses and shrubs is the common approach to vegetation management in transmission line rights-of-way. Alternative vegetation management techniques should be selected based on environmental and site considerations including potential impacts to non-target, endangered and threatened species;

- Removing invasive plant species, whenever possible, and cultivating native plant species;
- Avoiding clearing in riparian areas;
- Avoiding use of machinery in the vicinity of watercourses.

In the case where the use of herbicides is the preferred approach to control vegetation growth within the ROWs, herbicide application should be managed to avoid their migration into off-site land or water environments.

Regarding the risk of forest fires, the following mitigation measures are recommended:

- Monitoring right-of-way vegetation according to fire risk;
- Removing blowdown and other high-hazard fuel accumulations;
- Time thinning, slashing, and other maintenance activities to avoid forest fire seasons;
- Disposal of maintenance slash by truck or controlled burning . Controlled burning should adhere to applicable burning regulations, fire suppression equipment requirements, and typically must be monitored by a fire watcher;
- Planting and managing fire resistant species, such as hardwoods, within, and adjacent to, rights-of-way;
- Establishing a network of fuel breaks of less flammable materials or cleared land to slow progress of fires and allow fire fighting access.

Regarding avian and bat collisions and electrocutions, they can be minimized by the following measures (World Bank, 2008):

- Aligning transmission corridors to avoid critical habitats (e.g. nesting grounds, heronries, rookeries, bat foraging corridors, and migration corridors);
- Maintaining 1.5 meter spacing between energized components and grounded hardware or, where spacing is not feasible, covering energized parts and hardware;
- Retrofitting existing transmission or distribution systems by installing elevated perches, insulating jumper loops, placing obstructive perch deterrents (e.g. insulated "V's"), changing the location of conductors, and / or using raptor hoods;
- Considering the installation of underground transmission and distribution lines in sensitive areas;
- Installing visibility enhancement objects such as marker balls, bird deterrents, or diverters.

Health and Safety

Both community and occupational health and safety are of concern in electric power transmission projects. Community health and safety issues involve chemical and EMF exposure, and electrocution and fire hazards. Chemical contamination from chemical maintenance techniques may be minimized by adopting the following mitigation measures:

- Utilizing mechanical clearing techniques, grazing and/or selective chemical applications;

- Selecting herbicides with minimal undesired effects;
- Not applying herbicides with broadcast aerial spraying;
- Maintaining natural low-growing vegetation along the ROW.

Electrocution hazard may result from direct contact with medium-voltage electricity or from contact with tools, vehicles, ladders, or other devices that are in contact with medium-voltage electricity.

Recommended techniques to prevent these hazards include:

- Use of signs, barriers (e.g. locks on doors, use of gates, use of steel posts surrounding transmission towers, particularly in urban areas), and education / public outreach to prevent public contact with potentially dangerous equipment;
- Grounding conducting objects (e.g. fences or other metallic structures) installed near power lines, to prevent shock.

Despite the fact that the evidence of adverse health risks associated with exposure to EMF is weak⁶ (NCIRP 2009), some mitigation measures are recommended, including:

- Considering siting new facilities so as to avoid or minimize exposure to the public. Installation of transmission lines or other medium-voltage equipment above or adjacent to residential properties or other locations intended for highly frequent human occupancy, (e.g. schools or offices), should be avoided;
- Evaluating potential exposure to the public against the reference levels developed by the International Commission on Non-Ionizing Radiation Protection (ICNIRP).

If EMF levels are confirmed or expected to be above the recommended exposure limits, application of engineering techniques should be considered to reduce the EMF produced by power lines, substations, or transformers. For example, shielding with specific metal alloys, burying transmission lines, increasing height of transmission towers, performing modifications to size, spacing, and configuration of conductors. Mitigation measures for fire hazards were presented above.

As for occupational health and safety, hazards specific to electric power transmission and distribution projects primarily include live power lines, working at height, electric and magnetic fields, and exposure to chemicals. Prevention and control measures associated with live power lines include:

- Only allowing trained and certified workers to install, maintain, or repair electrical equipment;
- Deactivating and properly grounding live power distribution lines before work is performed on, or in close proximity, to the lines;
- Ensuring that live-wire work is conducted by trained workers with strict adherence to specific safety and insulation standards;
- Workers should not approach an exposed energized or conductive part even if properly trained unless: The worker is properly insulated from the energized part with gloves or other approved insulation; or, the energized part is properly insulated from the worker and any other conductive object; or, the worker is properly isolated and insulated from any other conductive object;

⁶ In the absence of experimental evidence and given the methodological uncertainties in the epidemiologic literature, there is no chronic disease for which an etiological relation to EMF can be regarded as established (Ahlbom *et al.*, 2001).

- Where maintenance and operation is required within minimum setback distances, specific training, safety measures, personal safety devices, and other precautions should be defined in a health and safety plan.

Workers may be exposed to occupational hazards when working at elevation during construction, maintenance, and operation activities. Prevention and control measures for working at height include:

- Testing structures for integrity prior to undertaking work;
- Implementation of a fall protection program that includes training in climbing techniques and use of fall protection measures; inspection, maintenance, and replacement of fall protection equipment; and rescue of fall-arrested workers, among others;
- Establishment of criteria for use of 100 percent fall protection (typically when working over 2 meters above the working surface, but sometimes extended to 7 meters, depending on the activity). The fall protection system should be appropriate for the tower structure and necessary movements, including ascent, descent, and moving from point to point;
- Provision of an adequate work-positioning device system for workers. Connectors on positioning systems should be compatible with the tower components to which they are attached;
- Hoisting equipment should be properly rated and maintained and hoist operators properly trained;
- Safety belts should be of not less than 16 mm two-in-one nylon or material of equivalent strength. Rope safety belts should be replaced before signs of aging or fraying of fibers become evident;
- When operating power tools at height, workers should use a second (backup) safety strap;
- Signs and other obstructions should be removed from poles or structures prior to undertaking work;
- An approved tool bag should be used for raising or lowering tools or materials to workers on structures.

Electric utility workers typically have a higher exposure to EMF than the general public due to working in proximity to electric power lines. Occupational EMF exposure should be prevented or minimized through the preparation and implementation of an EMF safety program including the following components:

- Identification of potential exposure levels to electric and magnetic fields (EMF) in the workplace, including surveys of exposure levels in new projects and the use of personal monitors during working activities;
- Training of workers in the identification of occupational EMF levels and hazards;
- Establishing “No Approach” zones around or under high-voltage power lines in conformance with the table below:

No approach zones for medium-voltage power lines

<i>Nominal phase to phase voltage rating*</i>	<i>Minimal distance</i>
750 or more volts, but no more than 150,000 volts	3 meters

* Note that the proposed project activities will not include power lines with a voltage greater than 132kV.

- Implementation of action plans to address potential or confirmed exposure levels that exceed reference occupational exposure levels developed by international organizations. Action plans may include limiting exposure time through work rotation, increasing the distance between the source and the worker, when feasible, or the use of shielding materials.

Occupational exposures to chemicals in this sector primarily include handling of pesticides (herbicides) used for right-of-way maintenance. Recommendations specific to the use of pesticides include:

- Train personnel to apply pesticides and ensure that personnel have received the necessary certifications or equivalent training where such certifications are not required;
- Respect post-treatment intervals to avoid operator exposure during reentry to crops with residues of pesticides;
- Ensure hygiene practices are followed to avoid exposure of family members to pesticides residues.

Traffic

Aircraft collision impacts caused by transmission lines may be mitigated by adhering to the following (World Bank, 2008):

- Avoiding the siting of transmission lines and towers close to airports and outside of known flight path envelopes;
- Consultation with regulatory air traffic authorities prior to installation;
- Adherence to regional or national air traffic safety regulations;
- Use of buried lines when installation is required in flight sensitive areas.

Socio-Economics

To minimize the socio-economic impacts of electric power transmission projects, the following measures are recommended:

- Extensive public consultation during the planning of powerline and power line right-of-way locations;
- Accurate assessment of changes in property values due to power line proximity;
- Siting power lines, and designing substations, with due consideration to landscape views and important environmental and community features;
- Location of medium-voltage transmission and distribution lines in less populated areas, where possible;
- Burying transmission or distribution lines when power must be transported through dense residential or commercial areas.

3. Relevant Environmental & Social Procedures

e. Land Acquisition, Displacement and Compensation Framework

The accompanying draft Resettlement Policy Framework (RPF) document sets out in detail the approach to the implementation of OP 4.12 regarding involuntary resettlement that will be adopted in the project, including any requirements for land acquisition, displacement and compensation.

17. Hazardous Waste Management

As part of the implementation of the project, a Hazardous Waste Management Plan will be put in place. The overall goal of the waste management plan is to reduce and safely dispose of waste generated in all aspects of project implementation. As the guidelines for the project's ESMP further below describe in more detail, the ESMP consists mainly of Environmental, Health and Safety clauses to be implemented during construction by the contractors (with costs to be borne by the contractor). The ESMP will factor in *inter alia* the following specific points regarding Hazardous Waste Management, particularly with respect to PCBs. See Annex 3 for an ESMP template.

Principles

In order to reduce and safely dispose of waste generated during project implementation, the Implementing Agency (ESCOM) will ensure that the contractors adhere to the following principles:

- Operate in a manner consistent with the principles of sustainable development recognising that a key element of this is to inhibit the flow of wastes to the natural environment
- Identify, track and dispose in an environmentally responsible manner all potentially hazardous waste streams generated by project implementation, including oils, scrap metals and plastics, packaging, as well as solid wastes.

Proposed Hazardous Waste Management Practices

Oil-Filled Assets. The SAPP Guidelines on the Management of Oil Spills will be used as the basis, if necessary, for ESCOM's management of any oil spills that may occur during project implementation.

Asbestos. The SAPP Guideline for Safe Control, Processing, Storing, Removing and Handling of Asbestos and Asbestos Containing Materials will be used as the basis for developing an ESCOM Asbestos Waste Management Practice, if this proves necessary in project implementation.

PCBs. The following issues regarding PCBs will be taken into consideration by the contractors as part of the Hazardous Waste Management Plan in the project's ESMP:

- **Construction of secondary containment for transformer installation**—Secondary containment would be required at any substation receiving a new or replacement transformer. For estimating purposes, it was assumed that any existing secondary containment structure would not be large enough for the generally larger replacement transformer and that a new secondary containment structure would need to be built at every replaced transformer location. The costs include material costs for concrete and wood for concrete forms, plus labor costs for excavating, building forms, and mixing and placing concrete.
- **Excavation and disposal of oil-contaminated soil**—No contamination is anticipated along the transmission or distribution lines, so these environmental mitigation costs apply primarily to substations. At existing substations, the volume of soil generally encompasses an area slightly larger than the area for the secondary containment, plus an allowance for any heavy surface contamination near oil-filled equipment. For estimating purposes, an average depth of one meter should be used to calculate soil volumes. As noted above, soil from the **Fundis Cross** and **Chinyama** substation sites

is potentially contaminated with PCBs, so estimates need to be based on transportation of the soil from these sites to the landfill in Kigali, Rwanda, the closest identified facility that would accept PCB-contaminated waste. The estimates should include costs for characterizing, excavating, transporting, and disposing of contaminated soil.

- **Site characterization for PCB-containing oil-filled components scheduled for removal**—At substations where upgrades of transformers or oil-filled switchgear are proposed – i.e. at the **Fundis Cross** and **Chinyama** substation sites -- testing and characterization of the oil in each component slated for removal will be required. The costs for this mitigation measure would be based on providing a team of trained technicians to sample and test the PCB content of the insulating oils. The costs consider labor, testing supplies, safety equipment, and spill response materials.
- **Draining, documenting, labeling, and packing removed PCB-containing oil-filled components**—When a substation site tests positive for PCB oil-filled equipment, the removed equipment must be drained, labeled, and packed for shipping to an appropriate disposal location. Costs in this category will include the costs for trained technicians to drain the switchgear or transformer oil into barrels or tanks, manage any incidental solid waste such as rags or absorbent materials contaminated in the draining process, prepare the equipment for shipping, and document the process. It does not include any transport costs from the site or disposal costs.
- **Temporary Storage of PCBs** — Where necessary, the conditions for a temporary PCB waste storage areas (30 days or less, pending permanent disposal) include:
 - Mark the area with signs that indicate that the storage area contains PCBs.
 - Address all containers of PCB-contaminated liquids in a Spill Prevention, Control and Countermeasure (SPCC) plan.
 - Place leaking PCB items and equipment in a non-leaking PCB container (e.g. an over-pack drum or poly tray) with absorbent materials.
 - Non-leaking and undamaged large PCB capacitors and PCB-contaminated equipment may be stored on pallets if the permanent storage area has immediate available (unfilled) storage space equal to ten (10) percent of the volume of the capacitors stored outside the facility.
 - Check items weekly for leaks.
 - Mark all PCB items in temporary PCB waste storage areas with the date they were removed from service for disposal.
 - **Transport and disposal of PCB-containing oil-filled large transformers**— It is assessed that appropriate conditions for permanent PCB waste storage in Malawi do not currently exist. Instead, PCBs and PCB-contaminated waste will need to be transported abroad and disposed of in an appropriate fashion. Costs likely to be incurred in this category reflect the estimated costs to transport PCB-contaminated oil drained from large transformers to Thermopower Process Technology Ltd in Johannesburg, South Africa for thermal destruction by incineration. The cost of disposal varies based on the level of PCB contamination in the oil. The costs do not include any costs for shipping or dismantling the replaced transformers because ESCOM practice is to use the transformers at other substations if possible.
 - **Transport and disposition of PCB-containing oil-filled small transformers and switchgear** — The costs in this category, if any, reflect the estimated costs to transport PCB-contaminated oil drained from small transformers to Thermopower Process Technology Ltd in Johannesburg, South Africa for thermal destruction by incineration. The cost of disposal varies based on the level of PCB contamination in the oil.
 - **Transport and disposition of metal waste**—Substations undergoing rehabilitation and upgrades could have a variety of obsolete equipment removed such as old switchgear, insulators, cables, gantry components, control panels. The rest of the removed equipment will consist primarily of steel, copper, and aluminum components,

with smaller quantities of glass, ceramics, and plastics. Any scrap metal can be sold at a profit. Any receipts from the sale of the metal components are assumed to offset the costs of disposal of the materials with no scrap value.

4. Environmental & Social Management and Reporting

f. Corporate Level

As a general principle, it is important to have effective project reporting regarding environmental and social safeguards in place, since this forms the basis for annual corporate reporting. A number of monitoring indicators which ESCOM can use to evaluate its environmental and social management performance on an annual basis are listed at the end of this Section. These were considered in undertaking an initial environmental audit of ESCOM projects as a basis for future corporate environmental and social reporting.

The results of the preliminary environmental audit reflect the fact that up to now ESCOM has not had a Corporate Environmental & Social Policy or rigorous Environmental & Social Management System in place. Record keeping at project level is relatively poor compared to peer power utilities in Africa, especially with respect to environmental information and environmental procedures. Without a much more detailed environmental audit of ESCOM projects, it is difficult at present to report accurately on the socio-economic and environmental impacts of ESCOM projects and activities at the corporate level.

This situation will improve as ESCOM management puts in place an Environmental and Social Management Unit (ESMU) and as Project Managers take up environmental and social management responsibilities. As the proposed ESMU undertakes environmental audits of projects, an environmental information base will be progressively built up which can then be used as the basis for Corporate environmental and social reporting.

Furthermore, this ESMF sets out in Section C below a proposed **Corporate Environmental and Social Management Plan** ('CESMP'). This is **not** the regular ESMP for this ESMF, but constitutes instead a set of proposed areas for capacity building that will help ESCOM minimise and/or avoidance negative environmental or social impacts across its operations. A budget for these activities, to be financed by the WB project, is proposed in the Institutional Arrangements section below.

Monitoring Indicators for Environmental Management Performance

It is the responsibility of ESCOM to conduct regular internal audits of the environmental performance of its operations. The audits should be a systematic evaluation of all activities undertaken in relation to a defined set of indicators. This information can then be incorporated into ESCOM's corporate Annual Report.

The following indicators can be used as an initial basis for reporting environmental performance at corporate level across ESCOM projects:

- Number of project activities for which an environmental and social screening form has been completed. The requirement to complete a screening form for each Project is part of the recommended EMSP for ESCOM. It is also designed to meet the screening requirements of international financing donors such as the World Bank. This is therefore a key indicator for ESCOM. The target should be to complete a screening form for every project and specific activity.
- Tracking of projects by impact category. As set out above, project activities can be categorised into three categories: (i) ESIA required; (ii) no ESIA required, (iii) not yet clear if ESIA required. This would provide an indication of the type of projects ESCOM is developing in terms of potential environmental and social impacts. For example, a predominance of projects requiring ESIAs could highlight the need to re-assess the project types proposed by ESCOM and to develop more "environmentally friendly" projects.

- Environmental management training events attended by ESCOM staff. This can provide an indication of staff and management commitment. This could also be divided into internal and external, formal and informal categories as well as environmental and non-environmental staff.
- Ratio of environmental / social staff to the total number of ESCOM technical staff. In addition to numbers of staff, tracking the types of professional discipline (e.g. social, geographer, ESIA specialist) is also important to ensure a mix of appropriate capabilities across social and environmental fields.
- Implementation of a ‘corporate’ Environmental and Social Management Plan (ESMP). In addition to the project-specific ESMP, as set out in Annex 3 to this draft ESMF, ESCOM should have a corporate ESMP for its overall operations which is reviewed (and updated if necessary) at least once per year. Ideally, it would include monitoring indicators to be used in assessing annual environmental and social performance as well as longer term performance. Recommendations for aspects of this corporate ESMP are given below.
- Actions implemented to involve the community. Given the nature of ESCOM’s projects and their poverty alleviation implications, this is an important indicator.

An annual report on ESCOM environmental and social performance could be prepared based on the above indicators. This should form part of ESCOM’s Annual Report and can also be submitted to the Malawi Energy Regulatory Authority (MERA) for their comment and review.

18. Project Level

Project Environmental & Social Reporting Responsibilities

The primary and overall responsibility for project environmental and social reporting rests with ESCOM, and in particular with the Environmental and Social Management Unit (ESMU), since they have the responsibility to ensure that the environmental and social management procedures as outlined in this draft ESMF (including the associated project ESMP in Annex 3) and the accompanying draft RPF are applied to the project. In addition to ESCOM staff and management, the contractors and consultants (e.g. consulting engineer) involved in the implementation of the project’s activities also have reporting responsibilities, as outlined below.

- **ESCOM Project Managers.** ESCOM Project Managers have reporting responsibilities for social and environmental matters just as they have reporting responsibilities for the engineering and financial aspects of their projects. They are required to report to the Manager of ESCOM’s ESMU that environmental screening has been applied to their project, that the project ESMP has been followed and that any necessary follow-up measures in the planning, implementation (construction) and operation of their project have been taken. In the event that project activities require specific mitigation measures and monitoring requirements following the screening process (such as preparation of an ESIA, an ESMP or a full or abbreviated RAP), or as outlined in the project ESMP, the following reporting responsibilities rest with the Project Manager:
 - Overall responsibility for ensuring that the project’s ESMP is updated and implemented, and that they comply with all legislative and contract requirements.
 - Ensuring and partaking in regular reviews of the ESMP and documenting any changes.
 - Providing a regular report to ESCOM’s ESMU and ensure that findings and recommendations are responded to and implemented as necessary.
 - Ensuring any non-conformities are reported.
 - Ensuring any non-conformities are corrected within the required time frame and that remedial solutions are effectively implemented and documented.

- Supervising contractors and consultants to ensure that they fulfil their environmental and social obligations, as set out in the project ESMP that forms part of the contract documents, and recording compliance.

Ongoing monitoring of air and water quality, noise impacts and solid waste disposal may be required under the project ESMP to assure compliance with regulations and guidelines and appropriate reporting of monitoring data to the concerned regulatory agencies. Although not required by any ESIA that may be undertaken, or any Government of Malawi environmental regulations, it is important that the results of environmental and social monitoring also be conveyed to the affected public. In addition, the project manager may seek assistance from ESMU in undertaking the above reporting requirements.

- **Consultants.** Consultants – in this specific case, the Consulting (or Supervisory) Engineer that ESCOM shall recruit to assist in preliminary design, procurement and supervision of the project activities – shall be required to submit monthly project environmental & social status reports as an attachment to their monthly progress report. The report should cite accomplishments of the preceding (billed) month and objectives of the current month and next month. In particular, as the Consulting Engineer will be working at project sites on a day-to-day basis with the contractors, the report should describe adherence to the project ESMP clauses included in the contractors’ contracts. This supervisory requirement shall form part of the ToR for the Consulting Engineer, who shall have appropriate professional experience with World Bank safeguards provisions in this respect. Any problems encountered or expected and corrective measures should also be stated and reported to the ESCOM project manager.
- **Contractors.** As the actual implementer of the project works (for Component 1a), the contractor bears responsibility for implementing the project ESMP that will form part of their contract, consisting mainly of Environmental, Health and Safety clauses. As part of implementing the project ESMP, the contractor must develop appropriate protocols for regular site inspections and audits that monitor compliance with environmental and social legislation (including any relevant licensing requirements imposed by MERA, the sector regulator).

19. *Corporate Environmental & Social Management Plan (CESMP)*

One of the main responsibilities of ESCOM’s ESMU is take appropriate measures to ensure the minimisation and or avoidance of any negative environmental or social impacts across ESCOM’s operations. This section outlines the broad elements of a **Corporate ESMP (CESMP)** which sets out the actions and targets to manage and improve overall ESCOM’s environmental and social performance (as opposed to project-specific actions, which are covered in Annex 3). The corporate ESMP should be revised annually and carried forward on an ongoing basis. While this corporate ESMP is not a requirement for implementation of the proposed Malawi Energy Sector Project project, it is recommended as best practice for managing environmental and social safeguards issues across ESCOM. Note that this CESMP does **not** constitute a ‘regular’ project ESMP , but constitutes instead a set of proposed areas for capacity building that will help ESCOM in minimising negative environmental or social impacts across its operations. A **budget** for these activities, to be financed by the WB project, is proposed in the Institutional Arrangements section below.

The provisions of this Corporate ESMP need to be integrated into ESCOM’s business strategies and plans so that adequate budget and resources are allocated in implementing it. The ESMU should be the driving force in ensuring the Plan is integrated into ESCOM operations and should have the responsibility for reviewing the Plan.

Principles

ESCOM should conduct its overall operations by adopting the following principles/actions which are reflected in the corporate ESMP:

- **Precautionary principle** – reduce the chance of serious environmental problems even if it is unsure that these problems will occur.

- **Inter-generational and intra-generational equity** – reduce the effects of activities on the environment that the community, now and in the future, relies on to meet its needs and expectations.
- **Conservation of biological diversity and ecological integrity** – manage properties to maintain the range of native plants and animals and the health of natural areas.
- **Improved valuation and pricing of environmental resources** – improve the way environmental costs and benefits are valued and use this information in decision making, particularly with respect to development of new projects.

In implementing these principles ESCOM will reduce risks to human health and reduce its impacts on the environment by:

- Reducing the environmental impact of its discharges to air, water and land;
- Minimising the creation of waste;
- Reducing the use of energy, water and other materials and substances;
- Reusing and recovering energy, water and other materials and substances, where feasible.

The following table sets out a set of recommended actions that would allow ESCOM to put in place a corporate ESMP that would allow the objectives set out above to be met.

CORPORATE ENVIRONMENTAL & SOCIAL MANAGEMENT PLAN (CESMP): RECOMMENDED ACTIONS

Objective	Action	Responsibility
Ensure environmental and social sustainability in all ESCOM activities	<p>Evolve the environmental and social management procedure / practices and update as necessary for ESCOM in line with MERA (energy sector regulator) requirements, national legislative requirements and best international practices.</p> <p>Design programme to advise ESCOM on specific sustainability issues in relation to its upcoming projects and ensure that efforts are made to achieve the ESMU's objectives.</p> <p>Plan and develop a programme to minimise environmental and social impact of ESCOM activities, and explore opportunities to ensure that environmental and social features are identified and exploited through the design projects.</p> <p>Produce and disseminate guidance on sustainability aspects for ESCOM Projects.</p> <p>Monitor and follow-up the environmental and social impacts of ESCOM's projects.</p>	ESMU
Develop environmental & social information program	<p>Maintain corporate environmental and social information and a reference library on social and environmental matters.</p> <p>Prepare annual report on state of environmental and social issues within ESCOM.</p>	ESMU
Develop social and environmental monitoring and reporting capacity	<p>Carry out annual survey of ongoing projects and report on environmental and social aspects</p> <p>Maintain an environmental monitoring program to monitor the condition of sensitive sites and minimise the potential for enforcement action due to non-compliance.</p> <p>Develop a time frame and program for adoption of ISO 14001 Environmental Management System (EMS) in ESCOM.</p> <p>Develop a framework for providing environmental information, communication, and capacity building services for environmental management and impact assessment throughout ESCOM.</p>	ESMU
Internal capacity building	<p>Develop capacity to highlight and demonstrate the socioeconomic impact of ESCOM's activities on the people of Malawi.</p> <p>Develop the capacity to guide and assist other parts of ESCOM in handling issues of compensation of PAPs.</p> <p>Establish a social and environmental training program for ESCOM staff and oversee its implementation.</p>	ESMU
Establish and maintain a separate ESMU	<p>Display environmental issues of power sector on website for public awareness.</p> <p>Provide environmental information regarding ESCOM's activities, projects and operations to</p>	ESMU

Objective	Action	Responsibility
section on ESCOM's website for presenting environmental & social issues	ESCOM stakeholders and the public.	
Increase awareness on environmental & social issues of ESCOM's operational staff	Organise workshops, seminars and make presentations on environmental & social issues regularly for various categories of staff. Improve procedures for general awareness-raising on environmental & social issues, e.g. impact minimisation.	ESMU
Fully functioning Environment & Social Management Unit (ESMU)	Environmental & social resources – ensure adequate and relevant staffing and expertise Provide necessary field equipment Office – establish and maintain reference library	ESCOM Management & ESMU
Develop/implement hazardous waste management procedure	Develop and implement comprehensive procedures, in line with the guidance set out in the main sections above.	ESMU
Improve environmental & social assessment, management and monitoring	Develop and apply monitoring and evaluation guidelines, to be implemented for all current and future projects. Develop and implement procedures for handling and disposal of PCBs and other hazardous waste, building on this draft ESMF and accompanying project ESMP	ESMU
Improve social impacts assessment	Develop and apply guidelines for undertaking an ESIA for future projects	ESMU
Record keeping and establishment of environmental data base	Creation and ongoing development of a database capturing system (e.g. Microsoft Access), linked to a Geographic Information System (GIS), to hold all project information.	ESMU
Environmental Compliance	Complete an environmental and social screening form (based on the examples in this draft ESMF) for each project activity, and audit the use of the form	ESMU

5. Institutional Arrangements & Budget

Overall responsibility for environmental / social supervision outlined in this draft ESMF will rest with ESCOM's Environmental and Social Management Unit (ESMU). The ESMU will consult with the Malawi Environmental Affairs Department, within MNREE, in implementing the provisions of this draft ESMF. In particular, the ESMU has responsibility for the screening process set out in this document (see Annex 2 for the detailed screening form), the categorization of the results from the screening, and the determination of the necessary follow-up actions. While external consultants can assist the ESMU in this task, this does not remove the ESMU's overall responsibility as part of the implementing agency. In general, the ESMU should be involved in all new project and sub-project planning operations.

Multiple actors will be responsible for implementation of the findings from the screening process. Environmental and social clauses drawn from the project ESMP will be included in the bidding documents for the main Supply & Install contracts, so that contractors will be contractually responsible for environmental/social management during construction. It should be noted that most of the budget required for the implementation of the ESMP will be part of the contractor's contract.

In addition, ESCOM's Consulting Engineer (supervisory engineer) will be responsible for supervising that there is adequate adherence to these environmental and social clauses by the contractors during project implementation.

Budget

As ESCOM has relatively limited experience of implementing World Bank-financed projects, and given that ESCOM's ESMU is a relatively new unit, a budget estimated at US\$500,000 will be allocated from the project financing to ensure adequate technical assistance and training is made available to the ESMU, to enhance its capacity to manage the environmental and social issues identified in this draft ESMF and accompanying ESIA.

The budget would be composed as follows:

Budget Item	Indicative Amount (US\$)
Screening process	\$200,000
Training and workshops to support implementation of the Corporate ESMP	\$100,000
Targeted technical assistance and capacity-building support to embed social and environmental processes in ESCOM	\$100,000
Funding for preparation of ESIAs, ESMPs and full/abbreviated RAPs during implementation, as necessary	\$100,000
	\$500,000

ANNEX 1: LIST OF POSSIBLE SITES

Component 1a: Distribution & Transmission Upgrading And Expansion

CATEGORY & ACTIVITY CODE	SUMMARY DESCRIPTION
New 132kV Substations (Central & South)	
6047	New Dwangwa 132/33kV Substation Associated T-lines
New Distribution Substations (North)	
7081	Katoto 33/11kV Substation Associated T-lines
New Distribution Substations (Central)	
7065	Kauma 33/11kV Substation Associated T-lines
New Distribution Substations (South)	
7002	Bangwe 33/11kV Substation Associated T-lines
Uprate Existing Substations (Central)	
6007	Golomoti 132/66/33kV Substation
6016	Chinyama 66/33kV Substation
Uprate Existing Substations (South)	
6013	Fundis Cross 66/33kV Substation
7011	Nkula 66/33kV Substation
7001	Balaka 66/33/11kV & Chingeni 66/33kV (also 6035 and 6037)
New 33/11 kV Distribution Lines (North)	
7090	Karonga - Mzuzu road OHL
7091	Luwinga - T/hill - Mzuzu OHL
7092	Luwinga - Choma Poultry OHL
7093	FMB - Kaning'ina (New) OHL
New 33/11 kV Distribution Lines (Central)	
7075	Area 25 - Lumbadzi (Kamuzu Int. Airport) OHL
New 33/11 kV Distribution Lines (South)	
7036	Bangwe 205 - Nguludi Turn off OHL
7119	Mapanga - Chiladzulu 33 kV OHL
Rehabilitate 33 and 11kV Lines (South)	
7018	Chichiri 105 - Customs 205 OHL
7022	Chileka 305 - Mapanga 505 OHL
Underground Cables Rehabilitations (North)	

7095	Mzuzu S/S - St. Pauls UGC
Underground Cables Rehabilitations (South)	
7038	Queens - MBC UGC
7039	Queens - MCA UGC
7041	Customs - Kassam UGC
7042	Customs - St. George UGC
7043	St. George - BT Main UGC
7044	Kassam - BT Main UGC
7046	Limbe 'A' - RMI49 UGC
7047	RMI1353 - RMI377 UGC

Peri Urban Network Extensions	
8002.01	Chadzunda
8002.03	Mapanga (Area 12 Machinjiri)
8002.05	Mpemba (New Chilobwe)
8002.07	Soche Hill
8002.08	Chileka road
8002.09	Mdala village
8002.10	Matabi
8002.11	Federation - Angelo
8012.01	Chikupira
8012.02	Old Naisi
8012.03	Skinner
8014.01	Area 21
8014.06	Area 25B beyond TTC
8014.07	Area 43
8014.08	Area 44
8014.09	Area 44 proper
8014.12	Area 49/1B
8014.13	Area 49/5
8014.14	Area 49/6
8014.17	Chimoka
8014.18	Chinsapo (Area 46)
8022.01	Katoto-Mzuzu

Component 1b: Low Voltage Reticulation Reinforcement

Low Voltage Reinforcement Project	
9000	Low Voltage Reticulation Goods & Equipment for installation in existing grid areas in Lilongwe, Blantyre, Mzuzu & Zomba
	Training School for ESCOM linesmen & technicians
	Consulting Engineer to advise ESCOM on Component 1b

ANNEX 2: ESIA SCREENING FORM

Guidance on how to complete the Screening Form:

- Answer all relevant questions
- Provide an additional description, where needed, for all “yes” answers
- Provide the required supporting documentation, such as maps, in an Annex

To expedite review of the submission and obtain approval for the project by the “responsible regulatory body”, it is important that the information provided is as complete and comprehensive as possible.

Project Identification and Project Proponent

Name of Project:			
ESCOM Project Reference Number:			
Location of Project: (locality / village, administrative post, district, province)		GPS coordinates:	
Place of activity			
Method of selecting Project:			
Project Proponent Name:			
Project Funding Source (e.g. GoM, MCC, WB etc.)			
Type of Project			
Proponent Contact	Name:		
	Phone:		
	E-mail:		
Screening Consultant Company (if applicable)	Company/ Individual Name:		
	Phone:		
	E-mail:		
	Representative		

	Name:	
	Phone:	
	E-mail:	

Project Description

Project aims / objectives:

Type and quantity of energy to be supplied (kVA/kW):

List ESCOM's involvement and their activities / responsibilities:

- List other organisation's involvement and their activities / responsibilities, if applicable:

Approximate Project cost:

Start and end date (month / year) of Project Implementation Phase:

Major Project stages:

List the following to be used during the Implementation and Operation Phases:

Technology and machinery:

Type, origin and quantity of work force:

Type, origin and quantity of raw material:

Chemical products, including scientific names:

Origin and quantity of water:

Origin and quantity of fuel and lubricants:

Other resources:

Location

Attach maps as annexes showing:

Geographical location of the Project:

An appropriately-scaled map clearly showing:

- ③ The Project area with existing buildings, infrastructure, vegetation and land use;
- ③ The Project area with any planned construction, plants, transmission lines or access roads.

Reasons for selection of locality:

Alternative Project localities considered:

The Biological Environment

The Natural Environment

Describe the habitats and flora and fauna in the Project and wider area (e.g. downstream area, access roads) expected to be affected by the Project, and note the level of disturbance from human occupation:

Will the Project directly or indirectly affect ecologically important areas such as:

Natural forest types?

Remnant vegetation?

Wetlands (i.e. lakes, rivers, swamps, mangroves, seasonally inundated areas)?

Other habitats of threatened species that require protection under Malawi laws and/or international agreements?

Are there, according to background research / observations, any threatened / endemic species in the Project area that could be affected by the Project?

Will vegetation need to be cleared for the Project?

Will there be any potential risk of habitat fragmentation due to clearing activities?

Will the Project lead to a change in access to the project area, leading to an increase in the risk of depleting biodiversity resources?

Will the proposed Project activity trigger World Bank OP 4.04 Natural Habitats?

Protected Areas

Does the Project area or do Project activities:

Occur within or adjacent to any designated protected areas?

Affect any protected areas downstream of the Project?

Affect any ecological corridors used by migratory or nomadic species located between any protected areas or between important natural habitats (protected or not) (e.g. mammals or birds)?

Will the proposed Project activity trigger relevant clauses around Protected Areas in World Bank OP 4.04 Natural Habitats?

Invasive Species

Is the Project likely to result in the dispersion of or increase in the population of invasive plants or animals (e.g. along transmission lines or as a result of a dam or new access road)?

The Physical Environment

River Systems

Will the Project affect:

Water quantity?

Water quality (i.e. through sedimentation, chemical pollution)?

River stream patterns?

Seasonal flow variations?

Flooding regime?

River ecology?

Aquatic habitats?

Geology / Soils

Will vegetation be removed and any surface left bare?

Will slope or soil stability be affected by the Project?

Will the Project cause physical changes in the Project area (e.g. changes to the topography)?

Will local resources, such as rocks, sand, gravel or groundwater, be used?

Could the Project potentially cause an increase in soil salinity in or downstream of the Project area?

Could the soil exposed due to the Project potentially lead to an increase in leaching of metals, clay sediments or organic materials, or the formation of acid sulphate soils?

Landscape / Aesthetics

Will the Project adversely affect the aesthetics of the landscape (e.g. through the construction of transmission lines, windmills, solar panels)?

Pollution

Will the Project use or store dangerous / hazardous substances (e.g. large quantities of hydrocarbons)?

Will the Project produce solid or liquid wastes (e.g. from construction camps, runoff from irrigation areas)?

Will the Project cause air pollution (e.g. dust)?

Will the Project generate noise? Distinguish between temporary, during implementation (construction activities), and permanent, after implementation (diesel generators, windmills)?

Will the Project generate electromagnetic emissions (common to transmission lines)?

Will the Project potentially release pollutants into the environment, e.g. refurbishment / replacement of electrical transformers which contain Polychlorinated Biphenyls (PCBs), a persistent organic pollutant (hazardous waste) which is highly toxic to the environment and people? (PCBs were once added to transformer oils.)

Will the Project accumulate spent batteries requiring safe disposal?

The Social Environment

Beneficiaries

Number / profile of direct beneficiaries and expected benefits:

Land Use, Land Acquisition, Resettlement and In-Migration

Total estimated land size of Project area (obtained from a map):

Describe existing land use of Project area (e.g. government structures, residences, service facilities, community facilities, agriculture, forestry, tourism):

Total estimated size of land directly impacted by the Project (land loss):

Describe existing use of land directly impacted by the Project:

Who presently uses the land directly impacted by the Project?

Will a large area or a high proportion of a community's land be directly impacted by the Project?

Describe the predominant existing land use within a ½ km radius of the Project area:

Are there sensitive land uses near the Project area (e.g. hospitals, schools)?

Will any proposed land use plans be negatively affected by the Project?

Will any densely populated areas be affected by the Project?

Will the Project require the resettlement of any residents / businesses, and to what extent (provide approximate numbers of households/businesses)?

Will the Project trigger World Bank OP 4.12 Involuntary Resettlement?

Will the Project affect any resources that local people use from the natural environment?

Will the Project restrict people's access to land or natural resources?

Will the Project result in construction workers or other people moving into or having access to the area during Project implementation?

Will the influx of people into the area lead to additional demands on local water supplies and other social amenities?

Loss of Crops, Trees and Structures

Will the Project result in the permanent or temporary loss of:
Crops?

Fruit trees and/or other productive trees e.g. coconut palms?

Structures for homesteads or businesses?

Health and Safety

Is the Project likely to affect human / community health (e.g. through the spread of communicable diseases /disease vectors, or through the use of hazardous substances)?

Is the Project likely to endanger worker's health and safety and/or public safety?

Socio-Economic Status

Brief socio-economic profile of the area:

Is the Project likely to provide local employment opportunities, including employment opportunities for women?

Will the Project reduce income, or negatively affect existing economic activities?

Is the Project giving attention to local poverty alleviation objectives?

Historical, Archaeological or Cultural Heritage Sites

Will the Project affect or alter historical, archaeological, and/or cultural heritage site(s) or require excavation near the same?

Will the Project affect or alter sacred locations (e.g. fetish trees or stones) or require excavations near the same?

Will the Project affect graves?

Will any of the Project activities trigger World Bank OP 4.11 Physical Cultural Resources?

Other Impacts

Is the Project area or its immediate surroundings subject to pollution or environmental damage caused by other (existing) activities?

List other environmental / social factors that may have a significant impact (positive or negative) on the Project, and the expected intensity of such impacts:

Project Operation

Is the Project being designed with local participation (including the participation of women) in the planning, design, and implementation phases? List local groups and non-governmental organisations (NGOs) consulted to date:

Does the Project have an operating and/or management plan?

What technical training / support are proposed to ensure ongoing operation of the Project?

Provide details of any proposed mitigation / compensation measures:

Are any monitoring activities proposed for the Project?

Are any Project audit / review procedures proposed?

RECOMMENDATIONS:

ESIA CATEGORY:

The proposed project will:

- (a) not require additional environmental work
- (b) require only an ESMP
- (c) require an Environmental Impact Assessment (ESIA) report,
including an Environmental and Social Management Plan (ESMP)
- (e) require the preparation of a full or abbreviated Resettlement Action Plan (RAP)

Briefly describe reasons for selecting the ESIA category:

VERIFICATION OF SCREENING FORM

Signature (Proponent)

Name, Position and Date:

Signature (Consultant Company / Individual, if applicable)

Name, Position and Date:

Signature (ESCOM)

Name, Position and Date:

ANNEX 3: ESMP 'TEMPLATE'

As part of the ESIA process discussed in this document, Environmental and Social Management Plans (ESMPs) will be prepared, as necessary, for relevant project activities. This annex provides a broad overview of the critical elements of these ESMPs.

As part of the ESIA process, appropriate measures should be considered to eliminate or mitigate the negative social and environmental impacts identified, and such measures should be described in the ESMPs. Each ESMP will include a detailed plan to monitor the implementation of these impacts - mitigating measures related to project construction and operation. The ESMPs should include a proposed work program, budget estimates, schedules, staffing and training requirements, and other necessary support services to implement the mitigating measures.

The ESMPs shall review the authority and capacity of institutions at local, regional, and national levels and recommend steps to strengthen or expand them so that the ESMPs may be effectively implemented. Recommendations may extend to new laws and regulations, new agencies or agency functions, inter-sectoral arrangements, management procedures and training, staffing, operation and maintenance training, budgeting, and financial support.

An outline of the contents of the ESMP should be included in the project's Operational Manual, along with environmental/social protection clauses for contracts and specifications.

Development of ESMPs should be led by ESCOM's ESMU, in close collaboration with the project's technical consultancy, specifically the project Consulting (supervisory) Engineer, relevant environmental and social authorities, public administrators, local NGOs and project affected groups.

The ESMPs should include and address the following:

- Management program to address the most adverse environmental, social and public health impacts;
- Plans for the control of residual impacts and emergency situations during construction and operation.
- A Health Impact Statement detailing measures to mitigate public health and safety risks
- Provisions to facilitate implementation of ESMP measures, such as:
 - An environmental & social policy and Code of Conduct;
 - Roles and responsibilities of the various responsible parties involved in the various phases of the project;
 - Standards, guidelines and legal requirements (including environmental permits required and the processes to be followed in obtaining these permits);
 - Environmental & social specifications for design;
 - Environmental & social specifications for construction;

- Environmental & social specifications for operation;
- A draft budget for each of the proposed actions.
 - Detailed maintenance plans relating to inter alia, 'clean' and contaminated topsoil and waste management, 'clean' and polluted water management, removal of vegetation, erosion and slope stabilization, noise management, uncontaminated solid waste management, hazardous material and waste management, fuel off-loading and storage, air quality management, health and safety strategy, risk management and emergency response, socio-economic factors, land use and public consultations with PAPs.
 - A detailed monitoring program that includes: soils, vegetation, ecological indicator species, surface and ground water quality, air quality, noise, marine environment and socio-economic indicators, for instance, related to labor, safety, control and access to land & resources, gender, beneficiaries, and community engagement. The ESMPs will identify responsible parties, the location of monitoring points, what must be monitored and how frequently. In order to ensure that all aspects are appropriately considered within the ESMPs, specialist input is recommended.

ANNEX 4: PRELIMINARY PUBLIC CONSULTATIONS

(See Section B.1.E above for further information)

Organisation	Individual	Date (all 2010) and Place	Topics	Comments
Commissioner of Lands, Blantyre	Kwame K. Ngwira	Week of March 15, Blantyre	Data similar to that from Ministry of Lands on land acquisition and registration process; special concerns included siltation and monitoring the development around the Shire River	
Commissioner of Lands, Lilongwe	Mr. Chifomboeti	Week of March 22, Lilongwe	Data similar to that from Ministry of Lands and Commissioner of Lands, Blantyre	
Environmental Affairs Department	B. Yassin	March 17, Lilongwe	Sources of baseline data; weed problem in Shire River; current and forthcoming “state of environment” and “environmental outlook” reports; organization of environmental management functions from district to village levels; existing guidance	There is a history of Government concern about weed problem; capacity for environmental management at district level and below has fluctuated; is increasing now
Ministry of Lands, Land Registry	F. Chikembote, O. Mlozi	March 18, Lilongwe	Land registration process; gender representation; pending land policy; ESCOM and eminent domain	Currently land registration takes more than a year; documents are in English; women may own land, but few are registered as owners
Matabi peri-urban site	Local residents	March 14, Blantyre	Number of people waiting for power; duration of wait; plans for residential and business uses of power; reasons for living in village; current expenditures for food, paraffin; makeup of families; employment; water source; waste management	Matabi peri-urban site
Mangambe Village	Local residents	March 15, Mangambe village in upper Shire River watershed	Agricultural practices and perceived environmental problems, gender-specific aspects of economy and agriculture	Used for general background and comparative information
Mpilisi – Liwanga	Local	March 15, near	Demographic makeup of village; gender-specific economic and agricultural practices,	Weeds are used in the

Village	residents, including chief	Liwonde Barrage	especially history of use and current uses of weeds; requests from village for future weeds; Government subsidy for fertilizer; village's proposed future site for weed deposition	same way that other fertilizers are used—burned, composted with animal waste, or planted in directly; need this additional source of fertilizer, as Government subsidizes only for a small percent of population
Issa Mponda Village	Local residents	March 16, Issa Mponda Village in upper Shire River watershed	Agricultural practices and perceived environmental problems, gender-specific aspects of economy and agriculture	
Manjeira Village	Local residents	March 16, Manjeira Village in upper Shire River watershed	Agricultural practices and perceived environmental problems, gender-specific aspects of economy and agriculture	
Chigumula Village	Local residents	March 27, along Chigumula-Bangwe line 7035 DLS	No unallocated customary land available; price of land; no known additional rental houses nearby for renters who work at local factory; price of houses	
Kasinje Village	Local residents	March 28, along Nkula-Golomoti line 6006 TLS	Likely project-affected persons have no land outside the wayleave to move to—their houses and fields all would be affected	
Chimbala Village	Local residents	March 29, along Salima-Chintheche line 6010 TLC	Some residents say that a line crossing graveyard (not poles) would be acceptable; others say line should be on one side or the other, not crossing the graveyard. Residents disagree about whether relocating houses or traversing graveyard would be better.	
Mandezu area at Mbemba	Local residents	March 30, along Chintheche-Luwinga line 6001 TLN	Agricultural practices, gender-specific aspects of economy and agriculture; value of trees, houses, crops	
Chaola Village	Local residents	March 30, along Chintheche-Luwinga line 6001 TLN	Agricultural practices, gender-specific aspects of economy and agriculture; value of trees, houses, crops	
Mapunda Village	Local residents	March 30, along Chintheche-Luwinga line	Uses of local wild plants; value of trees, houses, crops	

		6001 TLN		
Bwengu Village	Local residents	March 31, along Luwingu-Bwengu line 6004 TLN	Agricultural practices, gender-specific aspects of economy and agriculture; value of trees, houses, crops	
Blantyre District Assembly	Precious Kantitsi, Director of Planning and Development	January 28 and March 17, Blantyre	Socioeconomic data, sources for environmental data; organization of assembly, identification of interested and informed staff to be further consulted Major concerns: <ul style="list-style-type: none"> • Public involvement in determining uses of the Shire River • Public consultation with district assembly • Sufficient water for drinking and irrigation • Tendency for nearby public to take advantage of ESCOM's tree removal and remove more trees • High-voltage power lines must avoid villages • Increased road deterioration due to use by ESCOM trucks and vehicles • Opportunity should be afforded to locals to conduct the work (economic benefit and reduced occurrence of HIV) • Siltation • Adherence to construction guidelines particularly when filling in excavations and regenerating (use caution when planting blue gum [i.e., eucalyptus trees] because they deplete aquifers and water sources) • Inform villages (i.e., chiefs) before work begins 	
Blantyre City Assembly	Solid Waste Management	January 28, Blantyre	Landfills, regulations and practices applying to contractors regarding waste disposal (construction waste, hazardous waste, recycling); waste disposal for city residents and businesses	
Coordination Unit for the Rehabilitation of the Environment (CURE)	Christopher Mwambene, Director	28-Jan	<ul style="list-style-type: none"> • Catchment management – people have moved into those areas in last 20 years; middle Shire contributes the silt; upper Shire contributes the weeds. • Most displacement occurred when plants were built. • Regarding weed management: <ul style="list-style-type: none"> – Composting—compost would be useful for mulch (in rain-fed agriculture, which is what Malawi has). The issue is skills transfer: ESCOM could harvest but farmers must be trained to compost and mulch – Harvesting—mechanical might not be best method (review costs); biological solutions might be appropriate but could have unintended consequences • Consider use of silt—distribute to farmers • ESCOM environmental unit is expanding—capacity building of that unit would be advantageous. • To what extent ESCOM adequately communicates with communities around plants and facilities is not known • ESCOM must apply economically acceptable tariffs to return resources to environment 	

Bureau of Standards		January 28, Blantyre	Obtained copies of several laws but few were available. Obtained some Blantyre maps, but few were available. Visited laboratory where most equipment was not working. The following items appeared to be operable: atomic absorption analyzer, gas chromatograph, microbiology methods; however, chemistry areas seemed to lack control and proper management to reduce inadvertent contamination.	
National Statistical Office	Madison Makwemba	January 29, Zomba	MACRO undertaking current household survey. ICF downloaded all GIS files.	
Geological Survey Department	January 29, Zomba	Director, Dr. Leonard Kalindekafe, provided a geological map to the team.	Geological Survey Department	
Surveyor General's Office		February 1, Lilongwe	Aerial photography was conducted in 1995 (1:25,000) by South African consultants. Conducting another survey would require notification of civil aviation, police, and the army. Surveys are typically conducted when cloud cover is reduced (starting in May).	
Department of Environmental Affairs		February 2 and 3, Lilongwe	Requested National Environmental Action Plan, Environmental Management Act, Environmental Impact Assessment Guidelines, by sector. The 1969 Water Resource Act is being revised in the cabinet.	
Ministry of Agriculture, Department of Water Resources		February 2 and 3, Lilongwe	Mr. Mateeki from the Ministry of Agriculture, Department of Water Resources, provided maps of hydrology and geology and promised to email data.	
Polytechnic		March 17, Blantyre	Physics, Biochemistry, and Civil Engineering staff have equipment to analyze metals and organics but most equipment was in disrepair and housekeeping is insufficient for conducting trace analyses. Requested any available watershed reports. In the lower regions (i.e., Rift Valley), water table is generally 2 meters deep; in the higher elevation regions, they are generally 15 meters deep. An illness recently investigated in Blantyre was attributed to a borehole contaminated by a latrine pit. Authorities provided chlorine to be used.	
Ministry of Agriculture and Irrigation		March 17, Blantyre	Provided laws. Referred ICF to the Land Resources Department.	
Agricultural Research Station	Thomson Chilanda, Deputy Director of Agricultural Research Services	March 17, Blantyre	No recent vegetation surveys but there may be an Indigenous plant report in Lilongwe (checked while in Lilongwe, but none existed). Phytosanitation certificates can be obtained in Lilongwe and Blantyre at the Agricultural Research Stations, and the stations can fumigate (cost is 500 MWK [kwacha]). Referred us to the Soil Survey Unit in Lilongwe for surveys and maps (Mr. Mussa) and Agricultural Research Station in Lilongwe (Mr. Makumba). There is a private laboratory in Lilongwe, known as ARET.	
Ministry of Health		March 17, Blantyre	Provided several 5-year Strategic Plans for Accelerated Child Survival and Development in Malawi. Requested that we return for data on major illnesses. Concerns about impacts from this project include the occupational health and safety of workers and public health from any activities.	

Ministry of Labor		March 17, Blantyre	Received copies of the Occupation H&S abstract and were referred to Lilongwe for other laws. Impact concerns for this project included the old equipment causing injuries and cultivation of the river banks.	
Commissioner of Lands		March 18, Blantyre	Noted that there are 3 categories of land: public land, customary land, and private land (which can be obtained from customary and public lands). Public land is government-controlled by the Commissioner of Lands. Customary land is owned/occupied/used by villages. The chief allocates traditional land. Private land or leased public land. Within Blantyre, there is free-hold land, requiring no rent. Public land may be used or leased by applying to the Ministry and paying a premium. To use customary lands requires contacting the district commission, who will set a meeting with the village headman. Lands are acquired by the Commissioner of Lands and converted to public lands. Requests for a right-of-way are made to the District Commission, which then appeals to the Commissioner of Lands. The Commissioner of Lands values the property (market values are obtained by reviewing the developments on site). Only public lands are registered. The President of Malawi owns all customary land, which is controlled by the Ministry of Lands. Contacting the chiefs is a matter of procedure. The Department of Physical Planning handles zoning. Provided several laws, including the Land Policy, which lays out the process described above. Special concerns included siltation and monitoring the development around the Shire River.	
Department of Forestry		March 21, Lilongwe	Forest Extension has information on customary lands and plantations. Forest reserves are state-owned, and a license application is needed if someone wants to use them.	

Source: ICF/CORE, Malawi System Power System Studies

