１３．簡易環境影響調査（SES）

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ENVIRONMENTAL AND SOCIAL CONSIDERATION SURVEY (ESCS) FOR PREPARATORY SURVEY ON THE PROJECT FOR REINFORCEMENT OF TRANSMISSION NETWORK IN NACALA CORRIDOR IN THE REPUBLIC OF MOZAMBIQUE

Simplified Environmental Study

January 2015

THE PRESENT DOCUMENT COMPRISES:

PART 1: EXECUTIVE SUMMARY

PART 2: SIMPLIFIED ENVIRONMENTAL STUDY

PART 3: PUBLIC ENGAGEMENT REPORT

ACRONYMS AND ABBREVIATION

%	Percentage
°C	Degree Celsius
AIDS	Acquired Immune Deficiency Syndrome
CFM	Caminhos de Ferro de Moçambique
CO	Carbon monoxide
CRM	Constitution of the Republic of Mozambique
dBA	Decibels
DPA	Direcção Provincial de Agricultura (Provincial Directorate of Agriculture)
DPCA	Direcção Provincial de Coordenação da Acção Ambiental (Provincial Directorate for the Coordination of Environmental Affairs)
DPGM	Direcção Provincial de Geologia e Minas (Provincial Directorate of Geology and Mines)
DPRME	Direcção Provincial dos Recursos Minerais e Energia (Provincial Directorate of Mineral Resources and Energy)
DPT	Direcção Provincial do Trabalho (Provincial Directorate of Labour)
EC	Electrical Conductivity
EDM	Electricidade de Moçambique
EHS	Environment, Health and Safety
EIA	Environmental Impact Assessment
EIS	Environmental Impact Study
EMP	Environmental Management Plan
EMoP	Environmental Monitoring Plan
EN	National Roads
ESCS	Environmental and Social-Consideration Survey
ESG	General Secondary Education
ESIA	Environmental and Social Impact Assessment
GoM	Government of Mozambique
GWh	GigaWatt
ha	Hectare
HCB	Hydro-electrical Power Station of Cahora Bassa
HIV	Human Immunodeficiency Virus
IFC	International Finance Corporation
INAM	Instituto Nacional de Meteorologia (National Institute of Meteorology)
INE	Instituto Nacional de Estatística (National Institute of Statistics)
ITCZ	Inter-tropical Convergence Zone
JICA	Japan International Corporation Agency
kg	Kilogram
kHz	KiloHertz
km	Kilometre
km2	Square kilometre
kn	Knot
kV	Kilovolt
LNG	Liquid Natural Gas
m	Metre

m/s	Metre per second
m3	Cubic Metres
m3/h	Cubic Metres per Hour
mg/L	Milligram per litre
MICOA	Ministério para a Coordenação da Acção Ambiental (Ministry for the Coordination of Environmental Affairs)
MINAG	The Ministry of Agriculture
mm	Millimetre
MML	Minas Moatize Limitada
MSA	The Ministry of State Administration
MW	Megawatt
MZN	Metical
N	North
NE	North East
No-Go	No-Action Alternative
NO_2	Nitrogen Dioxide
NW	North West
ODA	Official Development Assistance
OHS	Over Head
OHS	Occupational Health and Safety
OHTL	Overhead Transmission Line
OP	Operational Policies
PAP	Project Affected Persons
ROW	Right of Way
RU	Relocation Unit
S	South
SADC	Southern African Development Community
SAPP	Southern Africa Power Pool
SCDS	Specialist Environmental Services and Social Development Unit
SDPI	Serviços Distritais de Planeamento e Infra-estruturas (Planning and Infrastructure Provincial Services)
SE	South East
SEA	Simplified Environmental Assessment
SES	Simplified Environmental Study
SLUCP	Simplified Land-use Compensation Plan
sqkm	Square Kilometre
SO_2	Sulfur Dioxide
SS	Substation
STI	Sexual Transmitted Infections
SW	South West
T	Tons
TDS	Total Dissolved Solids
TL	Transmission Line
VAT	Value Added Tax
WBG	World Bank Group
WBOP	World Bank Operational Policies

WWF	World Wildlife Fund

PART 1

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

The present document is the Simplified Environmental Study (SES) of the proposed Project for the reinforcement of the transmission network in Nacala Corridor, Namialo, Republic of Mozambique. A Simplified Environmental Study (SES) and Simplified Land-use Compensation Plan (SLUCP) have been commissioned by Japan International Corporation Agency (JICA) in order to meet their requirements and the national legislation in Mozambique.

The Project is proposed by Japan International Corporation Agency (JICA), which is a Japanese Agency, responsible for implementation of Official Development Assistance (ODA) that supports the growth and socio-economic stability of developing countries with the aim of contributing to peace and development of international society.

Electricidade de Moçambique E.P. (EDM) is the Project Proponent. EDM, the national electricity company in Mozambique, is responsible for developing and implementing the Project on behalf of the Government of Mozambique.

A SES and SLUCP were commissioned to *Impacto – Projectos e Estudos Ambientais Lda* (Impacto), a fully registered Mozambican company with the Ministry for the Coordination of Environmental Affairs to conduct EIAs in Mozambique and has extensive experience in EIAs. The main objectives of the EIA process are:

- to identify and assess the main potential environmental impacts (negative and positive) of the proposed project, taking into account the biophysical and socioeconomic domains; and
- to identify the mitigation, environmental management and environmental monitoring measures that will allow for minimizing potential negative impacts and to enhance potential positive impacts of the project, so as to ensure that it can be implemented in an environmentally sound manner.

The environmental legal framework against which the proposed project needs to comply, includes:

- Both national and international legal instruments;
- The national legal framework specific to energy sector;
- The identification of those international conventions ratified by the Government of Mozambique.

The proposed project site is in the Administrative Post of Namialo, Meconta District, Nampula Province. The establishment of a new substation in Namialo aims at ensuring a stronger supply of electricity to the Northern region of the country as well as other benefits including the reduction of energy losses, the energy production at a competitive market price, the availability of supply capacity of good quality electricity, the contribution to energetic security in Mozambique (on the medium and long term), the efficient use of the existing EDM staff, the creation of jobs and economic growth and, the reduction of CO_2 emissions, amongst others.

The construction of Namialo substation will allow in/out configuration for the existing two transmission lines to Pemba and Nacala. This can bring reliability and redundancy of power supply to Nacala corridor as well as Pemba. The proposed Namialo SS will be located on the junction point of these two lines.

The project facilities planned for the new construction are rather small-scale, basically confined to a new electricity transformer substation located along the ROW of existing power transmission line (TL) in Namialo (gross land area requirement is about 10 ha), a new access road and implantation of new transmission towers in substitution of the old ones present in the study area.

A new access road is planned for the study area and initially it will be a temporary access road as per this project is planned so as to facilitate effective transportation of construction materials/equipment and others to the substation of only about 1.5 km in length from EN12. It is noted that 31m of this 100m width as affected gross ROW is the actual ROW of 110kV transmission line under the jurisdiction of EDM. In fact, actual width of road will be much less (about 10 m width of ROW for road, including temporary land clearance, within the 100 m width of gross ROW is regarded as the maximum requirement for road).

The project facilities planned also include construction of 2 new transmission towers and also the demolition of 3 existing transmission towers.

An alternative site was initially chosen under the scope of the Feasibility Study on Chimuara-Nacala Transmission Project (2013), approximately 800 meters from the current Namialo site.

The different items surveyed for the site selection were site area, access, topographic/geographical features, vegetation, meteorology, transmission network, environmental and social considerations, and transportation of heavy objects, among others. The site assessed under the Feasibility Study on Chimuara-Nacala Transmission Project (2013) was less advantageous than the current Namialo site due to erosion potential, closer proximity to village and higher potential for economic resettlement.

With the No-Action Alternative (No-Go), possibilities of expanding the access to stable electrical power of good quality to more households and new industries in the Northern region would be highly restricted by the needs of other countries affiliated in the Southern Africa Power Pool (SAPP).

For the purpose of evaluating the environmental and socioeconomic impacts, three main phases of the proposed project were considered in this study: construction, operation and decommissioning.

In the light of the proposed project, a number of potential environmental and socioeconomic impacts (negative and positive) were identified and assessed. The large majority of the biophysical impacts were considered low in terms of significance. The biophysical parameters assessed include geology, geomorphology and soils, air quality, hydrology, solid waste, noise and vibration, flora and fauna, landscape and visual and land use. The socioeconomic impacts were both positive and negative during the three phases of the proposed project. The positive socioeconomic impacts

were particularly focused on the economy (i.e. direct and indirect employment) and public utilities (i.e. increase in the amount of energy available). The negative socioeconomic impacts were mostly associated with health (i.e. STI's in the population and workers safety, work accidents), economy (i.e. loss of crops, crop areas and other economic opportunities), tensions (i.e. high expectations with regards to employment opportunities and social conflict due to physical presence of external workers) and traffic and transport (i.e. changes in the intensity and traffic due to the transport of the construction material and demolition waste to landfills and recycling areas).

An environmental management plan was drafted in order to:

- Ensure that the proponent, EDM, would be in charge, through the establishment of a RU, of implementation, mitigation and monitoring of the activities presented in the SLUCP.
- Provide the Ministry for Coordination of Environmental Affairs (MICOA) with an instrument that facilitates the objective evaluation of the different project phases, keeping in mind the Mozambican Environmental Legislation, and
- Provide the Proponent of the Project with clear and obligatory instructions with regard to his environmental responsibilities during all project phases.

A general perspective on the establishment of the new substation in the Namialo site suggests that the project will provide employment opportunities, gains in the local and national economy, provision of market for supply and building material, informal sector benefits, increase in electricity supply, increase in revenue and increase in security. Under the light of the above and since no fatal flaws have been identified, we propose that the establishment of the substation in the Namialo area should proceed. From the assessment point of view, it is considered that the project could be implemented without causing any major detrimental effects on the physical, biological and socio-economic environment provided that the mitigation, environmental management and environmental monitoring measures are fully implemented and will allow for minimizing potential negative impacts and to enhance potential positive impacts of the project, so as to ensure that it can be implemented in an environmentally and socially sound manner.

PART 2

SIMPLIFIED ENVIRONMENTAL STUDY

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1 INTRODUCTION

The present document is the Simplified Environmental Study of the proposed Project for the Reinforcement of the transmission network in Nacala Corridor, Namialo, Republic of Mozambique.

1.1 Objective and scope of the study

A Simplified Environmental Study (SES) and Simplified Land-use Compensation Plan (SLUCP) have been commissioned by Japan International Corporation Agency (JICA) in order to meet their requirements and the national legislation in Mozambique.

The proposed project is small-scale that falls under the area of influence of the already approved ESIA study by MICOA (Letter No. 138/GM/MICOA/13 dated 6th of December 2013). Consequently, MICOA/DPCA-Nampula does not require any further ESIA study for the project since the project is located under the area of influence of the above approved ESIA Report. Still, in order to meet the JICA Guidelines for Category B project SER (simplified environmental report) and SLUCP (simplified land-use compensation plan) were commissioned.

The SES Report for the Project outlines the legislative framework, provides a description of the project and its location, and provides a description of the biophysical and socioeconomic conditions of the study area. The report also provides an assessment of the impacts of the proposed project on the surrounding biophysical and social environment. Lastly it provides recommendations on how negative impacts can be mitigated and positive effects enhanced as well as a monitoring plan for relevant environmental parameters such as air quality, noise and vibration and waste management

1.2 Relevant laws, regulations and guidelines used in SES

The SES (simplified environmental report) process complies with the JICA guidelines as well as relevant Mozambican environmental legislation. The process was designed to assess the potential environmental and social impacts of the Project. The laws, regulations and guidelines are described in detail in Chapter 2.

1.3 Project Proponent

Electricidade de Moçambique E.P. (EDM) is the Project Proponent. EDM is responsible for developing and implementing the Project on behalf of the Government of Mozambique. EDM, the national electricity company in Mozambique, was transformed into a public enterprise in 1995. Its mission is to run production, transmission, distribution and marketing services for electricity in Mozambique, in the public interest and for the consumer's benefit preserving the environment.

1.4 SES implementing organization and experts of the team

Impacto – Projectos e Estudos Ambientais Lda (Impacto) is a fully registered Mozambican company financed entirely by Mozambican capital. Impacto was officially constituted in writing and the registration was published in the Government Gazette, No 33, Series III, on the 14th August 1996. Impacto is registered with the Ministry for the Coordination of Environmental Affairs to conduct EIAs in Mozambique and has extensive experience in EIAs. The contact details for Impacto are as follows:

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The specialists that form part of the EIA team are provided in Table 1.

Table 1: The EIA team

Name	Area of Expertise	Role
J. Hatton	Environmental Management	Project Director
M. Pereira	Environmental Management	Project Manager
D. de Castro	Socioeconomic Specialist	SLUCP specialist
E. Muiuane	Hydrologist	Surface Water Study
F. Munguambe	Public Consultation	Public Consultation Specialist
H. Nhampanze	Public Consultation	Public Consultation Specialist

2 LEGAL FRAMEWORK

2.1 Introduction

The objective of this chapter is to present the environmental legal framework against which the proposed project needs to comply, including:

- Both national and international legal instruments;
- The national legal framework specific to energy sector
- The identification of those international conventions ratified by the Government of Mozambique; and

Also addressed in this chapter are some international guidelines related to best practice in the development of projects of this nature that, whilst not constituting formal legal imperatives, are important documents, as they establish standards, guidelines or recommendations related to this project's activities.

2.2 Environmental Management

The 2004 Constitution of the Republic of Mozambique (CRM) defines the right of all citizens to live in a balanced natural environment, and of their obligation to protect it (Article 72). Furthermore, the State is required to (i) promote initiatives capable of ensuring the ecological balance and the preservation of the environment; and (ii) implement policies to prevent and control pollution and to integrate environmental objectives in all public sector policies so as to guarantee the citizens' right to live in a balanced environment under a sustainable development framework (Article 117 of CRM).

The National Environmental Policy, approved by Resolution No. 5/95, of 6 December 1995, lays the foundations for all ancillary environmental legislation. Article 2.1 of this Policy promotes sustainable development through a compromise between the country's socio-economic development needs and the protection of the environment. This policy promotes, inter alia, the management of the country's natural resources - and of the environment in general, such that resources preserve their functional and productive capacities for present and future generations.

The Environment Law (Law No. 20/97, of 1 October 1997) defines the legal basis for the implementation of this Policy. The Law applies to all public or private activities that may directly or indirectly affect the environment. Also, this law requires licensing for any activity under article 15 of the current law.

The Electricity Law (Law 21/97, of 7 November 1997) contains important clauses on the creation of rights of way, security and protection of cultural heritage and the environment.

The Land Law (Law 19/97, of 1 October 1997) includes, in article 8g, the classification of land occupied by overhead, ground, underground and submarine electricity installations and conductors, with a boundary strip of 50 metres each side of the overhead line or cable.

2.3 Environmental Impact Assessment Regulations (Decree 45/2004 of 29 September as amended by Decree No. 42/2008 of 04 November)

The EIA process is controlled by Environmental Impact Assessment Regulations under the Environmental Law approved by Decree 45/2004, of 29 September as amended by Decree No. 42/2008 of 04 November. These Regulations are applicable to all public and private activities.

Articles 3 and 5 of the EIA Regulations provide for a screening process which defines the extent and type of environmental assessment required. Three project categories are defined by the Regulations:

- Category A: Activities presented in Annex I are considered to have significant adverse impacts on the environment and are subject to an Environmental Impact Study (EIS).
- Category B: Activities listed in Annex II are those for which potential environmental impacts are less adverse than those of Category A projects and are subject to a Simplified Environmental Assessment (SEA).
- Category C: Activities listed in Annex III are exempt from an EIA and SEA but still require observance of good management practices.

A Simplified Environmental Study has been commissioned by the proponent, and as such, the EIA process must follow the provisions for this category. The Simplified Environmental Study is regulated by Article 13 of the EIA Regulations.

Under Article 13, the Simplified Environmental Study (SES) may commence, and should result in a report that contains as a minimum, the following:

a) Non-technical summary including principles questions assessed and proposed conclusions;
b) Location and description of the activity,
c) Legal framework for the activity and their integration in existing development plans for the region within the direct area of influence of the activity;

d) Environmental diagnosis including a brief description of the reference environmental setting;
e) Identification and evaluation of environmental impacts from the activity;
f) Environmental Management Plan for the activity, that includes the monitoring of impacts, environmental education programme, and emergency contingency plans;
g) The identification of the multidisciplinary team that prepared the Simplified Environmental Study;
h) Public Participation Report in accordance with requirements under No 9 of Article 14, where required.

In addition, the Simplified Environmental Study will include a Public Participation Process, in compliance with Article 14. The Public Participation Process undertaken as part of the Simplified Environmental Study is summarised in the Public Participation Report.

2.4 Waste Management

The regulating authorities and service providers for waste collection, treatment and disposal in Mozambique are district and municipal, while environmental protection is enforced at a central and provincial level.

The Environment Law (Law No. 20/97, of 1 October 1997) is the umbrella law for environmental matters and is an important instrument for the enactment of specific regulations, most notably the Regulation on Waste Management no. 13/2006 which provides the rules concerning the production, deposit on soil and subsoil and prohibits the throwing of waste to the water or to the atmosphere, of any toxic and polluting substances. In addition, the Regulation defines competencies in waste management, waste classifications, obligations for entities handling waste and environmental licensing obligations and collection, among others.

Additionally, the Municipality Law (Law no. 2/97, of 18 February 1997) obligates local municipalities to ensure basic sanitation and quality of life. Municipal responsibilities include the development of programmes for ecological protection and procedures for the removal of solid, treatment and disposal of solid residues including medical and hazardous waste.

Other key pieces of legislation pertinent to the treatment and disposal of solid waste include Article 6 of Environmental Law outlining coordinating the actions for environmental management, the regulation on Environmental Impact Assessment (Regulation No. 76/98, of 29 December 1998) and a further Regulation on Environmental Impact Assessment (Decree 45/2004, of 29 September 1998) requiring an Impact Assessment Study and the issue of an environmental licence for all entities/processes resulting in legally significant

waste streams. This regulation also stipulates that vehicles used for waste transportation and all waste management operators require licences.

Article 9 of the Regulation of Waste Management (Regulation 13/2006, of 15 June 2006) obliges the producers of waste to minimize waste generated. In addition, the Environment Law (Law No. 20/97, of 1 October 1997) imposes strict liability on entities causing environmental damage. The government is responsible for setting the compensation amount on a case by case basis, which includes the cost of remediation of the affected area.

Obligations under Article 9 of the Regulation of Waste Management (Regulation 13/2006, of 15 June 2006) include:

- Ensure the segregation of the different categories of waste;
- Ensure the treatment of the waste before its deposition;
- Ensure the protection of all workers engaged in the handling of waste against accidents and diseases resulting from their exposure to the same;
- Ensure that all waste to be transported contains minimum hazard of contamination, for the workers engaged in this process, for the general public and for the environment;
- Build the capacity of their workers in matter of health, occupational safety and environment;
- Ensure that the disposal of waste inside and outside the production site does not have a negative impact on the environment or on the public health and safety;
- Make a detailed annual record of the origins, quantities and types of waste handled, transported, treated, recovered or disposed of and keep it during the five years subsequent to the respective record.

2.5 Other relevant national legislation and policies

Other relevant national legislation and policies:

- Decree 495/73, on preventing the pollution of waters and beaches;
- Measures to protect biodiversity (Article 12 of the Environment Law 20/97), particularly with regard to protecting rare and protected land and marine flora and fauna species;
- Article 13 of Law 20/97, defining protected areas as areas and ecosystems recognized as having the status of the protected spaces listed in Annex A, including coral reefs, mangroves, forests, smaller islands, conservation zones or areas, populated areas producing the need for resettlement;
- Forest and Wildlife Law – relevant to the project's area of influence (article 10 of Law 10/99).
- Elements foreseen in Decree 12/2002 (Regulations of the Law on Forests and Wildlife) – especially in conservation areas for tourism (article 87) and articles 103, 104 and 105 on the construction of infrastructure;

- Law on Territorial Planning (Law 19/07) that, among other dispositions, reaffirms citizens' right and need to participate in the planning process, application of the principle of precaution, and environmental sustainability and protecting the land-use rights of local communities (article 4).
- Labour Law (Law 8/98) guaranteeing fair treatment and safe working conditions for workers in construction and operation;
- Decree 57/2011, establishing safety norms and standards for high-voltage lines and specifying, in article 28, that high-voltage lines equal to or more than 66 kV must have a protection zone 50 m wide;
- Decree 31/2012, regulating the resettlement process arising from economic activities.

2.6 International Norms and Directives

The following regional and international laws and conventions are considered applicable to this project:

- SAPP Environmental Directives, 2010;
- African Convention on the Conservation of Nature and Natural Resources;
- United Nations Convention on Biological Diversity;
- Convention on Wetlands of International Importance;
- Kyoto Protocol on the United Nations Convention on Climate Change;
- Protocol on Cooperation in the Energy Field of the Southern Africa Development Community;
- Stockholm Convention on Persistent Organic Pollutants; and
- Protocol on the Conservation of Wildlife and application of the law in SADC

Specific reference to international World Bank operational policies (OP) and World Bank group environment, health and safety (EHS) guidelines was made on the Feasibility Study on Chimuara-Nacala Transmission Project (2013), namely:

- WB OP 4.01 – Environmental Assessment;
- Policy and Standards on Social and Environmental Sustainability of the International Finance Corporation (IFC) of 2012;
- IFC Environment Health and Safety guidelines – General EHS Guidelines: environmental, April 2007;
- IFC Environmental, Health, and Safety Guidelines for Electric Power Transmission and Distribution, April 2007; and, 19/09/2013 Pag. 24 Chimuara-Nacala Transmission Project Environmental Impact Assessment – Volume I – Main Report SCDS, Maputo
- IFC Environmental, Health, and Safety Guidelines – Occupational Health and Safety (OHS), April 2007;
- WB OP 4.11 – Physical Cultural Resources
- WB OP 4.12 – Involuntary Resettlement

- WB OP 4.36 – Forests
- Legislation and Directives specifically applicable to special disciplines that will be considered during the EIA process will be detailed in the relevance sections of the EIA terms of reference.

3 DESCRIPTION OF PROPOSED ACTIVITY

This Simplified Environmental Assessment pertains to the construction of a new substation in the Administrative Post of Namialo, Meconta District, Nampula Province, Republic of Mozambique.

3.1 Project Justification

The construction of a substation in Namialo will ensure a stronger supply of electricity to the Northern region of the country with consequent improved socio-economic benefits. Please refer to Section 10 for the beneficial importance of the project.

The construction of Namialo substation will allow in/out configuration for the existing two 11OkV OH transmission lines to Pemba and Nacala. This can bring reliability and redundancy of power supply to Nacala corridor as well as Pemba. The proposed Namialo SS will be located on the junction point of these two lines.

3.2 Project Purpose

The purpose of the current project includes the following:

- To bring reliability and redundancy of power supply to Nacala Corridor as well as Pemba by levelling the load of the two transmission lines.
- To increase the power supply capacity to Nacala area.
- To reinforce distribution power supply to Namialo area where the industrial growth is expected. (Monapo Substation has only 16 MVA, 110/33kV capacity).
- To decrease the electricity fault due to old equipment and human error

3.3 Geographical Location of the Proposed Project

The proposed substation is located in the Administrative Post of Namialo, Meconta District, Nampula Province. The relative position of the study area to Nampula city and within the Nampula Province is shown in Figure 1. The proposed study area is located approximately 78 kms from the Nampula city and also approximately 72 kms from the coastline.

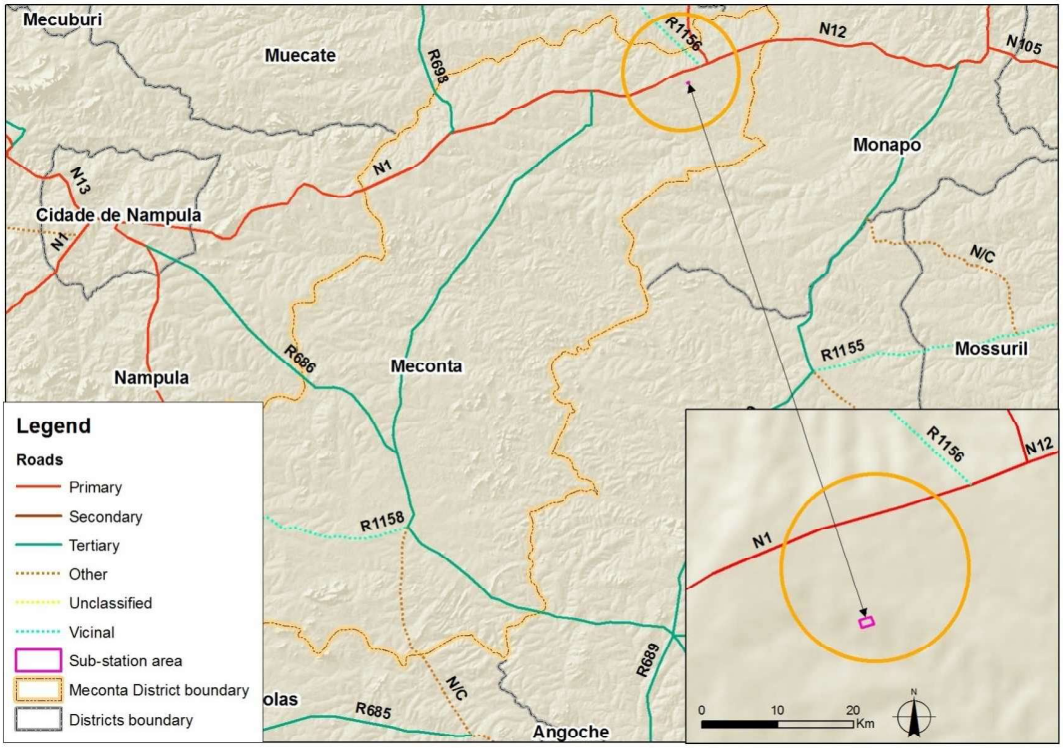


Figure 1: Geographical Location of the proposed project

A13–25

A new access road is planned for the study area and initially it will be a temporary access road as per this project is planned so as to facilitate effective transportation of construction materials/equipment and others to the substation of only about 1.5 km in length from EN12. It is noted that 31m of this 100m width as affected gross ROW is the actual ROW of 110 kV transmission line under the jurisdiction of EDM. In fact, actual width of road will be much less (about 10 m width of ROW for road, including temporary land clearance, within the 100 m width of gross ROW is regarded as the maximum requirement for road).

The layout of the new substation and access road is shown in Figures 2 and Figure 3.

Figure 2: Layout of Namialo Substation Site

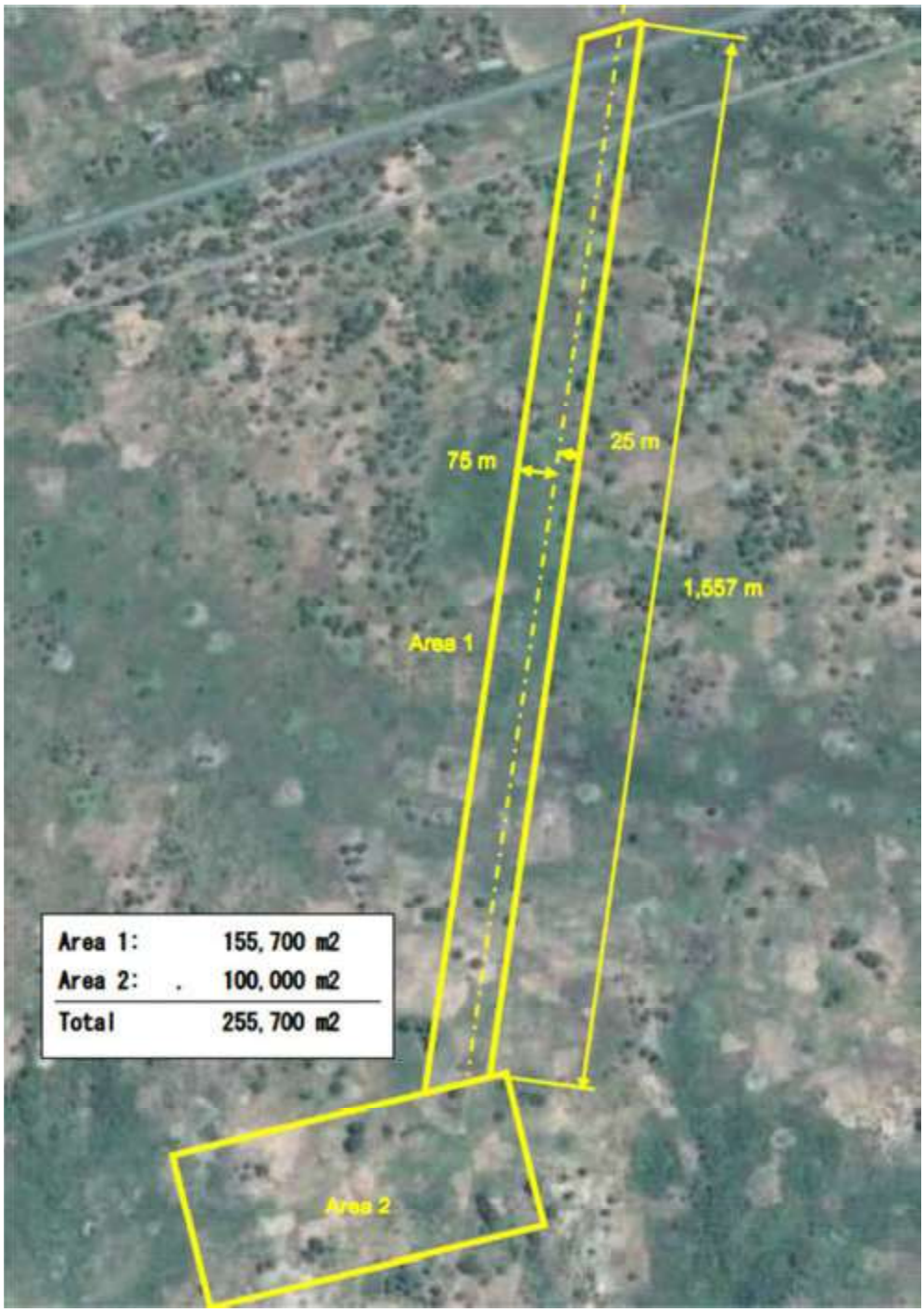


Figure 3: Layout of substation site in relation to the access road

The project facilities planned also include construction of 2 new transmission towers and also the demolition of 3 existing transmission towers.

3.4 Assumptions and Limitations

Up to this stage, the final technical description of the project and design parameters, including dimensions, layout, building dimensions, characteristics of equipment were not readily available for the present study.

Consequently, the identification and description of impacts and adequate mitigation measures associated with the construction and operation of the Namialo substation and temporary access road is based on the information supplied *viz.* the location of Namialo substation and temporary access road as shown in Figure 3.

4 ANALYSIS OF ALTERNATIVES

4.1 Site Alternatives

An alternative site was initially chosen under the scope of the Feasibility Study on Chimuara-Nacala Transmission Project (2013), approximately 800 meters from the current Namialo site (Figure 4).

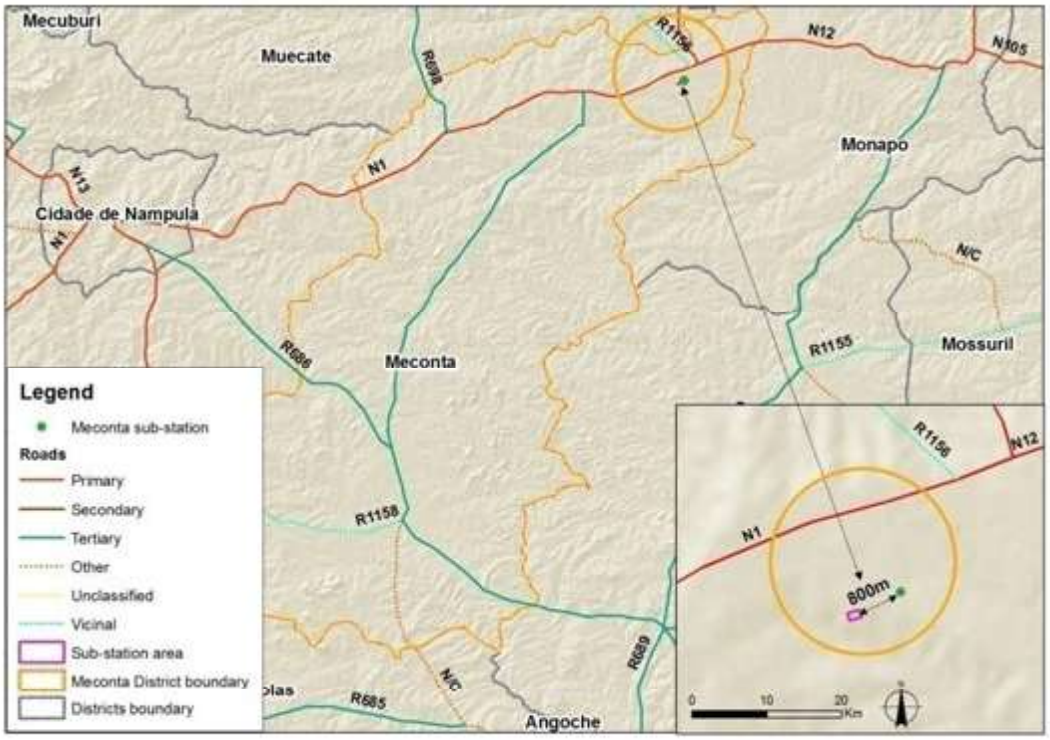


Figure 4: Geographical Location of the alternative site.

The different items surveyed for the site selection were site area, access, topographic/geographical features, vegetation, meteorology, transmission network, environmental and social considerations, and transportation of heavy objects, among others. The site assessed under the Feasibility Study on Chimuara-Nacala Transmission Project (2013) was less advantageous than the current Namialo site due to erosion potential, closer proximity to village and higher potential for economic resettlement.

4.2 The "No Action"Alternative

The Cahora Bassa Hydroelectric Dam (HCB) is the main source of electrical power supply in Mozambique. Part of the power produced is being transported to the Central and Northern regions of the country by means of a 220 kV AC transmission line, the other part is being transported to the neighbouring country Zimbabwe by means of a 400 kV AC transmission line.

However, the largest part of the power produced by HCB is being sent to the Apollo substation in South Africa through a 535 kV DC transmission line and part of it is then supplied to the Southern Africa Power Pool (SAPP) region.

Mozambique's national power grid is interlinked with the SAPP and operates as an integral part of the countries in the region. As the power system of the Southern region, which includes Maputo City, is located more than 1,000 km away from the HCB, the power is being imported from the SAPP through the power networks of South Africa and Swaziland through a 400 kV AC transmission line. As a result, more than 80% of the internal power demand is being supplied via South Africa.

Currently, the demand for electrical power in the entire country corresponds to approximately 610 MW and 4,025 GWh/year of power consumption, with a maximum potency of 610 MW. However, the average annual growth rates during the past 5 years reached values between 10.6% and 13.8%. The prevision is that the demand for power will continue to increase at high rates during the next years because of the new economical activities underway or starting and the expected increase in income levels.

The demand for electrical power is expected to increase continuously at a constant rhythm in the next future. However, the purchase of electrical power from the Cahora Bassa Hydro-electrical Dam, which corresponds to 88% of the power supply capacity of the municipality, is limited to 300 MW of firm energy and 200 MW of not firm potency. Any increase in these numbers is considered to be difficult, as this requires cession negotiations with other countries affiliated in the SAPP.

With the No-Action Alternative (No-Go), possibilities of expanding the access to stable electrical power of good quality to more households and new industries in the Northern region would be highly restricted by the needs of other countries affiliated in the SAPP.

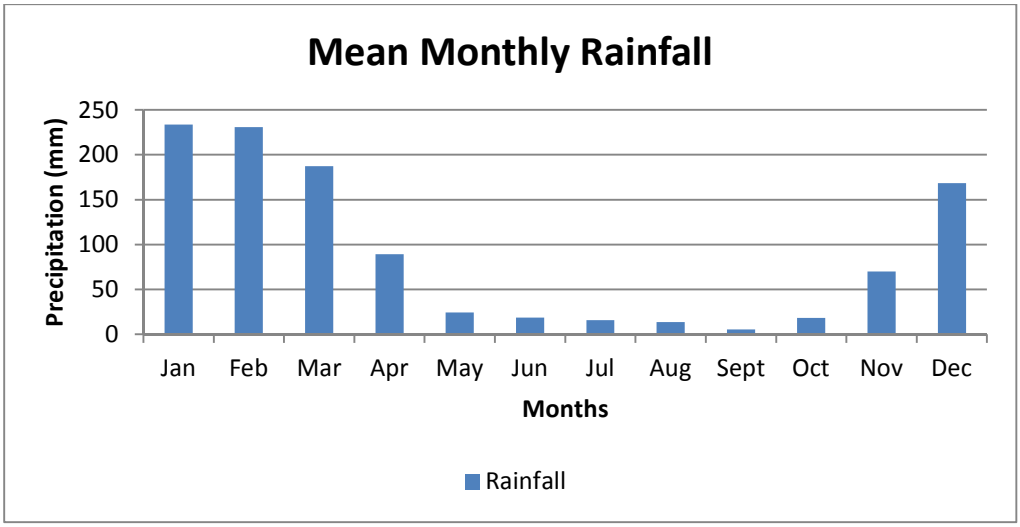
Because of the expected growth of the demand for power supply, there is a need for the energy sector of Mozambique to reinforce the current electrical grid, not only to maintain the current capacity but to guarantee an increase in the capacity of power supply from a trustworthy source in the years to come. Within this context, it seems that the implementation of the new Namialo substation is crucial.

5 DESCRIPTION OF THE BIOPHYSICAL ENVIRONMENT OF THE PROJECT AREA

5.1 Meteorology

5.1.1 Rainfall and Temperature

The Köppen climate classification for northern Mozambique and is a humid equatorial climate with a dry winter (Köppen Aw). The area is strongly influenced by the relative position of the Inter-tropical Convergence Zone (ITCZ) and its seasonal migration between hemispheres. Two distinct climatic seasons are experienced, with a hot and wet summer from November to April, and a cooler and dry winter season from May and October. In the southern hemisphere summer the ITCZ is located at about 15° S. Summer rain occurs in the form of convective storms as a result of surface convergence. In the southern hemisphere winter the ITCZ migrates to around 15° N. The atmosphere is drier and divergence prevails with very little rainfall occurring. Information is available for Nampula City, which is representative of the study area (Figure 5). The Nampula city meteorological station is located in 15°06'00.0"S 39°17'00.0"E.

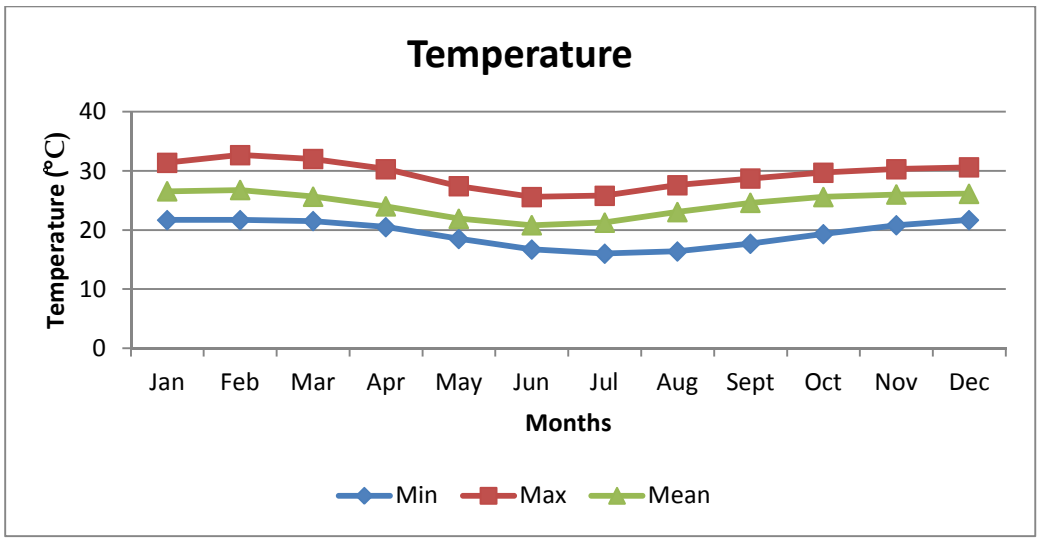


Source: http://www.inam.gov.mz/produtos/estatisticas/nampula.htm

Figure 5: Mean Monthly Rainfall in Nampula City

The mean annual rainfall is about 1100 mm. Between 1971 and 2000 (INAM, date accessed 08.08.2014), the majority of the rainfall occurred in summer between November and April. A strong seasonal trend is clearly evident in Figure 5.

Also for the mean monthly temperatures, information is only available for Nampula city (Figure 6). The mean monthly temperatures varied between 19,4°C and 29,3°C. The mean annual temperature in the study area ranges between 24°C and 25°C. The annual temperature range (difference between the mean temperature of the warmest month and the temperature of the coldest month is about 5, 9°C.



Source: http://www.inam.gov.mz/produtos/estatisticas/nampula.htm

Figure 6: Mean Monthly Temperature (Min, Max and Mean) in Nampula City

5.1.2 Humidity

In Nampula city, in the summer season, the humidity is generally high and may reach the 90 or 100%. Information from the Nampula city substation regarding humidity (highest, lowest and average) is not available. Relative humidity data is only available for the stations located in Maputo, Macomia, Mocimboa da Praia and Montepuez.

5.1.3 Wind

Wind data is not available for the study site. The closest available information is for the north of Mozambique. Winds are generally very light on the northern Mozambique coast due to the tropical location and a sheltering effect provided by Madagascar from the Indian Ocean. The average wind speeds are less than 5 m/s, but gusts up to 20 m/s have been known to occur in all months. The winds are almost exclusively from the northeast and east from September to March, and become almost exclusively southerly in the winter months, from April to August. As stated above, throughout the year, the winds are generally weak to moderate, with speeds ranging between 0.5 and 6.7 m/s. North winds prevail during the January and February with speeds between 0.5 and 3.6 m/s (Figure 7).

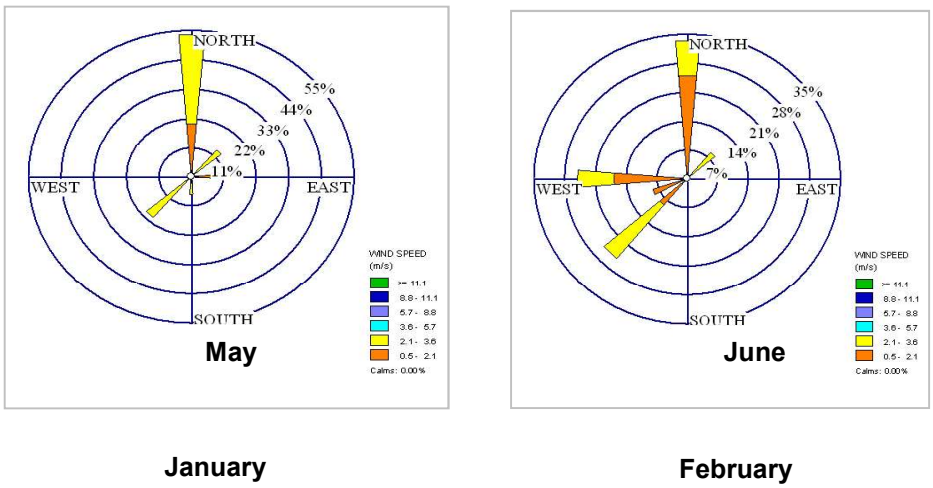
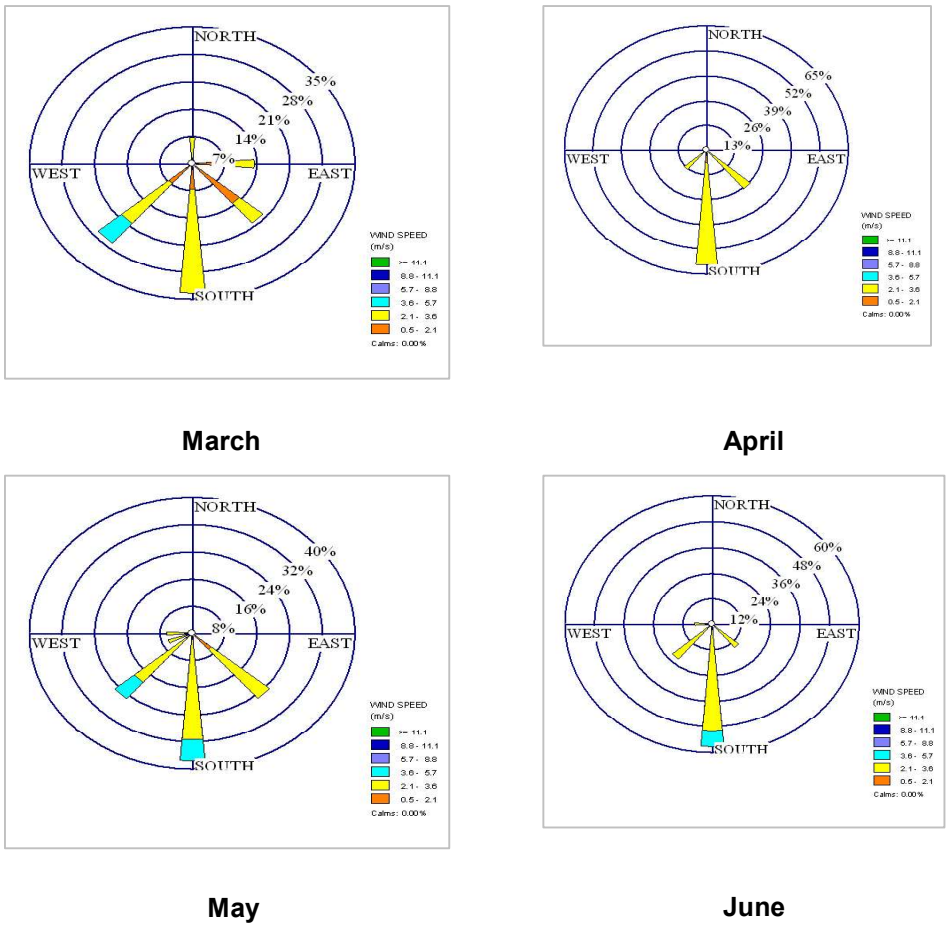
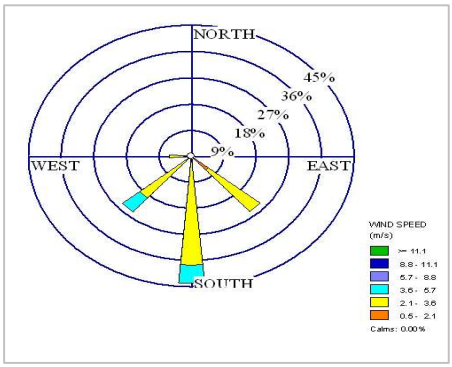
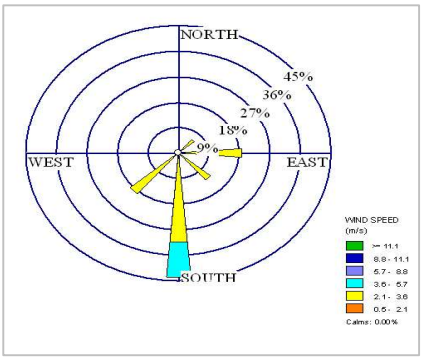


Figure 7: January and February wind roses

From March to August, the winds are mainly from the South Quadrant with moderate speeds (2.1 to 3.6 m / s) (Figure 8).



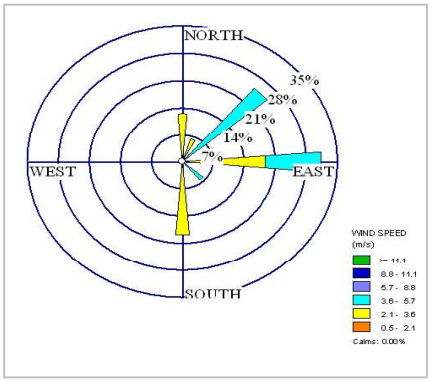


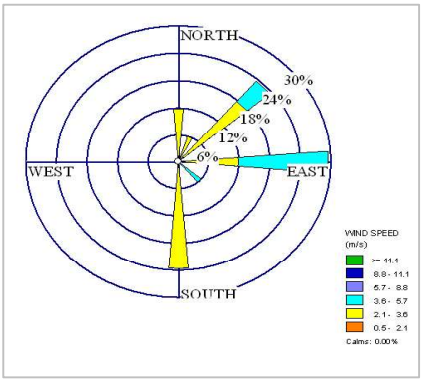


July **August**

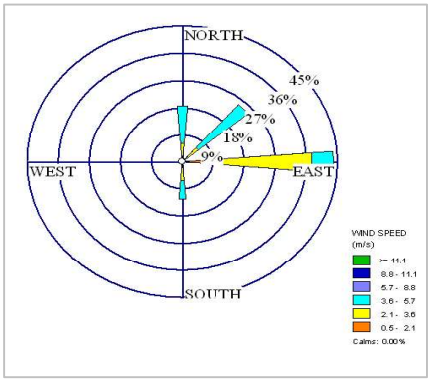
Figure 8: March to August wind roses

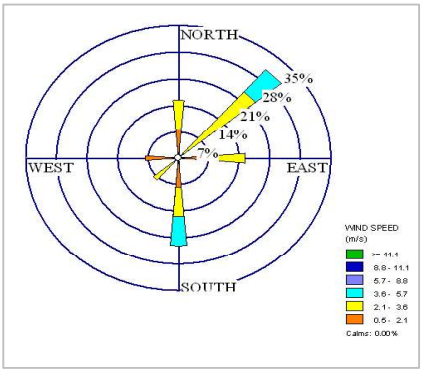
East / West Winds prevail during the months of September, October, November and December (Figure 9. The wind speeds during these months are slightly higher (reaching 5.7 m/s) compared to the rest of the year.





September **October**





November **December**

Figure 9: September to December wind roses

5.1.4 Solar Radiation

Mozambique has a high and consistent level of solar radiation throughout its territory, however detailed information about solar radiation is not available for Meconta District and Nampula Province.

5.1.5 Lightning Days

There is no data available for Meconta District and Nampula Province in terms of number of lightning days per year.

5.2 Geology, geomorphology and soils

According to Editora Nacional de Moçambique (2009), the project area is located in an area characterized by intrusive structures and flattened blocks in the foothills that occur between Ilha de Moçambique and Meconta.

Figure 10 shows the geological features of the proposed area for the project where the dominant rocks are granite and different kinds of gneisses.

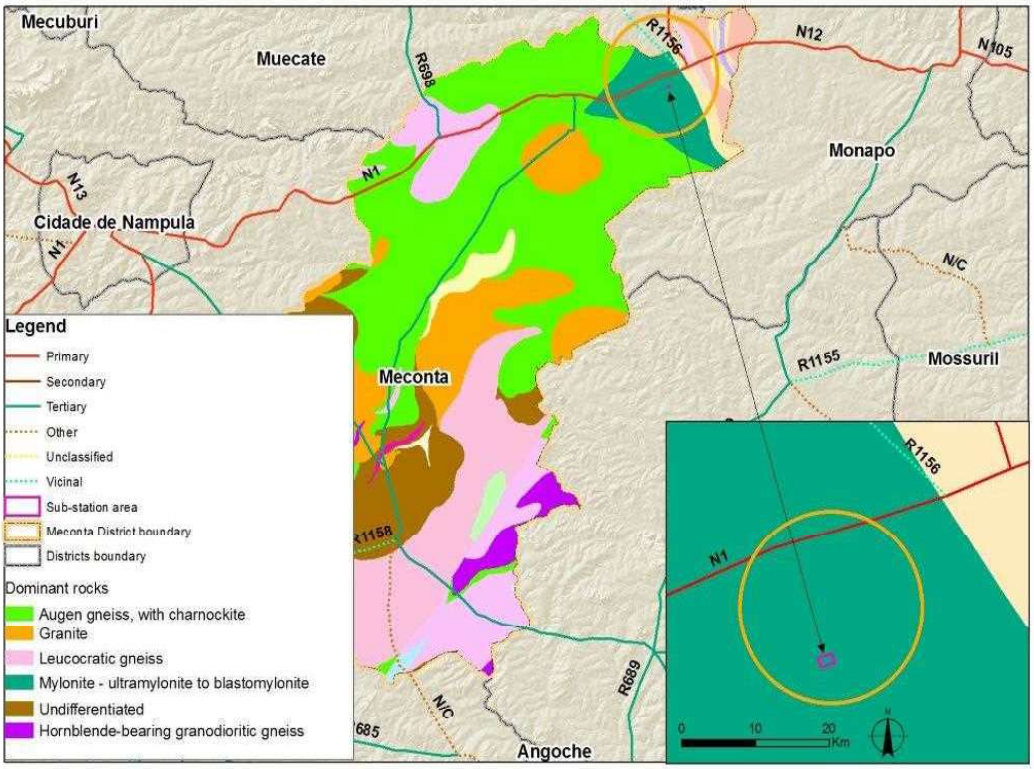


Figure 10: Geological features of the proposed project area

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The geomorphology of Meconta district is characterized by the presence of lowlands that are crossed by some rivers (some of which perennials). The terrain topography rises from the coast to the interior gradually moving towards a more uneven relief with steep slopes at the sub-plateau zone in the interior of the province (Figure 10).

The coastal area is characterized by the presence of sandy soils and coastal dunes. The project's area is characterized by the presence of reddish soils, shown in Figure 11 as soils VM (medium textured soils) and VG (red clayey soils) or an association of both (VG+VM). These red soils are Ferric Lixisols in the FAO soil taxonomy classification. They are generally deep (with a depth greater than 100 cm), with good drainage and moderately fertile, however red soils are considered to have a high risk of erosion.

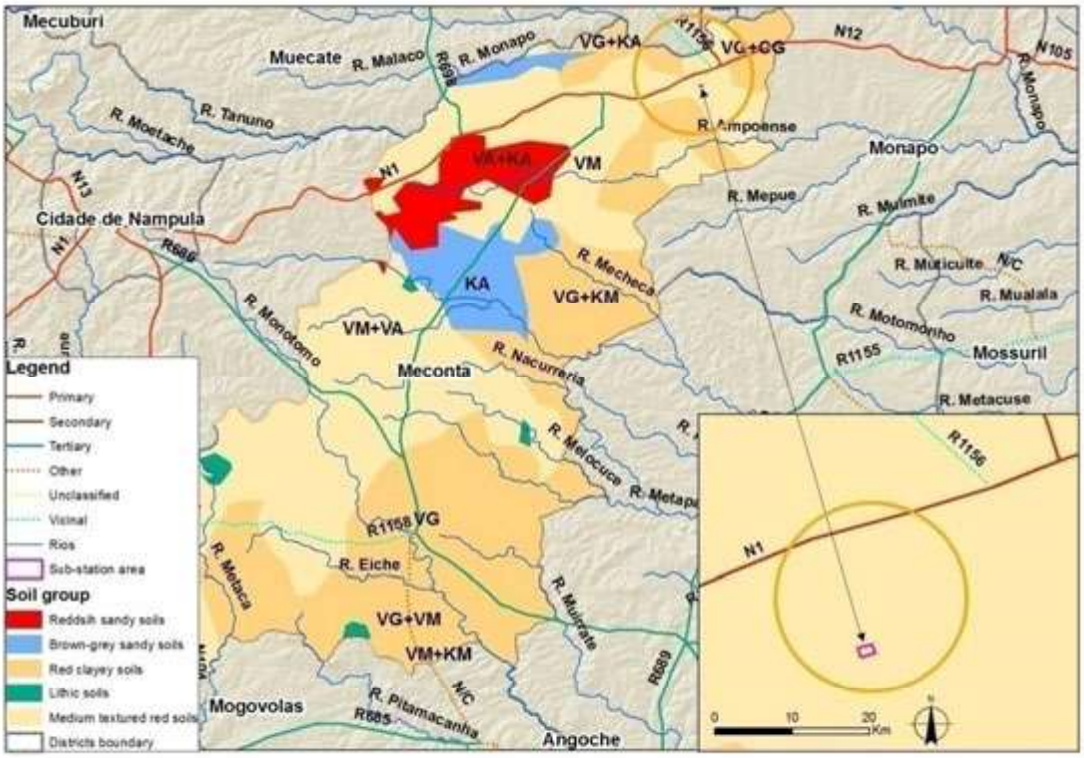

Figure 11: Soils in the proposed project area

5.3 Hydrology

5.3.1 Surface water resources

In terms of surface waters the study site is enclosed by the basins of the Monapo river (Figure 12), which starts in the district of Lalaua and supplies the Nampula city and the village of Monapo, including the banana farming of Matanuska.

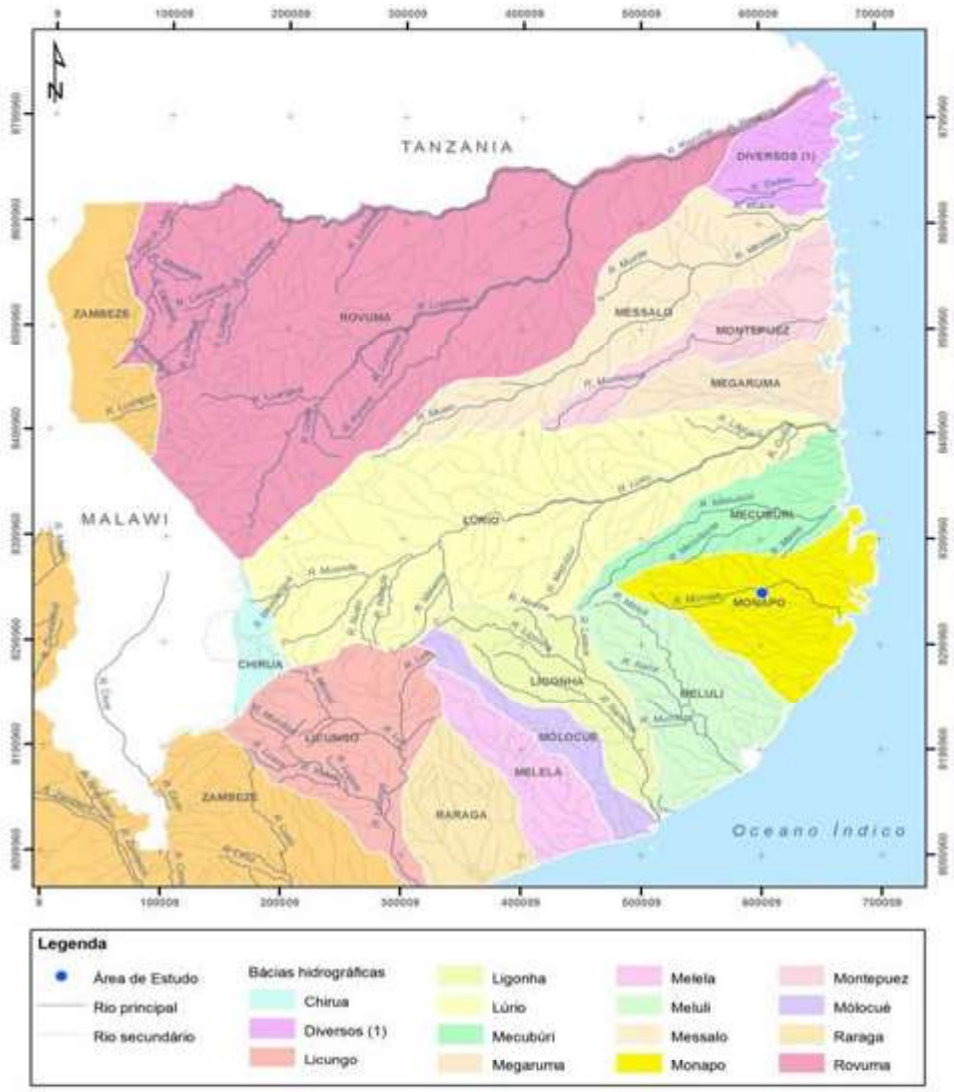

Figure 12: Basins in the northern part of Mozambique

Figure 13 shows that in the close vicinity of the project site, there are two main rivers namely the Monapo River (approximately 4 kms away) and Ampoense river (approximately 7 kms away).

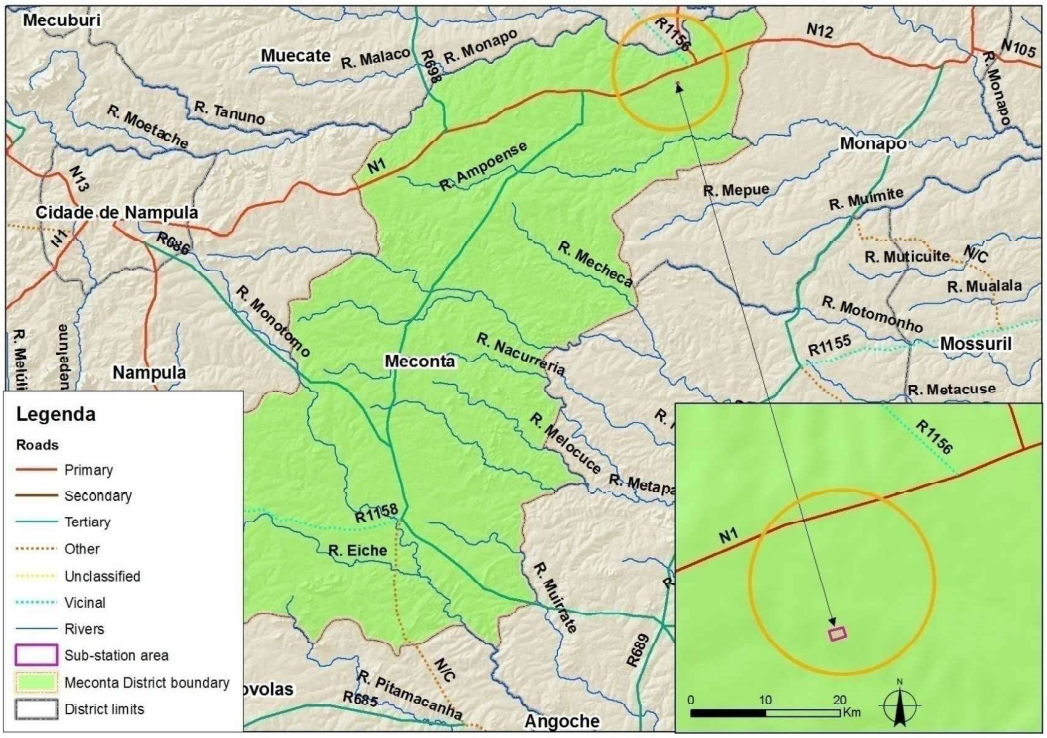

Figure 13: Hydrology of the proposed project area

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The village of Namialo has a water supply system which is currently not functioning due to degradation of the infrastructure and thus, the majority of its population relies on other sources for water for domestic consumption, such shallow wells and boreholes such as the one existing in the area of the future project.

5.3.2 Ground water resources

In terms of groundwater resources, the area of study is located in the hard rock province which is generally characterized by low groundwater potential due to low porosity and permeability of the geological formations occurring in the region. However, when the fresh rock is sufficiently weathered and fractured it can possess good hydraulic conditions to store enough water to supply enough water for domestic consumption.

5.3.3 Flooding

According to the Chimuara-Nacala Transmission Project (2013), Meconta district have a moderate level of risk of flooding. This is based on the fact that flooding risk increases with the proximity to the coast due to the increase of in flow and due to the land becoming flatter. According to the interviews undertaken with local residents, the area is often severely affected by droughts. Although Nampula province is commonly known for its flood and drought cycles, the local residents have not reported any severe case of flooding over the past 10 years.

5.4 Water Supply Infrastructure in the study site

During the site visit, groundwater samples were taken at one point around the site. The objective of the exercise was to obtain suitable baseline information for surface waters to firstly understand the quality of the water. During the site visit, monitoring parameters such as pH, Temperature and Electrical Conductivity were measured on site. Samples were kept in a cool environment, in a container with temperatures below 25°C. Biological sampling was not appointed as a requirement for this project.

In the area of study there is a shallow well which is equipped with a hand pump with a depth of approximately 5 m. The characteristics of the water quality are given below, namely measured in situ (Table 2) and determined in the laboratory. The parameters conform with the Regulations on Water Quality for Human Consumption, approved by Ministerial Diploma 180/2004 of 15 September regulations applied in Mozambique and thus, the water of the borehole can be classified as potable.

Table 2: Water Quality of the borehole water existing in the study site (in the Field).

Parameter	Value	Maximum Limit	Brief Observations (In accordance with Ministerial Diploma 180/2004)
Temperature	27.6 °C	n/a	This is the temperature range of potable water.
Electrical Conductivity (EC)	90 µs/cm	50 – 2.000 µs/cm	The value is below the limit recommended.
pH	8.7	6,5 – 8,5	Water is slightly basic (slightly above the considered value)
Total Dissolved Solids	44.40 mg/L	1000 mg/L	The value is below the limit recommended.
Total hardness (as $CaCO_3$)	< 1.000 mg/L	500 mg/L	The value is below the limit recommended.
Chloride (Cl^-)	12.346 mg/L	250 mg/L	The value is below the limit recommended.
Nitrate nitrogen	1.139 mg/L	10 mg/L	The value is below the limit recommended.

5.4.1 Temperature

The water sample temperature was 27.6 °C. Temperature values are known to be dependent on the climatic conditions at a particular geographical area and the period that the sample is taken.

5.4.2 Electrical Conductivity

Electrical Conductivity is a measure of the ability of an aqueous solution to carry an electric current and it measures the ionic content of the water and the water sample presented a value of 90 µs/cm. According to the Regulations on Water Quality for Human Consumption, approved by Ministerial Diploma 180/2004 of 15 September, electrical conductivity should range between 50 – 2.000 µs/cm. The water sample values show that the water is good for drinking purposes (provided there is no organic pollution and not too much suspended clay material).

5.4.3 pH

The pH value is an important index of acidity or alkalinity and the concentration of the hydrogen ion in groundwater. The pH value recorded was 8.7. According to the Regulations on Water Quality for Human Consumption, approved by Ministerial Diploma 180/2004 of 15 September, pH is a physical parameter that should fall in the range between 6,5 and 8,5. Water with a pH above 8.5 is considered basic or alkaline and it is often referred to as hard water. This kind of water (hard water) does not pose a health risk.

5.4.4 Total Dissolved Solids

Total dissolved solids (TDS) is comprised by inorganic salts and some small amounts of organic matter that are dissolved in water. In general, the TDS is the combination of cations and anions ions in the water. The maximum limit according to the Regulations on Water Quality for Human Consumption, approved by Ministerial Diploma 180/2004 of 15 September for TDS is 1000 mg/L. The water sample has presented a value of 44.40 mg/L. The most important aspect of TDS with respect to drinking water is its effect on the taste or palatability of the water. The palatability of drinking water with a TDS below 600 mg/L is considered to be good.

5.4.5 Total Hardness

Hardness if the property that makes water capable of precipitating soap. Water becomes hard by being in contact with soluble metallic cations such as calcium (Ca) and magnesium (Mg). The maximum limit according to the Regulations on Water Quality for Human Consumption, approved by Ministerial Diploma 180/2004 of 15 September for Total Hardness is 500 mg/L. The water sample presented a value of less than 1.000 mg/L which is considered soft water. The water sample is therefore considered safe for drinking.

5.4.6 Chloride

Almost all natural waters contain ions such as chloride and sulphate. Chloride often originates from the dissociation of salts, such as sodium chloride or calcium chloride, in water. In drinking water, the salty taste produced by chloride depends upon the concentration of the chloride ion. The maximum limit according to the Regulations on Water Quality for Human Consumption, approved by Ministerial Diploma 180/2004 of 15 September for TDS is 250 mg/L. The water sample presented a value of 12.346 mg/L, therefore lower than the maximum limit established by the Regulations on Water Quality for

Human Consumption in Mozambique. It is important to note that chloride is an essential element as is the main extracellular anion in the body. It is now widely known that the chloride ion play an important role in renal function, neurophysiology and nutrition.

5.4.7 Nitrate nitrogen

Nitrogen is indispensable for all living things, as it is a vital component of protein. Excessive concentration of nitrate-nitrogen in drinking water can be detrimental to the health, particularly of pregnant and nursing women and infants. The maximum contaminant level established for nitrate nitrogen in a public water supply is 10 mg/L. The water sample has shown a much lower level, 1.139 mg/L. The level of nitrate nitrogen is therefore within the acceptable concentrations considered safe for human consumption.

5.5 Air Quality

Ambient air quality monitoring is not undertaken in Meconta District, so no data is available to verify the current status of ambient air quality. Despite this, it is expected that ambient air quality will be relatively good as there are currently no major sources of air pollution in the region.

Domestic wood burning and traffic along the road are the main activities that may affect the air quality in the area of influence.

5.6 Noise Level

The overall District of Meconta is predominantly rural. There is no data regarding measurements for existing noise levels within the district, but it is expected that existing ambient noise levels in this predominantly rural area are low.

The main noise source within and around the project area is the vehicular traffic from the EN12 highway.

5.7 Waste Management

According to a telephonic conversation conducted with the local structures in Meconta, there are no adequate facilities for the collection and disposal of domestic and construction wastes. Most of the waste produced by the local community in the area is biodegradable waste that is presently buried or burnt (informally managed).

The Project will produce a limited amount of solid and liquid waste during the construction phase, namely:

- Biomass cut when cleaning the land (trunks, branches etc.)
- Packaging (boxes used to transport angle frames and insulators, rolls for cables, cement sacks, etc.);
- Leftovers and defective parts of conductor cable, broken insulators etc.;
- Waste produced by equipment maintenance (filters, burnt oil etc.)
- Solid waste from the workers' camps;
- Grey and sewage water produced in the camps.
- Demolition of transmission towers

The domestic waste produced during the lifecycle of the project may be divided into biodegradable and non-biodegradable waste. The former (biodegradable waste) can be buried in a suitable pit and covered with topsoil, with a layer of lime spread 0.5m below the surface. The latter (non biodegradable waste) as well as non-toxic waste may require a dedicated landfill site. For the construction phase, the contractor shall establish, if deemed necessary, a dedicated landfill site for the waste generated by the project. If hazardous wastes are produced within the lifecycle of the project, these will need to be transported to the Mavoco landfill in the Matola Municipality, Maputo Province.

Due to lack of adequate landfill /disposal facilities near areas with recent economic developments, investors are being advised to construct landfills designed to receive certain project wastes, particularly for non-hazardous wastes. Another possible solution for projects that produce great amounts of waste is the use of incinerators for the treatment of non-hazardous combustible wastes as well as certain hazardous wastes. Both options (construction of landfill site and incinerators) are being chosen as efficient solutions for the management of waste in small as well as large-scale projects such as the Liquefied Natural Gas project in Cabo Delgado.

Only a small amount of solid waste will be generated all during operation phase. It will result from the replacement of broken parts, maintenance of the substation and a small amount of domestic waste from the few workers during the operation of the substation.

5.8 Habitats and Flora

The project area is located in the deciduous woodland miombo phytogeographic zone. According Wild & Barbosa (1967), the unit 27. Deciduous woodland Miombo – Discontinuous Dry Forest – Savanna Mosaic is a type of miombo that is restricted to Nampula Province. In the project area this woodland type has been transformed into open bush land by slash and

burn agriculture. The main trees species are: *Brachystegia spiciformis, Adansonia digatata* (baobab) and *Sterculia apendiculata.*

Most of the natural habitats originally occurring in the Project area have been transformed by human activity mainly clearing of woodland for small-scale farms and harvesting of trees for firewood and charcoal production. Consequently there are very few remnants of semi-natural habitats occur in the project area. Tree species that may occur as isolated remnants of semi-natural habitats include: *Brachystegia* spp., *Julbernardia globiflora*, *Combretum* spp., *Albizia versicolor*, *Ficus* spp., *Terminalia sericea*, *Strychnos innocua*, and *Bauhinia thronningi*. No species considered to be rare or endangered were identified in the remnant woodlands.

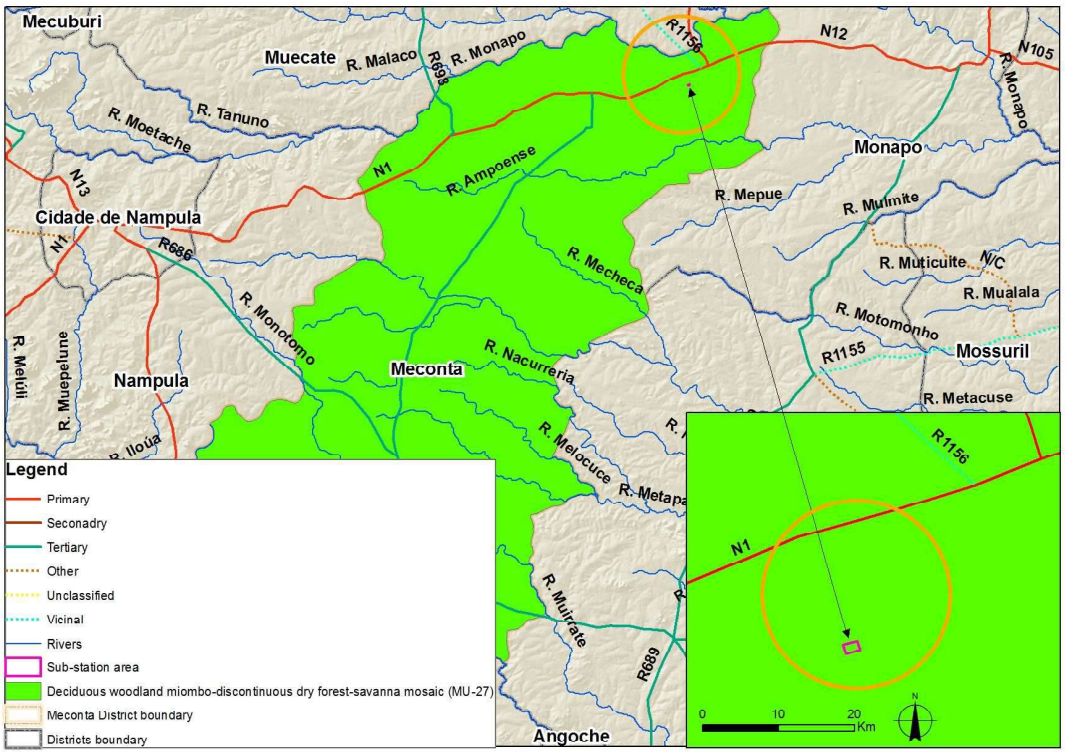

Figure 14: Vegetation of the proposed project area

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5.9 Fauna

A national wildlife survey carried out in 2008 out covering most of Mozambique. using aerial surveys along transects also confirmed the absence of medium to large wildlife species in the Project area (Agreco, 2008). The low diversity of wildlife is expected as the Project area coincides with areas of very high vegetation clearance and cultivation.

No medium size or large mammals were recorded during the field survey. This is due to the highly fragmented and disturbed nature of habitats present in the study area. The Provincial Services of Forestry and Wildlife have previously confirmed that the Project area is depleted of wildlife and that no large mammals migration routes are reported for the Project area. During the site visit, there was no record of herpetology, avifauna or reptiles, however local residents have reported the presence of small mammals and reptiles in the area.

5.10 Areas of Special Importance

There are three main areas of special importance that are relatively far from the proposed area of study: Mecuburi Forest Reserve, Baixo Pinda Forest Reserve and Matibane Forest Reserve. The location of these Forest Reserves are far away from the project area as shown in Figure 15.

Figure 15: Areas of special interest in relation to the proposed project area

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6 DESCRIPTION OF THE SOCIOECONOMIC ENVIRONMENT OF THE PROJECT AREA

A socio-economic description will be provided in this chapter. In Mozambique, the regular interval between censuses is of ten years and the last national census was conducted in 2007. Information provided in this chapter will be based on the 2007 National Census data.

6.1 Geographical Location and Administrative Division

Meconta is a district, situated in the Nampula Province. The district also borders the districts of Muecate (to the North), Mongicual and Mogovolas (to the South), Monapo (to the East) and the district of Nampula (to the West). Meconta district is divided into four administrative posts, which are in turn sub-divided into six localities (Table 3).

Table 3: Administrative Division of Palma District

Administrative Post	Localities
Meconta	Meconta-Sede
Corrane	Corrane- Sede
	Mecua 1
	Mecua 2
Namialo	Namialo
7 de Abril	7 de Abril- Sede

***Source**: Impacto, 2014*

At district level, the government structure follows the type of district governance laid down by Decree no. 6/2006 of 12 April, on the organic structure of district governments. Under this decree, the district is headed by an Administrator. Under the Administrator are the district Permanent Secretary and the directors of the district services of Health, Women's Affairs and Social Welfare; Education, Youth and Technology; Planning and Infrastructures; and Economic Activities.

In the administrative posts and localities, the top authorities are the Heads of the Administrative Posts and Heads of Localities, who are hierarchically subordinate to the District Administrator. At grass roots level (Localities and Villages) a traditional structure prevails where power is exercised by community leaders (Régulos).

6.2 Demography

According to National Population Census 2007 (INE; 2009), Nampula is the most populated province in Mozambique with 4,076,642 inhabitants, of which 1,999,958 men and 2,076,684 women. Nampula covers 81.606 km² and has a population density of 50 inhabitants/km2 (INE, 2007).

Table 4 shows key demographic indicators for Nampula province and for the country.

Table 4: Demographic indicators refer Nampula Province for 2007

Demographic indicators	Nampula Province	Mozambique
Life expectancy (years)	52.7	49.4
Child mortality rate (per 1000)	126.7	118.3
Mortality rate (1000)	14.9	16
Birth rate (per 1000)	41.3	42.2
Global Fertility Rate	5.9	5.9

***Source**: Recenseamento Geral da População e Habitação 2007 (INE, 2009)*

Based on the Nampula Province demographic indicators and national indicators, life expectancy is higher in Nampula than in the rest of the country. As for the gross death and birth rates, these are lower than the national average. However, there is a reduction in these rates in Nampula province in 2009. According to information from the Provincial Health Directorate, the death rate in the province has fallen to 11.9 per 1,000, and the birth rate to 39.4 per 1,000.

Meconta District has a surface area of 3,786 km² and the latest census[1] indicates a total population of 174,358 (INE, 2011). The population density for 2011 of this district stands at 46 hab/km². It is estimated that the projections for population in 2014 stand at 182,581, therefore approximately 49.1 hab/km² (±39,676 households). Approximately 53% of individuals in the district comprise the economically active population in the 14 – 64 age group (Table 8-5).

Table 5 shows the population density for the Administrative Post of Namialo.

Table 5: Demographic information for Namialo

Administrative area	Men		Women		Total
	N.º	%	N.º	%	N.º
Namialo A.P.	25271	50	25199	50	50470

***Source**: Recenseamento Geral da População e Habitação (INE, 2011)*

[1] 3rd General Population and Housing Census – Census of 2007

The Namialo Administrative Post has the same proportion of men as of women (50%).

6.2.1 Ethno-lingustic Groups and Religion

Regarding ethnic groups, the data from the 2007 Census on mother tongues shows that the Emakhuwa ethnic group is dominant in Nampula province. The Emakhuwa ethnic group is represented by 2,777.013 inhabitants (69.7%), followed by the coti ethnic group, with 60,780 inhabitants (1.8%) in Nampula Province.

There is one major ethno-linguistic groups in Meconta District, namely the Makuwa, being *Emakhua* the main spoken language in the area. As for religion, Islam is dominant, but Christianity is also practiced.

6.3 Settlement Patterns

In Meconta, an average household size is between 3 and 5 persons. Although it is a matrilineal society, the majority of the households are still headed by men.

Basic housing is made of clay bricks (*adobe*) and the roof is often topped with grass or thatch that is locally called *macuti*. This kind of housing is known as *palhota.*

Houses with adobe walls, owned by 66% of families, and mud and wattle houses inhabited by 28% of households. Other types of house are insignificant (1% have cement walls and 0,3% brick houses). Roofs with grass or thatch are mainly used by the local community, accounting for 91% of the households.

6.4 Road and Transport

In general, the areas affected by the project own a network road in good transitability conditions. Essentially the public transport network in the study area is dominated by semi-collective transport (private minibuses known colloquially as *chapas*) and public transport.

6.5 Collective Services and Amenities

Information regarding collective services and amenities was based on the Environmental Impact Assessment for the Chimuara-Nacala Transmission Project SCDS (2013).

6.5.1 Water Supply

Access to potable water in Meconta is still very weak. In 2007 only 0.16% of the 39 thousand households had piped water in the house. People get water mainly from wells that support 58% of households. They are complemented by water from rivers and lakes where 21% of households get their water. There are a few standpipes and protected boreholes, supplying 9% and 6% of households respectively. Figure 16 provides an overview of access to water in Meconta in 2007.

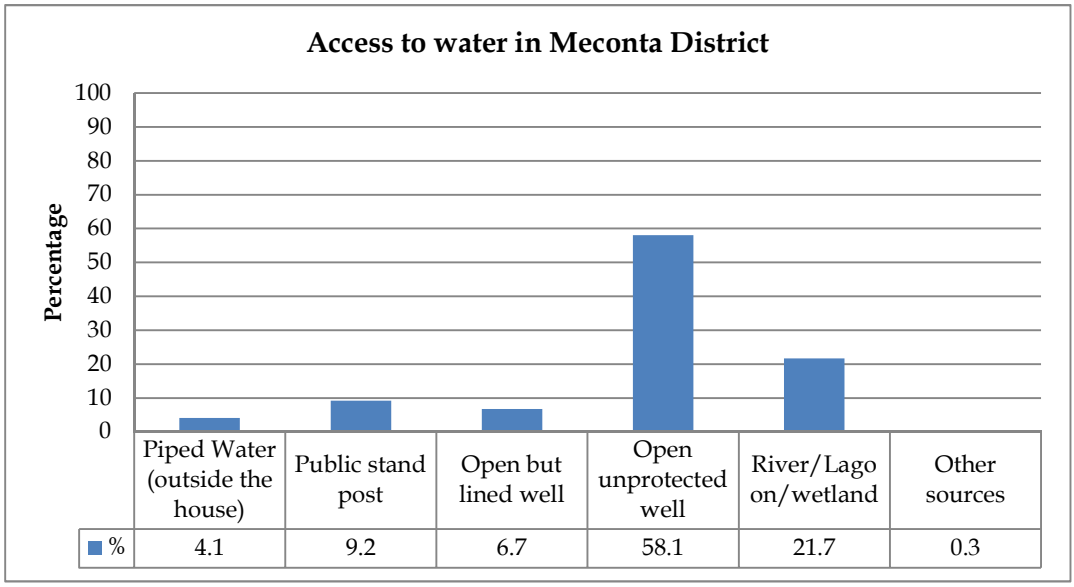

Figure 16: Access to potable water in Meconta District

6.5.2 Sanitation

In general, the sanitary system of rural areas affected by the project is characterized by traditional latrine. Basic sanitation in Meconta district is similar to that in the other districts in Nampula. Of the 39 thousand households, 57% do not have a latrine. A further 38% of families use standard traditional latrines compared to a little over 2% of families who have an improved traditional latrine.

6.5.3 Energy Supply

Much of the population resident in existing villages along the stretch under study does not benefit from electrical energy from Cahora Bassa, which only supplies the district capitals and some administrative posts.

In 2007 access to energy sources in Meconta district was as follows:

- Kerosene and firewood predominate, with 59% and 34% of families respectively;
- A little over 4% of households have electricity;
- Other alternative sources of energy such as candles, gas, solar panels and others are rare

6.5.4 Communications

Three mobile communication networks are operating in Meconta District, namely Mcel, Vodacom and Movitel. Coverage of the first two networks is, good. The newly established Movitel covers most parts that are not covered by Mcel and Vodacom. No land-based telephone network exists within the district. No information regarding telephone and internet subscribers is available.

6.6 Education

In 2007, the illiteracy rate among people over 15 years of age was 53%, slightly below the provincial average. In 2010 the primary and secondary gross enrolment rates were 118% and 28% respectively, with participation by girls 47% (Primary School) and 34% (Secondary School).

6.7 Health

The sanitary network in the Meconta district consists of 6 health centres and one health post (Table 6). Approximately 47 people working in the health service.

Table 6: Number of health units in the Meconta District

Administrative area	Type of health unit	
	Health centres	Health Posts
Meconta District	6	1

According to the 2007 Census (INE, 2009), malaria, HIV/AIDS and ante-natal causes are the main causes of death in Mozambique. Malaria is responsible for 28.8% of deaths, followed by HIV/AIDS with 26.9%. In general, this picture is repeated in Nampula province. According to information from the Nampula Provincial Health Directorate, the main causes of death in the province are malaria, diarrheal diseases and HIV/AIDS.

6.8 Economic Activities

The principal economic activity developed by the population in the study area is agriculture. There are, however, other important economic activities that

contribute to the monthly income of local communities in the Meconta District.

6.8.1 Agriculture

This activity is developed by the family sector for self-subsistence and is, essentially, rainfed agriculture. This agriculture follows a calendar that is divided between a number of activities such as burning/clearing, sowing, weeding and harvesting (Table 7).

Table 7: Agricultural Calendar

Activities	Burning/ clearing	Sowing	Weeding	Harvesting
Jan				
Feb				
Mar				
Apr				
May				
Jun				
Jul				
Aug				
Sept				
Oct				
Nov				
Dec				

Source: Interviews with the villages, 2014

Cassava is the predominant food crop along the entire stretch and plays an important role in the diet of families. Besides cassava, people grow other food crops such as maize, rice, sorghum, peanuts, horticultural crops, and beans. Besides their function for self-subsistence, these crops are also income crops since the families sell their surpluses. In adjacent areas, other income crops grown by the population are cotton, tobacco, sesame, castor beans, beans, cashew, and jatropha.

6.8.2 Other economic activities

According to MSA (2005), the Meconta district has large tracts of bush and forest containing timber species of considerable commercial value such as *Milletia stuhlmani* (jambirre), *Afzelia quazensis* (chanfuta), *Dalbergia melanoxylon* (umbila) and *Pterocarpus angolensis* (pau preto).Other species that have a lower commercial value are used to make charcoal. The cashew tree (*Anacardium*

occidentale) is very important for providing families with an income (MSA, 2005).

Small industry is the alternative to agriculture and is a complement to augment a family's income. There are 19 mills, 9 workshops of different kinds, 3 service stations, 3 bakeries and 2 sawmills. The commercial industrial sector comprises SANAM cotton ginning factories, the ACAI biscuit factory, and the CFM-North quarry and sawmill (MSA, 2005). Eight percent of the economically active population is wage earning.

7 ENVIRONMENTAL IMPACT ASSESSMENT AND MITIGATION MEASURES

This Chapter discusses the environmental and social impacts that may result from the proposed Project. Potential impacts are identified, the nature and significance of the impacts are determined, and mitigation measures provided.

The main objectives of the EIA process are as follows:

- to identify and assess the main potential environmental impacts (negative and positive) of the proposed project, taking into account the biophysical and socioeconomic domains; and
- to identify the mitigation, environmental management and environmental monitoring measures that will allow for minimizing potential negative impacts and to enhance potential positive impacts of the project, so as to ensure that it can be implemented in an environmentally sound manner.

It is worth recalling that not all impacts are negative and that positive impacts can also be expected, which will bring benefits to the society and the economy of Mozambique.

The methodology proposed for identification and assessment of the potential impacts is outlined below.

7.1 Impact Assessment Methodology

An impact assessment is based on a comparison of environmental scenarios, *viz.* the existing scenario prior to project implementation (baseline situation) and the expected scenario after project implementation. The assessment of impacts proceeds through an interactive process considering the following criteria:

- **Nature** (positive or negative impact);
- **Probability** (possibility of impact occurrence);
- **Extension** (the geographical area that may be affected by the impact);
- **Duration** (period along which the impact is expected to occur);
- **Magnitude** (effect on environmental and social processes);
- **Significance** (the level of importance of the impact).

The categories to be considered for each of the criteria above are indicated in the Table 8 below.

Table 8: Criteria for assessment of potential impacts of the project

CRITERIA	DESCRIPTION
Nature	**Nature of the environmental change**
Positive	Beneficial environmental change
Negative	Adverse environmental change
Probability	**Degree of possibility of impact occurrence**
Low	The possibility of occurrence is low, either due to the project design or due to the project nature, or due to the characteristics of the project area
Probable	There is possibility of impact occurrence
Highly Probable	Possibility of impact occurrence is almost certain
Definite	There is certainty that the impact will occur
Extension	**The geographical area that may affected by the impact**
Local	Only the place where the activities directly related to the construction and operation may occur, located within the boundaries of the study area
Regional	Project region – Administrative Posts adjacent to study area within Nampula Province
National	Mozambique
International	Mozambique and other countries (neighbouring or non-neighbouring countries)
Duration	**Period along which the impact is expected to occur**
Short-term	Less than 6 (six) months
Medium-term	Between 6 (six) months and 5 (five) years
Long-term	Project's lifetime
Permanent	The impact remains beyond the activity's lifetime, regardless of implementation of mitigation measures
Magnitude	**Effect on environmental and social processes**
Low	Small effect on the functioning of environmental and social processes
Moderate	Functioning of environmental and social processes is moderately affected
High	Functioning of environmental and social processes is considerably affected

All human activities impose some type of disturbance to some features of the natural and social environments, either in the form of a change in the natural systems or due to interactions with other human activities or with human systems. The assessment of **Significance** helps inform the relevant authorities and the public about the relative importance of the different impacts of the project. The assessment of impact significance results from a combination of the criteria above indicated, in particular Extension, Duration and Magnitude, as shown below in the Table 9.

Table 9: Criteria for assessment of significance of potential impacts of the project

Significance	Relation with the other criteria that describe the impact	Relation with mitigation measures
Negligible	- Low Magnitude, with any combination of other criteria.	- No further investigation, mitigation or environmental management is required.
Low (Low Significance Impact)	- Low Magnitude, with any combination of other criteria (except for Long-term Duration and National or International Extension); - Moderate Magnitude, with Local Extension and Short-term Duration.	- No specific mitigation is required, though it is subject to best environmental practices.
Moderate (Significant Impact)	- Low Magnitude, with National or International Extension and Long-term Duration; - Moderate Magnitude, with any combination of other criteria (except for: Local Extension and Short-term Duration; and National Extension and Long-term Duration); - High Magnitude, with Local Extension and Short-term Duration;	- Mitigation and Management is required to reduce the impact to an acceptable level (applicable to negative impacts).
High (High Significance Impact)	- Moderate Magnitude, with National or International Extension and Long-term Duration; - High Magnitude, with any combination of other criteria (except for Local Extension and Short-term Duration)	- If the impact cannot be mitigated/managed, it should influence decision as regards to particular aspects of the project (applicable to negative impacts).

This approach to impact assessment aims at minimising the subjectivity inherent to the evaluation of Significance. It is worth noting, however, that the context of the impact (i.e. the identity and the characteristics of the impact receptor), as well as compliance/non-compliance with norms, standards or legal instruments, must also be taken into account. Therefore, the use of this methodology also always has to take into consideration the specific conditions

that may apply to each impact, regardless of the proposed combinations of Extension, Duration and Magnitude.

The objective of an impact assessment is also to define technically acceptable, practicable and cost-effective mitigation measures for the environmental and social impacts identified. The overall purpose is to avoid unnecessary damage to the environment; safeguard valued or finite resources, natural areas, habitats and ecosystems and protect humans and their social environments.

Mitigation measures are developed to avoid, reduce, remedy or compensate for any negative impacts identified and to create or enhance positive impacts such as environmental and social benefits. In this context the term "Mitigation Measures" includes operational controls, as well as management actions. These measures are often established through industry standards and may include:

- Changes to the design of the project (e.g. changing the development approach for some specific project components);
- Engineering controls and other technical measures (e.g. waste water treatment facilities, communication procedures, etc.);
- Operational plans and procedures (e.g. waste management plans; safety procedures);
- The provision of like-for-like replacement, restoration or compensation, directed towards particular environmental elements potentially affected by the project.

Where significant residual impacts remain, further options for mitigation may be considered and impacts re-assessed, until they are as low as reasonably practicable for the project.

7.2 Pre-construction Phase

A Simplified Land Use Compensation Plan (SLUCP) was done as a subcomponent of the ESCS in order to address the social impacts and ensure the successful restoration and improvement of living standards, income earning capacity and production levels of the Project Affected Persons (PAP). The implementation of the SLUCP should be done prior to the construction phase (pre-construction phase)

7.3 Construction Phase

7.3.1 Soils and Relief

Changes in relief of landscape

The proposed project may cause changes in relief during construction phase. Levelling in the study area will be necessary for the substation to be built. Also, the opening of borrow pits for sand extraction for cement and construction work is also likely to cause some changes in relief.

Criterion	Rating	Mitigation measures
Nature	Negative	• Protection with terraces and vegetation. • Rehabilitation of borrow pits after use.
Probability	Definite	
Extension	Local	
Duration	Medium-term	
Magnitude	Low	
Significance	Low	

Increase of Soil Erosion and/or compaction due to construction activities

Construction activities have the potential to cause soil erosion and/or compaction as well as soil pollution. Erosion may result from the movement of heavy machinery, the removal of the vegetative cover and exposure of the soil surface. Erosion of the soil and run-off from construction materials could also cause and/or increase turbidity and siltation of the water bodies in the surrounding areas.

There are possibilities of soil erosion occurring during the construction of the proposed Namialo substation especially during rainy seasons. The soils in the are susceptible to erosion. Even footpaths can become channels due to the strength of the flow. Therefore, footpaths that lose their vegetation cover can become water channels at a later stage.

Due to the fact that the duration of the construction activity is short and the proposed project area is small the significance of this impact may be low, if mitigation measures are implemented.

Criterion	Rating	Mitigation measures
Nature	Negative	• Minimize work in the rainy season. • Limit access to the project area to the necessary minimum and remove as little vegetation as possible. • Avoid creating large open expanses of bare soil as these are most susceptible to wind and run-off erosion. In such areas, if necessary, create windbreaks should (e.g. a tree screen). • Suitable drainage systems should be installed to direct water and prevent waterlogging and erosion. • After construction, all non-paved areas should be reinstated with the topsoil to allow the reestablishment of the indigenous herbaceous vegetation. • All bare areas should be re-vegetated as soon as possible. • All vehicles and machinery should only use indicated routes and access roads.
Probability	Probable	
Extension	Local	
Duration	Medium-term	
Magnitude	Low	
Significance	Low	

7.3.2 Air Quality

Air Pollution Resulting from Emission of Pollutants from transportation and construction activities

The Project may cause some changes in air quality, during construction phase, due to: (1) potential for generation of dust (particulate matter such as PM_{10}) from transportation and construction activities and (2) emissions from machines such as (CO, NO_2, SO_2) related to the transport of material to and from the site and the use and movement of heavy machinery during the construction phase.

This environmental impact is considered to be relatively small due to the limited duration of the construction works.

Criterion	Rating	Mitigation measures
Nature	Negative	• Good maintenance of engines, vehicles and machinery • Use new, modern machinery and vehicles. • Repair and eventually replace machinery and vehicles when they exceed norms. • Loads on vehicles carrying dusty construction materials should be covered. • Loading and unloading bulk construction should be in areas protected from the wind on in calm conditions. • Vehicles carrying dusty materials should be washed before leaving the site (washing facilities should be available). • Limit access to construction site to construction vehicles only. Impose vehicle speed restrictions on the construction site. • Maintain high moisture content on exposed surface and roads by spraying with water. • Maintenance of construction vehicles to ensure optimum performance with reduced emissions.
Probability	Highly probable	
Extension	Local	
Duration	Short-term	
Magnitude	Low	
Significance	Low	

7.3.3 Hydrology

Changes to runoff

During the construction works, there will be garbage and effluents generated by the workers and resulting from the maintenance of equipment which has to be disposed appropriately as to avoid the contamination of the soil and water resources (both surface and groundwater).

The Project will create impermeable areas at a local scale near substations to guarantee that oil leaks from transformers do not contaminate soil and groundwater.

Criterion	Rating	Mitigation measures
Nature	Negative	• Maintain machinery and vehicles in workshops with sealed floors during all Project phases; • Collect waste oils in designated containers and transport them designated disposal/recycling site • Do not dispose untreated wastewater; • Monitor the impact of local erosion due to the flow and, if impact is significant reduce run-off
Probability	Low	
Extension	Local	
Duration	Medium-term	
Magnitude	Low	
Significance	Low	

7.3.4 Waste

Production of waste

The Project will produce a limited amount of waste during the construction phase, namely:

- Biomass cut when cleaning the land (trunks, branches etc.)
- Packaging (boxes used to transport angle frames and insulators, rolls for cables, cement sacks, etc.);
- Leftovers and defective parts of conductor cable, broken insulators etc.;
- Waste produced by equipment maintenance (filters, burnt oil etc.)
- Solid waste from the workers' camps;
- Grey and sewage water produced in the camps.

Criterion	Rating	Mitigation measures
Nature	Negative	• Minimise the use of disposable materials. • Train workers how to minimize and treat waste. • Dedicate resources to collecting, sorting, depositing, reusing and recycling according to norms (section 2.4), with special emphasis to metallic waste. • Avoid spillage of waste oil and others
Probability	Definite	
Extension	Local to Regional	
Duration	Short-term	
Magnitude	Low	
Significance	Low to Moderate	

Generation of waste from demolition of transmission towers

The demolition of three transmission towers will be carried out and this will produce large amount of metal waste.

Criterion	Rating	Mitigation measures
Nature	Negative	• Minimise the use of disposable materials. • Train workers on how to minimize and treat waste. • Dedicate resources to collecting, sorting, depositing, reusing and recycling, with special emphasis to metallic waste (section 2.4).
Probability	Definite	
Extension	Local	
Duration	Short-term	
Magnitude	Low	
Significance	Low	

7.3.5 Noise and Vibration

Increase in noise and vibration levels due to transportation and construction activities and demolition of transmission towers

The study area is a relatively tranquil area. During construction the four main sources of noise and vibration are: (a) noise produced by vehicles transporting equipment, material and workers; (b) Noised produced by chainsaws or other machines when cutting down trees; (c) noise produced by machines involved in the construction work for the substations; (d) noise produced from demolition of transmission towers. To avoid public nuisance and complaints and occupational hazard to the employees, mitigation measures need to be put in place.

Criterion	Rating	Mitigation measures
Nature	Negative	• Transportation of workers, equipment and materials should be undertaken during the day, especially in inhabited areas. • Use modern vehicles and ensure that these are well maintained. • Monitor the level of noise emissions and ensure they are within the applicable limits. • Repair and eventually replace machinery and vehicles when they exceed norms. • The Contractor should take measures to inform the communities about the start of the works and the time limit foreseen for their conclusion, the working hours established by law should be adhered to and respected. Work continuation during evenings, weekends and holidays should be minimized. • Whenever possible, machines and vehicles should be equipped with silencers. • Use noise barriers if necessary. When possible use natural noise barriers such as materials resulting from earthworks, trees. • All construction workers must be issued with the necessary protective equipment. • Construction work should be limited to the daytime (08:00-18:00) as far as possible, still a must for activities causing high noise/vibration.
Probability	Highly Probable	
Extension	Local	
Duration	Short-term	
Magnitude	Moderate	
Significance	Low	

7.3.6 Flora and Fauna

Loss of flora and fauna due to construction activities

For the construction of the substation and access road it will be necessary to clear the lane for construction of the substation. It should be noted that the habitats in the Project area have largely been degraded and replaced by small-scale farms. Hence the impacts on any residual habitats, flora and fauna will be minimal.

Criterion	Rating	Mitigation measures
Nature	Negative	• Restrict the access of the Contractor particularly outside of the area where the project will be implemented and reduce the construction work area to a minimum in these areas. • Guarantee the contractor has a license for clearing vegetation. • Limit cutting of trees to the site only. • All vehicles and machinery should only use indicated routes and access roads and therefore no off-road driving. • Apply mechanical vegetation control measures.
Probability	Probable	
Extension	Local	
Duration	Medium term	
Magnitude	Low	
Significance	Low	

7.3.7 Landscape and Visual

Change the visual of the landscape due to construction works

Construction works can be considered low aesthetic activity, although the appreciation of an object as good or bad looking is subjective. The visibility of construction activities depends on several aspects, namely size of work-site area and location in relation to the road. The construction work-site for the planned substation in Namialo is approximately 1.5 km from the nearest road, therefore it will not be very visible.

Criterion	Rating	Mitigation measures
Nature	Negative	• Limit construction activities to the construction areas only to minimize visual and landscaping impacts
Probability	Definite	
Extension	Local	
Duration	Medium-term	
Magnitude	Low	
Significance	Low	

7.3.8 Traffic and transport

Changes in the intensity and traffic flow due to trucks, extraordinary transport and others

The impact of traffic and transport will arise from the following activities:

- Construction of the temporary access roads;
- Delivering resources (materials, equipment and labour) to work sites.

All these activities require material, equipment and people to be transported, thereby increasing the amount of traffic. In addition to the impact on volume there are also:

- Constraints on traffic flows when transporting extra-large loads;
- Constraints on traffic flows when placing lines on road crossings;

The movement of heavy vehicles and equipment will be a factor of "disturbance" in terms of their interference with local traffic, especially as the all trucks that will be driving on the EN12 road. Based on the information available, the risks and impacts related to traffic and transport are likely to be as follows:

Criterion	Rating	Mitigation measures
Nature	Negative	• Transport extraordinary cargo out of rush hours and if necessary accompanied by traffic police. • Place signs and safety barriers. • Educate workers to follow traffic rules • Reduce roadblocks to a minimum. • Ensure the load prone to dust is well covered.
Probability	Definite	
Extension	Local	
Duration	Short-term	
Magnitude	Low	
Significance	Low	

7.3.9 Health

STI's in the population and workers safety and health

In the construction phase, there is a possibility for exposure to infectious diseases in interaction with employees (STDs including HIV/AIDS); It is likely that workers in the project area are exposed to the risk of other diseases such as malaria, HIV and diarrhoea.

Criterion	Rating	Mitigation measures
Nature	Negative	• Education of the public and workers on the risks and health hazards and legal norms, around infection, testing, and sexual behaviours. • Availability of condoms to employees and sales points around the camps. • Access to health services, medicines. • For the workers, ensure provision of mosquito nets, health facilities at camps, maintain a sufficient stock of medicines and prophylactics of first-line treatment of malaria, availability of clean water and adequate sanitary equipment.
Probability	Highly Probable	
Extension	Local	
Duration	Short term to Long term	
Magnitude	Moderate to High	
Significance	Moderate	

Work accidents

Due to the type of construction work that will be carried out on site, there is a potential risk of injuries and work accidents that can occur, such as falling from heights, risk associated with demolition of transmission towers, excavations and exposure to occupational health risks. The contractor must therefore ensure that general health & safety awareness and the communication of risks, management controls and mitigation measures for

potential health & safety risks exposed to are adequately communicated and controlled.

Criterion	Rating	Mitigation measures
Nature	Negative	• Train workers in occupational safety and health. All contractor teams involved in works during the construction phase shall be briefed on their obligations towards health & safety controls and methodologies. The briefing must take the form of a presentation and demonstration. The education / awareness programme should be aimed at all levels of management and general staff within the Contractor teams. An attendance register shall be signed at this briefing. Local labourers hired for the construction phase must receive training related to health & safety awareness prior to commencement of the works. • All construction workers must be issued with the necessary protective equipment, in particular, helmets, safety shoes, ear plugs and goggles. • Periodical exercises and simulations. • Award good behaviour. • Train employees in first aid. • Reserve a vehicle for emergencies such as transportation of patients at work site.
Probability	Highly Probable	
Extension	Local	
Duration	Short-term to Medium-term	
Magnitude	Moderate	
Significance	Moderate	

7.3.10 Economy

Loss of crops, cropping areas and other economic opportunities

The site for the construction of the substations and access road will have to be cleared prior to construction. Most of the area is occupied by small scale farms and fruit trees. This will result in the permanent loss agricultural land and fruit trees. The effect of such losses and associated compensation are dealt with in the SLUCP.

Criterion	Rating	Mitigation measures
Nature	Negative	• Advise farmers before construction so that they can harvest their crops • Compensate for the value, land and opportunities lost in a compensation plan. To this extent a simplified land-use compensation plan (SLUCP) has been prepared and is presented as separate document to this SES.
Probability	Definite	
Extension	Local	
Duration	Long-term	
Magnitude	Moderate	
Significance	Moderate	

Direct employment

The main economic impact will be the creation of local employment during construction of the substation, access road and establishment of two new towers. It is estimated that the labour requirements to build a substation is roughly 1020 people.

Criterion	Rating	Mitigation measures
Nature	Positive	• Prioritize the recruitment of local workers. • Use temporary employment for the training of local people. • Prioritize procedures of intensive hand labour instead of machines.
Probability	Definite	
Extension	Local to Regional	
Duration	Short-term	
Magnitude	Moderate	
Significance	Moderate	

Indirect employment due to induced development

During construction of the Project, the labour force will be concentrated in camps and places where the work will attract all kinds of service, thereby promoting indirect employment. The contractor's use of local equipment and service suppliers will also help generate indirect employment in this phase.

Criterion	Rating	Mitigation measures
Nature	Positive	• Prioritize local and national suppliers. • Invest in training of local service providers. • Connect the Project to investments. • Encourage investments that allow the recruitment of more local hand labour.
Probability	Probable	
Extension	Regional	
Duration	Long-term	
Magnitude	Low	
Significance	Moderate	

7.3.11 Tensions

High expectations with regards to employment opportunities

During the construction phase, there may arise high expectations in the surrounding communities with regard to the creation of unskilled job opportunities. These could be disappointed, as it is expected that a company with its own work force will be contracted for construction work.

Criterion	Rating	Mitigation measures
Nature	Negative	• If local workers (non-specialized and/or semi-specialized) will be necessary, the project must as far as possible incorporate and maximize the use of local labour. This should be best coordinated with the local authorities and with the provincial Directorate of Labour. • In the Contractor's contract, the number of work places to be opened for local staff should be stipulated, the hiring requirements, the maximum duration of the work, the recruitment procedures and wage levels.
Probability	Probable	
Extension	Local to Regional	
Duration	Short-term	
Magnitude	Moderate	
Significance	Moderate	

Social conflict due to physical presence of external workers

During the construction phase, construction workers will be hired especially for skilled workforce. The exact number of the proposed project is, however, not yet determined. Workers will, naturally, interact with the local population, and conflicts may occur of a socio-cultural nature. However, given the relative isolation of the site, this impact is thought not to be very significant.

Criterion	Rating	Mitigation measures
Nature	Negative	• Both, workers and local communities, should be subject to awareness-raising campaigns, so as to promote good relations, thus avoiding the occurrence of conflicts.
Probability	Probable	
Extension	Local to Regional	
Duration	Short-term	
Magnitude	Moderate	
Significance	Moderate	

7.4 Operation stage (post-construction)

7.4.1 Waste

Production of waste`

Only a small amount of waste will be generated all during operation phase. It will result from the replacement of broken parts, maintenance of the substation and a small amount of domestic waste from the few workers during the operation of the substation.

Criterion	Rating	Mitigation measures
Nature	Negative	• Minimise the use of disposable materials. • Train workers how to minimize avoid and treat waste. • Dedicate resources to collecting, sorting, depositing, reusing and recycling according to norms. • Avoid spillage of waste oil and others
Probability	Definite	
Extension	Local	
Duration	Long-term	
Magnitude	Low	
Significance	Moderate	

7.4.2 Air Quality

Air Pollution Resulting from Emission of Pollutants from operation phase

During the operation phase, vehicles and equipment will be used for maintenance work, including the replacement of obsolete or broken parts, all of which may produce gaseous emissions.

Criterion	Rating	Mitigation measures
Nature	Negative	• Good maintenance of engines, machinery and vehicles • Use new, modern machinery and vehicles • Repair and eventually replace machinery and vehicles when they exceed norms.
Probability	Definite	
Extension	Local	
Duration	Short-term	
Magnitude	Low	
Significance	Low	

7.4.3 Noise and vibration

Noise and vibration resulting from operation of substation

The noise and vibration produced by an operating substation can be relatively loud to adjacent property owners. A constant humming or buzzing noise may be audible a at short distances from the substation fence. The sound may be especially noticeable during night-time hours when ambient noise levels are lower.

Criterion	Rating	Mitigation measures
Nature	Negative	• A barrier of mature trees or high soil berms (green area) between the substation and nearby residences can be helpful in reducing noise impacts
Probability	Probable	
Extension	Local to Regional	
Duration	Short-term	
Magnitude	Moderate	
Significance	Moderate	

7.4.4 Improved Energy Supply

The main benefit of the Project is improved power supply. There is a strong need for the electricity sector of Mozambique promoting the rehabilitation and reinforcement of the installed capacity of the existing substations, through the construction of new substations such as the Namialo, not only for maintaining the current capacity, but furthermore to guarantee the increase in capacity of electricity supply of a trustworthy source during future years.

Criterion	Rating	Mitigation/Enhancement measures
Nature	Positive	• Ensure integration of the Project in the investment strategies in the four provinces affected by the Chimuara-Nacala Transmission Project
Probability	Definite	
Extension	Regional	
Duration	Long-term	
Magnitude	Moderate	
Significance	High	

7.4.5 Economy

Direct employment

During the operational phase, direct employment will be very limited. Most of the direct employment will be skilled work and less than 10 people are estimated to work in the substation. Therefore, during the operational phase, the direct employment is low in numbers.

Criterion	Rating	Mitigation measures
Nature	Positive	• Prioritize recruitment of local workers. • Use temporary employment for the training of local people. • Prioritize procedures of intensive hand labour instead of machines.
Probability	Definite	
Extension	Local	
Duration	Long-term	
Magnitude	Moderate	
Significance	High	

7.5 Decommissioning Phase (post-operation)

7.5.1 Waste

Production of waste

Waste will be produced during the lifecycle of the project, with greater emphasis during the decommissioning phase, when all the material incorporated in the substations will be converted into waste. It is expected that during decommissioning, all the material that makes up the infrastructure will

be converted into solid waste. Removal of the infrastructure will require the mobilization of workers that will probably have to be hosted in camps, which will produce household waste Demolition is not known when to occur. For the time being and based in the current condition, these are the possible impacts, however we suggest an EIA is done during the decommissioning phase

Criterion	Rating	Mitigation measures
Nature	Negative	• Minimise the use of disposable materials. • Train workers how to minimize and treat wastewater. • Dedicate resources to collecting, sorting, depositing, reusing and recycling according to norms
Probability	Definite	
Extension	Local	
Duration	Short-term	
Magnitude	Low	
Significance	Low	

7.5.2 Traffic and transport

Changes in the intensity and traffic due to the transport of the debris to landfills and recycling

The movement of heavy vehicles and equipment will be a factor of "disturbance" in terms of their interference with local traffic, especially as the trucks will driving on the EN12 road for the transportation of the debris to landfills and for recycling purposes.

Criterion	Rating	Mitigation measures
Nature	Negative	• Transport extraordinary cargo out of rush hours and if necessary accompanied by traffic police. Ensure the dust prone load is well covered.
Probability	Definite	
Extension	Local	
Duration	Short-term	
Magnitude	Low	
Significance	Low	

7.5.3 Health

STI's in the population and workers safety and health

In the decommissioning phase, the number of workers will increase when compared to the operation phase. There is again a possibility for exposure to infectious diseases in interaction with employees/local community (STDs including HIV/AIDS); It is likely that workers in the project area are exposed to the risk of other diseases such as malaria, HIV and diarrhoea.

Criterion	Rating	Mitigation measures
Nature	Negative	• Education of the public and workers on the risks and health hazards and legal norms, around infection, testing, and sexual behaviours. • Availability of condoms to employees and sales points around the camps. • Access to health services, medicines. • For the workers, ensure provision of mosquito nets, health facilities at camps, maintain a sufficient stock of medicines and prophylactics of first-line treatment of malaria, availability of clean water and adequate sanitary equipment.
Probability	Highly Probable	
Extension	Local	
Duration	Short term to Long term	
Magnitude	Moderate to High	
Significance	Moderate	

7.5.4 Economy

Direct employment

It is assumed that a workers are required for the decommissioning phase of the project. All the infrastructure that was implemented during the construction phase will have to be dismantled.

Criterion	Rating	Mitigation measures
Nature	Positive	• Prioritize recruitment of local workers.
Probability	Probable	
Extension	Local	
Duration	Short to medium-term	
Magnitude	Low	
Significance	Low	

8 ENVIRONMENTAL MANAGEMENT PLAN

8.1 The Environmental Management Plan (EMP)

The Environmental Management Plan (EMP) is an instrument, which will allow Electricidade de Moçambique (EDM) to integrate environmental components during the construction, operation and decommissioning of the proposed project. The main objectives of the EMP are the following:

- Provide the Ministry for Environmental Coordination (MICOA) with an instrument that facilitates the objective evaluation of the different project phases, keeping in mind the Mozambican Environmental Legislation, and
- Provide the Proponent of the Project with clear and obligatory instructions with regard to his environmental responsibilities during all project phases.

To ensure the fulfilment of the EMP is the responsibility of the project proponent, in this case of EDM.

The EMP comprises a set of general and specific recommendations, which altogether serve as a basis for the environmental management (mitigation of the impacts). Thus, the EMP serves to identify and describe the principles, responsibilities and activities, which EDM will be obliged to adopt in order to manage environmental aspects and impacts in an efficient way during the different phases of the project.

Normally the specifications in the EMP are designed to reach an optimal environmental protection based on best practices. However, situations can occur where technical difficulties could limit the norms specified in the EMP. In these situations, a pragmatic approach will be needed, which allows some flexibility for determining the best way in order to fulfil with the original intention and objective of the specific measure, in a way to ensure that the necessary intervention will satisfy the objective of the mitigation measure.

The EMP is considered to be an "alive" document that should be sufficiently flexible, using available and "reasonable" techniques without compromise the environmental protection, including socioeconomic aspects. In the cases where the specific conditions cannot be fulfilled and where there is no reasonable technical basis for modifying the stipulated conditions, any amendments to the EMP needed will require the approval of MICOA.

The Basic principles of the Environmental Management Plan are:

- ***Principle 1: Environmental Consciousness***

The proponent will be sensitised about the needs of the environment. The construction, operation and decommissioning phases will take into account the environmental aspects and not degrade (or degrade only to a minimum) the existing environmental conditions.

- ***Principle 2: Mitigation***

All the activities related with the life cycle of the Project will include appropriate mitigation measures in a way to guarantee that the negative environmental impacts will be duly mitigated and managed. The mitigation implies the identification of the best options to adopt, the minimisation or elimination of the negative impacts, the enhancement of the benefits related to the proposed project and the protection of public and individual rights. Thus, practical measures are looked for to reduce the adverse impacts or to enhance the beneficial impacts of the project.

- ***Principle 3: Responsibility***

The project proponent assumes complete responsibility for the implementation and control of the actions prescribed for managing the environmental impacts. The efficiency of the environmental mitigation measures needs to be evaluated by the proponent. The proponent and contractor need to manage the environmental impacts during the different project phases, in accordance with the Environmental Management Plan.

8.2 Actors Involved in the Implementation of the Environmental Management and Monitoring Plan

There are a number of actors who may play a key role in implementing the EMP:

- EDM, as the Project proponent and owner;
- The contractors, the companies that which will carry out construction work;
- Environmental supervisors, which should be hired along with engineering supervisors and be responsible for environmental and occupational safety and health supervision;
- District governments, namely, the Planning and Infrastructure Services (SDPI) and municipal governments;
- National (MICOA) and Provincial Directorates for the Coordination of Environmental Affairs (DPCA) of Nampula;

Table 10: Environmental Management Plan – Construction Phase

Phase: Construction					
Activity **Description of Activity**	**Environmental Items**	**Impact**	**Objective**	**Mitigation Measures**	**Implementation Agency**
Construction activities (i.e vegetation clearing, topsoil removal) and transportation, including movement of heavy machinery	Geology, geomorphology and soils	Changes in relief of landscape	Grant protection to areas that may be changed in terms of relief	• Protection with terraces and vegetation. • Rehabilitation of borrow pits after use.	Contractor
		Increase of Soil erosion and/or compaction due to construction activities	Reduce soil erosion/compaction	• Minimize work in the rainy season. • Limit access to the project area to the necessary minimum and remove as little vegetation as possible. • Avoid creating large open expanses of bare soil as these are most susceptible to wind and run-off erosion. In such areas, if necessary, create windbreaks (e.g. a tree screen). • Suitable drainage systems should be installed to direct water and prevent waterlogging and erosion. • After construction, all non-paved areas should be reinstated with the topsoil to allow the reestablishment of the indigenous herbaceous vegetation. • All bare areas should be re-vegetated as soon as possible. • All vehicles and machinery should only use indicated routes and access roads.	Contractor

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Construction activities (i.e vegetation clearing, topsoil removal) and transportation and demolition activities	Air Quality	Air Pollution Resulting from Emission of Pollutants from transportation and construction activities	Reduce air pollutants emissions	• Good maintenance of engines, vehicles and machinery • Use new, modern machinery and vehicles. • Repair and eventually replace machinery and vehicles when they exceed norms. • Loads on vehicles carrying dusty construction materials should be covered. • Loading and unloading bulk construction should be in areas protected from the wind on in calm conditions. • Vehicles carrying dusty materials should be washed before leaving the site (washing facilities should be available). • Limit access to construction site to construction vehicles only. Impose vehicle speed restrictions on the construction site. • Maintain high moisture content on exposed surface and roads by spraying with water. • Maintenance of construction vehicles to ensure optimum performance with reduced emissions.	Contractor

A13–77

Construction activities (i.e construction of infrastructures)	Hydrology	Changes to runoff	Manage changes of hydrological features	• Maintain machinery and vehicles in workshops with sealed floors during all Project phases. • Collect waste oils in designated containers and transport them to the designated disposal/recycling site • Do not dispose untreated wastewater. • Monitor the impact of local erosion due to the flow and, if impact is significant reduce run-off	Contractor
Construction activities (i.e biomass cut when cleaning the land, packaging, leftovers and defective parts of conductor cable, broken insulators, waste produced by equipment maintenance, solid waste from the worker's camps, grey and sewage water produced in camps)	Waste	Production of waste	Ensure waste is treated according to the local norms (section 2.4)	• Minimise the use of disposable materials. • Train workers how to minimize and treat waste. • Dedicate resources to collecting, sorting, depositing, reusing and recycling according to norms (section 2.4), with special emphasis to metallic waste. • Avoid spillage of waste oil and others	Contractor
		Generation of waste from demolition of transmission towers	Ensure solid waste is treated according to the local norms (section 2.4)	• Minimise the use of disposable materials. • Train workers on how to minimize and treat waste. • Dedicate resources to collecting, sorting, depositing, reusing and recycling, with special emphasis to metallic waste (section 2.4).	Contractor

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Construction activities (i.e vegetation clearing, topsoil removal) and transportation and demolition of transmission towers	Noise and Vibration	Increase in noise and vibration levels due to transportation and construction activities and demolition of transmission towers	Reduce noise and vibration levels	• Transportation of workers, equipment and materials should be undertaken during the day, especially in inhabited areas. • Use modern vehicles and ensure that these are well maintained. • Monitor the level of noise emissions and ensure they are within the applicable limits. • Repair and eventually replace machinery and vehicles when they exceed norms. • The Contractor should take measures to inform the communities about the start of the works and the time limit foreseen for their conclusion, the working hours established by law should be adhered to and respected. • Work continuation during evenings, weekends and holidays should be minimized. • Whenever possible, machines and vehicles should be equipped with silencers. • When possible use noise barriers such as materials resulting from earthworks, trees. • All construction workers must be issued with the necessary protective equipment. • Construction work should be limited to the daytime (08:00-18:00) as far as possible, still a must for activities causing high noise/vibration.	Contractor

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Construction activities (i.e vegetation clearing)	Fauna and Flora	Loss of flora and fauna due to construction activities	Reduce the loss of fauna and flora	• Restrict the access of the Contractor particularly outside of the area where the project will be implemented and reduce the construction work area to a minimum in these areas. • Guarantee the contractor has a license for clearing vegetation. • Limit cutting of trees to the site only. • All vehicles and machinery should only use indicated routes and access roads and therefore no off-road driving. • Apply mechanical vegetation control measures.	Contractor
Construction activities associated with the demolition of transmission towers or establishment of new infrastructures namely 2 new transmission towers and substation	Landscape and Visual	Change the visual of the landscape due to the building of substation	Reduce the visual impact caused by construction works	•Limit construction activities to the construction areas only to minimize visual and landscaping impacts	Contractor
Construction activities associated with movement of heavy machinery	Traffic and transport	Changes in the intensity and traffic flow due to trucks, extraordinary transport and others	Manage traffic flow	• Transport extraordinary cargo out of rush hours and if necessary accompanied by traffic police. • Place signs and safety barriers. • Educate workers to follow traffic rules. • Reduce roadblocks to a minimum. • Ensure the load prone to dust is well covered.	Contractor

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Construction activities (i.e new employment opportunities for local and people from other areas; accidents associated with construction phase such as working at heights)	Health	STI's in the population and workers safety and health	Reduce health impacts associated with migration of people to project site	• Education of the public and workers on the risks and health hazards and legal norms, around infection, testing, and sexual behaviours. • Availability of condoms to employees and sales points around the camps. • Access to health services, medicines. • For the workers, ensure provision of mosquito nets, health facilities at camps, maintain a sufficient stock of medicines and prophylactics of first-line treatment of malaria, availability of clean water and adequate sanitary equipment.	Contractor

		Work accidents	Reduce work accidents and risk of injury	• Train workers in occupational safety and health. All contractor teams involved in works during the construction phase shall be briefed on their obligations towards health & safety controls and methodologies. The briefing must take the form of a presentation and demonstration. The education / awareness programme should be aimed at all levels of management and general staff within the Contractor teams. An attendance register shall be signed at this briefing. Local labourers hired for the construction phase must receive training related to health & safety awareness prior to commencement of the works. • Periodical exercises and simulations. • Award good behaviour. • Train employees in first aid. • Reserve a vehicle for emergencies such as transportation of patients at work site.	Contractor
Construction activities (i.e employment opportunities, migration of workers to areas near the site)	Economy	Loss of crops, crop areas and other economic opportunities	Minimize and compensate economic losses for local communities	• Advise farmers before construction so that they can harvest their crops. • Compensate for the value, land and opportunities lost in a compensation plan. To this extent a Simplified Land-Use Compensation Plan (SLUCP) has been prepared and is presented as separate document to this SES.	EDM

		Direct employment	Increment employment opportunities for local workers	• Prioritize recruitment of local workers. • Use temporary employment for the training of local people. • Prioritize procedures of intensive hand labour instead of machinery	EDM and Contractor
		Indirect employment due to induced development	Ensure linkages and benefits from implementation of project are also translated to local and national suppliers	• Prioritize local and national suppliers. • Invest in training of local service providers. • Connect the Project to investments. • Encourage investments that allow the recruitment of more local hand labour.	EDM and Contractor

Construction activities (i.e employment opportunities, migration of workers to areas near the site)	Tensions	High expectations with regards to employment opportunities	Manage work expectations	• If local workers (non-specialized and/or semi-specialized) will be necessary, the project must as far as possible incorporate and maximize the use of local labour. This should be best coordinated with the local authorities and with the provincial Directorate of Labour. •In the Contractor's contract, the number of work places to be opened for local staff should be stipulated, the hiring requirements, the maximum duration of the work, the recruitment procedures and wage levels.	EDM and Contractor
		Social conflict due to physical presence of external workers	Avoid conflicts	• Both, workers and local communities, should be subject to awareness-raising campaigns, so as to promote good relations, thus avoiding the occurrence of conflicts.	EDM and Contractor

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Table 11: Environmental Management Plan – Operation Phase

Phase: Operation stage					
Activity / **Description of Activity**	**Environmental Items**	**Impact**	**Objective**	**Mitigation Measures**	**Implementation Agency**
Operation activities (ie replacement of broken parts, maintenance of substation and domestic waste from workers)	Waste	Production of waste	Ensure waste is treated according to the local norms (section 2.4)	• Minimise the use of disposable materials. • Train workers how to minimize and treat waste. • Dedicate resources to collecting, sorting, depositing, reusing and recycling according to norms. • Avoid spillage of waste oil and others	EDM – North Region
Operation activities	Air quality	Air Pollution Resulting from Emission of Pollutants from operation	Reduce air pollutants emissions	• Good maintenance of engines, machinery and vehicles • Use new, modern machinery and vehicles • Repair and eventually replace machinery and vehicles when they exceed norms.	EDM – North Region
Operation activities (ie machinery and equipment operation)	Noise and Vibration	Increase in noise levels due to substation operation	Reduce noise and vibration levels	• A barrier of mature trees or high soil berms (green area) between the substation and nearby residences can be helpful in reducing noise impacts.	EDM – North Region
Operation activities (i.e operation of the substation)	Energy Supply	Improved energy supply	Guarantee long term power supply	• Ensure integration of the project in the investment strategies in the four provinces affected by the Chimuara-Nacala Transmission Project.	EDM – North Region

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Operation activities (i.e employment on the substation during operation phase)	Economy	Direct employment	Increment employment opportunities for local workers	• Prioritize recruitment of local workers. • Use temporary employment for the training of local people. • Prioritize procedures of intensive hand labour instead of machines	EDM – North Region

Table 12: Environmental Management Plan – Decommissioning Phase

Phase: Decommissioning stage (post-operation)					
Activity **Description of Activity**	**Environmental Items**	**Impact**	**Objective**	**Mitigation Measures**	**Implementation Agency**
Decommissioning activities (i.e dismantlement of the substation and domestic waste from workers on site)	Waste	Production of waste	Ensure waste is treated according to the local norms	• Minimise the use of disposable materials. Train workers how to minimize and treat wastewater. • Dedicate resources to collecting, sorting, depositing, reusing and recycling according to norms.	EDM
Decommissioning activities associated with movement of heavy machinery	Traffic and transport	Changes in the intensity and traffic due to the transport of the debris to landfills and recycling	Manage traffic flow	• Transport extraordinary cargo out of rush hours and if necessary accompanied by traffic police. • Ensure the dust prone load is well covered.	EDM

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Decommissioning activities associated with migration of workers involved in dismantling of substation infrastructure	Health	STI's in the population and workers safety and health	Reduce health impacts on local communities and workers	• Education of the public and workers on the risks and health hazards and legal norms, around infection, testing, and sexual behaviours. • Availability of condoms to employees and sales points around the camps. • Access to health services, medicines. • For the workers, ensure provision of mosquito nets, health facilities at camps, maintain a sufficient stock of medicines and prophylactics of first-line treatment of malaria, availability of clean water and adequate sanitary equipment.	EDM
Decommissioning activities associated with migration of workers involved in dismantling of substation infrastructure	Economy	Direct employment	Increment employment opportunities for local workers	• Prioritize recruitment local workers.	EDM

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9 THE ENVIRONMENTAL MONITORING PLAN (EMoP)

In fulfilment of the Environmental Impact Assessment, on a tentative basis, **Impacto Lda.** proposes the following monitoring programme to determine the degree of implementation and effectiveness of the mitigation measures applied to the project activities.

Environmental monitoring can be defined as the systematic sampling of air, water, soil and biota in order to observe and study the environment, as well as to derive knowledge from this process (Wiersma, 2004). For the current project, an environmental monitoring programme will be defined for a number of elements such as ambient air quality (dust/SPM) and noise/vibration during construction/installation stage of the project that is considered as adequate. No surface water quality monitoring is regarded as necessary since there are no surface water bodies like rivers located in the vicinity of the project site.

9.1.1 Ambient Air Quality

The monitoring of air quality is important in order to ensure that National Ambient Air Quality Standards as well as international standards (ie World Bank) are not exceeded. The legal framework for the air quality includes:

- Decree No. 18/2004 approving the Regulation on Environmental Quality and Effluents' Emissions,
- Decree No. 67/2010 as a supplement of the Regulation on Environmental Quality and Effluents' Emissions (Decree No. 18/2004)
- World Bank Guideline

Ambient air quality sampling for the construction stage of the project (Namialo SS including temporary access road) focused on SPM /dust monitoring of ambient environment.

Dust (represented by SPM_{10} and $SPM_{2.5}$) is the significant air pollutant consequent to site clearance and other related construction activities. Operation of substation would have no effect on ambient air quality and hence operational stage ambient air quality monitoring is not required.

Ambient air quality conditions are considered to be good due to the rural nature of the study area and the lack of any industrial development in the general Project area. Air emissions are limited to small points sources related to subsistence agriculture and informal economic activities. Parameters such as NO2, SOx and CO are not required due to the fact that the project area is a wide-open area and these are likely to be fairly minimal.

9.1.2 Noise and Vibration

Necessary for construction stage of the project (SS and temporary access road). Operational stage noise/vibration could be mitigated with the provision of green space around the SS and other structural measures of sound proofing, if necessary. As such operational stage noise/vibration monitoring is regarded as not necessary. Mozambique has not promulgated its own noise regulations and reference is usually made to other standards and guidelines in cases where noise impacts need to be assessed. For this reason, the Pollution Prevention and Abatement Handbook from The World Bank Group was used.

9.1.3 Waste

Typical for a construction site and would require proper management of solid waste (including demolition waste in particular existing transmission tower demolition waste), sanitary waste, house-keeping of construction site and worker camp/housing areas during construction stage of the project by the construction contractor. Proper sanitary and solid waste management will continue during operation stage of the project as well focused on the office and other related living related areas like kitchen, and water closet (toilet) facilities of the SS (substation) by EDM.

9.2 Operation Phase

There is no need to monitor air quality, noise and vibration. Only for solid waste and sanitary waste. Section 2.4 of the current document highlights the waste management legal framework.

The entire environmental monitoring plan proposed for both the construction and operation phases of the project are summarized in Table 13.

Table 13: Environmental Monitoring Plan for the Project for Reinforcement of Transmission Network in Nacala Corridor in Republic of Mozambique

Environmental Items	Environmental Parameters/ Monitoring Item	Unit	Mozambique Standards: Decree 18/2004 and supplement 67/2010	Referred International Standards – WB/IFC Guidelines	Remarks (Measurement Point, Frequency, Method)	Responsible Agency	Cost of Monitoring
Construction Phase							
Air Quality	SPM_{10}	µgm/ m^3	Not Specified	50 150 Interim Value	·One Sampling Point near the project site and one sampling point 1 km away from the project site ·At least once in three months (one every season) – one 24 hr. day sampling ·High Volume Dust Sampler may be used	Implementation – Contractor / EDM	5000 USD per set Included in the overall construction cost
	$SPM_{2.5}$	µgm/ m^3	Not Specified	35 75 Interim Value	· One Sampling Point near the project site and one sampling point 1 km away from the project site ·At least once in three months (one every season) – one 24 hr. day sampling ·High Volume Dust Sampler may be used	Implementation – Contractor / EDM	5000 USD per set Included in the overall construction cost
Noise and vibration	Noise and vibration level	dB	Not Specified	70 (Night-time) 70 (Day-time) (Industrial Area)	100m from the construction site Per Month one 24-hr. day sampling Sound level meter	Implementation – Contractor / EDM	5350 USD per set Included in the overall construction cost
Waste	Solid waste (including demolition waste) Sanitary waste Housekeeping waste	-	-	-	Worksite and camp site (weekly)	Implementation – Contractor / EDM	Included in the overall construction cost
Operation Phase							
Waste	Solid waste and sanitary waste Housekeeping waste of the substation	-	-	-	Substation Worksite (weekly)	Implementation – EDM (North Region)	Included in the overall operation cost

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9.3 Independent Audit

EDM will be in charge of auditing the contractor. It is the task of MICOA and/or DPCA-Nampula to hold independent audits to verify compliance with the mitigation measures stated in this report.

The SES proposes that independent audits/supervision are undertaken to verify compliance with the mitigation measures stated in the report. EDM may hire an external auditor or a supervising consultant to ensure independence and impartiality in order to ensure that the Project is complying with the EMP requirements.

9.4 Monitoring Form

In light of the environmental monitoring plan for air quality, noise and waste, Table 14 presents the monitoring form for the three components.

Table 14: Environmental Monitoring Form for the Project for Reinforcement of Transmission Network in Nacala Corridor in Republic of Mozambique

Environmental Parameter	Item	Unit	Measured Value (Mean)	Measured Value (Max.)	Mozambique Standards: Decree 18/2004 and supplement 67/2010	Referred International Standards - WB/IFC Guidelines	Remarks (Measurement Point, Frequency, Method)
Construction Phase							
Air Quality	SPM_{10}	µgm/m³			Not Specified	50 150 Interim Value	One Sampling Point near the project site and one sampling point 1 km away from the project site ·At least once in three months (one every season) – 24 hr. day sampling ·High Volume Dust Sampler may be used
	$SPM_{2.5}$	µgm/m³			Not Specified	35 75 Interim Value	One Sampling Point near the project site and one sampling point 1 km away from the project site ·At least once in three months (one every season) – 24 hr. day sampling ·High Volume Dust Sampler may be used
Noise and vibration	Noise and vibration level	dB			Not Specified	70 (Day-time) 70 (Night-time)	· 100m from the construction site · Per Month one 24-hr. day sampling · Sound level meter
Waste	Solid waste (including demolition waste) Sanitary waste Housekeeping waste						Worksite and camp site (weekly)
Operation Phase							
Waste	Solid waste and sanitary waste Housekeeping waste of the substation						Substation Worksite (weekly)

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10 BENEFICIAL EFFECTS OF THE PROJECT

Employment Opportunities

With the construction of the Namialo Substation, there will be employment opportunities especially for casual workers from the local community. Creation of employment opportunities has both economic and social benefit. In the economic benefit, abundant unskilled labour will be used in economic production while socially the young and energetic otherwise poor people will be engaged in productive employment other than remaining idle. Employees with diverse skills are expected to work on the site during the construction period. Unskilled employees will gain some skills.

Employment opportunities are one of the long-term major positive impacts of the proposed Substation at the site location. This will occur during the operation and maintenance of the Substation. Other sources of employment will involve direct technical service provision to the Substation e.g. electrical engineers, Technicians, substation operators among others. There could be other indirect sources of employment e.g. businesses that rely on electricity.

For demolition to take place properly and in good time, several people will be involved. As a result several employment opportunities will be created for the demolition staff during the demolition phase of the proposed

Gains in the Local and National Economy

There will be gains in the local and national economy as a result of the construction of the proposed substation, through consumption of locally available materials including: timber, metals and cement. The consumption of these materials and others will attract taxes including Value Added Tax (VAT) and Income Tax which will be payable to the government. The cost of the materials will be payable directly to the suppliers.

Provision of Market for Supply of Building Materials

The project will require supply of large quantities of building materials most of which will be sourced locally from the surrounding areas. This provides ready market for building material suppliers such as quarrying companies, hardware shops and individuals with such materials.

Informal Sectors Benefits

During construction phase of substation, the informal sectors are temporarily likely to benefit from the operations. This will involve kiosk operators who

will be selling food to the workers on site. This will finally promote informal sector entrepreneurs at the surrounding areas for the period that the construction will be taking place.

Increase in electricity supply

In Mozambique, the electricity demand by far outstrips the electricity supply. The substation was requested for establishment to take care of the growing load in the area it is located. It will relieve the existing overloaded and long feeders and hence reduce technical losses in the system.

Increase in Revenue

There will be positive gain for the revenue system to the Government arising from the increased consumption of the electrical power from the proposed Substation. The electricity customers will be paying taxes to the Government.

Improved Security

With the establishment of the proposed Substation at the proposed site, the level of security will be improved around the project areas. This is as a result of more security lights and security personnel being employed to guard the Substation. The project site will also be well fenced. Hence if the level of security is increased, the neighbourhood will be more secure than before.

11 INSTITUTIONAL CAPACITY REQUIREMENTS

Given the geographical and economic scope of the Project, the general institutional framework for its effective implementation includes a wide range of agents and institutions. A brief initial panorama of the relevant institutions, their potential roles in the Project and their influence on its potential results is presented below.

The main agents and institutions involved in the Project are:

- Electricidade de Moçambique (EDM), as the proponent of the Project;
- The Ministry of Energy as the supervisory authority;
- The Ministry for the Coordination of Environmental Action (MICOA), responsible for environmental licensing and territorial planning;
- The Ministry of Agriculture (MINAG), responsible for issuing land use and benefits rights and logging licences and concessions;
- The provincial government of Nampula, in particular the Provincial Directorates for Mineral Resources and Energy (*Direcções Provinciais de Recursos Minerais e Energia* - DPRME), for the Coordination of Environmental Action (*Coordenação da Acção Ambiental* -DPCA), Agriculture (DPA), and Labor (DPT), as the bodies responsible for integrating the Project into economic and social development plans and strategies and licensing processes, namely, for investments that will involve granting spaces for mineral, agricultural and forest purposes that could interfere with the Project;
- The government of the Meconta district and its administrative posts where will be works on the new substation;
- The population in the direct area of influence;

12 CONCLUSION AND RECOMMENDATIONS

For the purpose of evaluating the environmental and socioeconomic impacts, three main phases of the proposed project were considered in this study: construction, operation and decommissioning.

In the light of the proposed project, a number of potential environmental and socioeconomic impacts (negative and positive) were identified and assessed. The large majority of the biophysical impacts were considered low in terms of significance.

The biophysical parameters assessed include geology, geomorphology and soils, air quality, hydrology, solid waste, noise, flora and fauna, landscape and visual and land use. The socioeconomic impacts were both positive and negative during the three phases of the proposed project. The positive socioeconomic impacts were particularly focused on the economy (i.e direct and indirect employment) and public utilities (i.e increase in the amount of energy available). The negative socioeconomic impacts were mostly associated with health (i.e. STI's in the population and workers safety, work accidents), economy (i.e. loss of crops, crop areas and other economic opportunities), tensions (i.e. high expectations with regards to employment opportunities and social conflict due to physical presence of external workers) and traffic and transport (i.e. changes in the intensity and traffic due to the transport of the debris to landfills and recycling).

Considering that Namialo site is regarded as optimal with respect to social aspects (i.e. no local communities present and in need of physical resettlement) and environmental aspects (i.e. vegetation has been mostly transformed into agriculture fields), the impacts assessed in the three phases (construction, operation and decommissioning) are generally low. An environmental management plan was drafted in order to:

- Ensure that the proponent, EDM, would be in charge, through the establishment of a RU, of implementation, mitigation and monitoring of the activities presented in the SLUCP.
- Provide the Ministry for Environmental Coordination (MICOA) with an instrument that facilitates the objective evaluation of the different project phases, keeping in mind the Mozambican Environmental Legislation, and
- Provide the Proponent of the Project with clear and obligatory instructions with regard to his environmental responsibilities during all project phases.

A general perspective on the establishment of the new substation in the Namialo site suggests that the project will provide employment opportunities, gains in the local and national economy, provision of market for supply and building material, informal sector benefits, increase in electricity supply, increase in revenue and increase in security.

Under the light of the above and since no fatal flaws have been identified, we propose that the establishment of the substation in the Namialo area should proceed. From the assessment point of view, it is considered that the project could be implemented without causing any major detrimental effects on the physical, biological and socio-economic environment provided that the mitigation, environmental management and environmental monitoring measures are fully implemented and will allow for minimizing potential negative impacts and to enhance potential positive impacts of the project, so as to ensure that it can be implemented in an environmentally and socially sound manner.

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14 ANNEX

14.1 Annex 1 – Letter from DPCA

REPUBLICA DE MOÇAMBIQUE

MINISTÉRIO PARA A COORDENAÇÃO DA ACÇÃO AMBIENTAL

DIRECÇÃO NACIONAL DE AVALIAÇÃO DO IMPACTO AMBIENTAL

DNAIA

À:
EDM

Maputo

Nossa referência Nº 826 /MICOA/DNAIA/180/14 **Data: 12-06-2014**

Assunto: Projecto de Transporte de Energia Chimuara – Nacala / Alteração do local da Subestação 400/220/110 Kv de Namialo

Exmos Senhores,

A DNAIA recebeu de V.Excias o pedido de alteração do local inicialmente proposto para a construção da Subestação de Namialo para um novo local, por forma a capitalizar as infra-estruturas existentes e respectiva minimização de impactos sobre o meio ambiente. Da análise dos antecedentes do projecto e da visita ao novo local, efectuada pela Direcção Provincial para a Coordenação da Acção Ambiental de Nampula, somos de parecer favorável à alteração do local tendo em conta que os impactos ambientais identificados são abrangentes, e não existem pessoas e benfeitorias a serem afectadas.

Com os melhores cumprimentos.

Atenciosamente,

Rosa Cesalina Benedito
Directora Nacional

C.C: DPCA-Nampula

PART 3

PUBLIC ENGAGEMENT

Table Of Contents

1 INTRODUCTION

Electricidade de Moçambique E.P. (EDM), the national electricity company is the proponent for the reinforcement of the electricity transmission network of the Nacala Corridor in Nampula province. EDM is responsible for developing and implementing the Project on behalf of the Government of Mozambique.

IMPACTO Ltd, was contracted by the Proponent to conduct a Simplified Environmental Study (SES) and a Simplified Land Use Compensation Plan (SLUCP) in order to produce environmental and social information for Meconta District, Nampula province, where the new electricity sub-station will be located.

Given the importance of the project for the local development and in order to maintain the authorities and the Interested and Affected Parties (IAPs) informed about the project's development, a Public Engagement meeting was held in Meconta district.

The present document constitutes the report on the public engagement meeting that was held and is an integral part of the Simplified Environmental Study report.

2 OBJECTIVES OF THE PUBLIC ENGAGEMENT

The objective of the public engagement was to enquire the sensitivity of the key Interested and Affected Parties regarding the project activities that are to be developed and disseminate the results of the Simplified Environmental Study. During the Public engagement, the IAPs had the opportunity to raise concerns, opinions and comments on any relevant aspect, so that this can be included into the existing environmental study, as well as to provide clarifications on aspects related to the project. The information process also allowed to create a communication channel between the public, the consultants and the project proponent to be developed during the period of project implementation.

The meeting held in Meconta district was guided by the following specific objectives:

- Provide information on the project;
- Disseminate the results of the studies carried out; and
- Enquire the sensitivities of the stakeholders that potentially will be related to the project and provide clarifications on aspects linked to the project, aiming at the inclusion of these key aspects into the Simplified Environmental Study report.

3 METHODOLOGY ADOPTED FOR THE PUBLIC ENGAGEMENT

Given the dimension of the project and the type of studies carried out, only one public engagement meeting was organised in the district capital of Meconta. The objective of the public engagement was to ensure that the local authorities and PAP were informed about the development of the project in the Meconta District, the impacts associated with the implementation of the project and the mitigation measures to be put in place in order to minimize the impacts that were identified through the studies. The Public engagement was conducted in a simply way with the aim of gathering the concerns of the interested and affected parties of the project.

3.1 Identification Of The Key Interested And Affected Parties

As this meeting was meant to be a directed public engagement with the local communities, all those persons that will be directly or indirectly affected and those only interested in the project were identified at level of Meconta district, particularly in Namialo administrative post. Thus, the following IAPs were identified:

- directors of district services
- influential persons at level of the district capital;
- the head of Namialo administrative post and 2 administrative post staff; and
- other entities to be selected by the district administrator

3.2 Involvement Of The Key Interested And Affected Parties

Being a public engagement meeting, the invitation at district level was done by means of an invitation letter addressed to the Administrator of Meconta district, who was requested in the letter to invite the members of the local Consultative Council in the district capital, representatives of Namialo administrative post, representatives from civil society and influential people to participate in the meeting.

4 SUMMARY OF MEETING HELD

The public engagement meeting of the project was held on 22nd August 2014 in the meeting room of Meconta District Administration from 10.00 to 1200 hours and was guided by the agenda scheduled for the meeting (Annex B).

In the meeting were present the district administrator and the members of the Consultative Council resident in the district capital and in Namialo Administrative Post (Annex C). The meeting was held with 39 participants.

The meeting was officially opened by the District Administrator, Rosa Vianeque, who thanks the consultant for their presence in the district and for the opportunity created for engaging the district into the public engagement process.

After that, the facilitator of the meeting and consultant of Impacto Lda., Eng. Herberto Nhampanze, welcomed the participants and presented the meeting's agenda and objectives and the project proponent, followed by the presentation of the EIA process in Mozambique.

After the introductory part, the facilitator of the meeting continued with the presentation of the results from the project's Simplified Environmental Study, focusing on the context, the project area and the potential impacts on the biophysical and socioeconomic components in the project's area of influence.

At the end of the presentation, the facilitator declared the questions and answers session as opened, in which seven interventions were made by the participants. All the questions raised by the participants during the meeting and the answers provided by the consultant and proponent were recorded in a Questions and Answers Matrix (Appendix D). At the end of the debate session, the district administrator was once more invited to make the final considerations and to officially close the public engagement meeting.

Opening ceremony by the Administrator

Participants listening to the presentation

Participant intervening during the meeting

Representative of EDM responding to a question

Closing ceremony by Administrator

Figure 1: Photographic record of the public engagement in Meconta

4.1 Summary of Issues Raised

The main issues raised during the meeting include the following:

- **Project location**: the participants enquired about the exact location of the project area and about the specific location where the sub-station will be implanted. This question allowed the local authorities to start awareness raising regarding development projects in the communities. Participants were informed that the sub-station will be constructed in Micolene village. Participants were also informed that the final design of the substation would be presented to them at a later stage.

- **Starting date of the project**: the participants have requested information about the start date of the project. EDM explained that the date for the start of the project has not yet been defined.

- **Involvement of district authorities**: Suggestions were made in the sense that whenever EDM intends to carry out any activities regarding the implantation of the project, EDM should involve the district authorities.

- **Hiring of labour:** concerns were raised regarding the hiring of labour and participants were informed that the hiring of local labour would be prioritised during the three phases of the project development.

5 CONCLUSIONS

In general, it can be concluded that the objectives of the public engagement have been achieved. The attendance of the meeting was considered very good as the number of attendees surpassed the number of people invited to the meeting. The public engagement meeting have allowed to gather questions, suggestions and comments from the PAP as well as for clarification of doubts and input to the SES report.

Annex A – Invitation letter

IMPACTO
PROJECTOS E ESTUDOS AMBIENTAIS

Ref. Impacto.C.213/14
Maputo, 13rd August, 2014

Mrs. Administrator of the District Meconta
Dra. Rosa Vianeque

Nampula

Assunto: Information Meeting about Reinforcement of Transmission Network of Nacala Corridor Project, Nampula Province

Dear Madam,

The Electricity of Mozambique EP (EDM), on behalf of the Government of Mozambique is developing a project to reinforce the transmission of the Nacala corridor network in Nampula Province.

This project is part of a large project called Project of Transport Energy Chimuara-Nacala, which was approved by the Ministry for Coordination of Environmental Affairs (MICOA), which involves the construction of a transmission line between power between Chimuara Namialo 400 kV and Namialo of the Nacala-a-Velha 220 kV, Nacala-a-Velha Nacala Port 110 kV and Namialo to Nampula 220 kV and that will also include the construction of new substations and the expansion existing substations. The project aims to increase the capacity of supply of power to the provinces of Zambezia and Nampula to facilitate the starting of large investment projects, mainly in Monapo and Special Economic Zone (EEZ) of Nacala.

The project involves only the above-mentioned construction of a new substation in Namialo and even an access road connecting the new substation to the main road.

At this point, the burden of electricity from a single airline power transmission from adjacent substations is very high and it is possible that in the near future, this will become overloaded. Therefore, in accordance with the above, this project will be of paramount importance to reinforce the power transmission network in the Nacala corridor.

The EDM, designated IMPACTO, Lda. as independent Consultant to conduct a Simplified Environmental and Social Study in order to produce more specific information for the area where the new substation will be located. The project was submitted to MICOA, which was approved without the need to perform an environmental study.

Given the importance of the project for local development and in order to keep authorities and Interested and Affected parties informed about the project, will be held an Information Meeting at Meconta District, Nampula Province level.

In this context, the IMPACTO Lda requests a meeting with Your Excellency and further requests that are invited to the same meeting the members of the Advisory Council of the District of Meconta, residents at the headquarters for the day August 22, 2014, in Conference Room District Administration Meconta from 10:00 to 12:00 hours

We also request the presence of the following entities:
¬ District Directors;
¬ Influential at headquarters of the district;
¬ Chief Administrative Post Namialo + 2 representatives
¬ Other entities

Preceding the meeting to be held at the headquarters of the District of Meconta, IMPACTO is requesting a brief meeting with the District Administrator, at the Administration Building on 22 August at 09:30 hours, for the purpose of harmonization on activities that should take place during a meeting.

In advance thank you the valuable collaboration so that we can fulfill the above program.

For any question you can contact IMPACTO through the following addresses: kete.fumo@impacto.co.mz; consulta.publica@impacto.co.mz or phone: +258 21499636, Fax: +258 21493019 or Mobile: +258 82 6656570.

Yours sincerely

Jorge Lacerda
Executive Director

Annex B –Agenda of the Meeting

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR REINFORCEMENT OF THE TRANSMISSION NETWORK IN NACALA CORRIDOR PROJECT

AGENDA of the Information Meeting

MECONTA DISTRICT – Meeting Room of the Meconta District Government
22nd August, 2014, 10:00 - 12:00 hours

Time	Presentation	By
Arrival	Participant registration	**Participants**
10:00	Welcome and introduction of participants	**District Administrator**
10:10	Presentation of the working team	**Facilitator**
	♦ Introduction and Objectives of the Meeting Information	**Facilitator**
10:20	♦ Presentation of the Project	**EDM**
10:30	♦ Presentation of the Draft Simplified Environmental Study Report	**IMPACTO**
10:50	**Coffee Break**	
11:05	Debate	**IMPACTO**
12:00	Final considerations	
12:05	**Closure**	**District Administrator**

Annex C – Participant Attendance List

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PROJECTO DE REFORÇO DA REDE DE TRANSMISSÃO DO CORREDOR DE NACALA – PROVÍNCIA DE NAMPULA

REGISTO DOS PARTICIPANTES

DISTRITO DE MECONTA, Governo Distrital, 22 de Agosto de 2014, 10:00 – 12:00 horas

NOME	INSTITUIÇÃO / COMUNIDADE	POSIÇÃO / RESPONSABILIDADE	CONTACTO
1. CALIHA CHAWELIA	RAINHA - NACAVALA	7 DE ABRIL	
2. CHALE ASSANE	REGULO - NACALA	"	
3- JOSÉ E. UDAO	REG. - MEPANGA	"	
4- AMIDO SALVADO	SECR. C. AMPITA	NAMIAGO	
5- ESTEVAO C. MURAVACHE	1º SECR. FRANCE	"	
6- JOSE MOISES ALMEDA	SECRET. C.O.P.	MEGAVIA PEAE	

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PROJECTO DE REFORÇO DA REDE DE TRANSMISSÃO DO CORREDOR DE NACALA – PROVÍNCIA DE NAMPULA

REGISTO DOS PARTICIPANTES

DISTRITO DE MECONTA, Governo Distrital, 22 de Agosto de 2014, 10:00 – 12:00 horas

	NOME	INSTITUIÇÃO / COMUNIDADE	POSIÇÃO / RESPONSABILIDADE	CONTACTO
7	FAPANE JOÃO	LIDER – B. MORAOMUNÃO	MECUNTA-SEDE	
8	ACÁCIO AGIPO	LIDER – B. NACOPO	MECONTA-SEDE	
9	MARIA DE FATIMA ANDRE	LIDER – B. NAMUCHALALA	—	
10	CESAR JOÃO	LIDER – B. NAPOLO-SEDE	—	
11	GUICHERMINA WALIGA	LIDER – B. NYME-ESTAÇÃO	—	
12	AMILIA JOÃO CEBOLA	LIDER. B. RAINHA	—	

PROJECTO DE REFORÇO DA REDE DE TRANSMISSÃO DO CORREDOR DE NACALA – PROVÍNCIA DE NAMPULA

REGISTO DOS PARTICIPANTES

DISTRITO DE MECONTA, Governo Distrital, 22 de Agosto de 2014, 10:00 – 12:00 horas

	NOME	INSTITUIÇÃO / COMUNIDADE	POSIÇÃO / RESPONSABILIDADE	CONTACTO
13	ALVARO BATISTA MUACHA	CHEFE B. UNIÃO XHANE	—	
14	ANA M. ARMANDO	SECRET. C. MATHARIA	MECONTA	
15	MATERA CHARIA	REG. MATHEMA	MECONTA	
16	AFONSO DAMELA	CAB. NAMORO	MECONTA	
17	ANGELINA ANGELO	LIDER - NAMAHIDO	11	
18	JANUARIO FRANCISCO	LIDER - RAFANE	11	

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PROJECTO DE REFORÇO DA REDE DE TRANSMISSÃO DO CORREDOR DE NACALA – PROVÍNCIA DE NAMPULA

REGISTO DOS PARTICIPANTES

DISTRITO DE MECONTA, Governo Distrital, 22 de Agosto de 2014, 10:00 – 12:00 horas

	NOME	INSTITUIÇÃO / COMUNIDADE	POSIÇÃO / RESPONSABILIDADE	CONTACTO
19	DANIEL ARMANDO	LÍDER - CORRANE	MECONTA-SE	
20	CESARIA MANUEL	SDPI - NATUANO		
21	DAVID A. CARDOSO	MEMBRO do CCP. NAMIALO	NAMIALO	
22	FRANCISCO DA COSTA C.	MEMBRO DO CCP. MECONTA	MECONTA-SE	
23	JERIMIAS AIFAI	1º S. Comités Corrane	NAMIALO	
24	JUMA CORREFE	1º S. C. NAIOPATIA	11	

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PROJECTO DE REFORÇO DA REDE DE TRANSMISSÃO DO CORREDOR DE NACALA – PROVÍNCIA DE NAMPULA

REGISTO DOS PARTICIPANTES

DISTRITO DE MECONTA, Governo Distrital, 22 de Agosto de 2014, 10:00 – 12:00 horas

	NOME	INSTITUIÇÃO / COMUNIDADE	POSIÇÃO / RESPONSABILIDADE	CONTACTO
25	Ali Raquia	Post. Adm Meconta		
26	Tomas Ernesto	1º S.C. Mucoleie	Namialo	
27	Lucas A. Victor	1º S. Joaquim Ch.	Namialo	
28	Cesar M. Manuel	1º S. 25 Setembro	Namialo	
29	Ananias Nhundonca	Líder de Naherede	Namialo	
30	António Xavier	1º S. C. Bona	Namial	

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PROJECTO DE REFORÇO DA REDE DE TRANSMISSÃO DO CORREDOR DE NACALA – PROVÍNCIA DE NAMPULA

REGISTO DOS PARTICIPANTES

DISTRITO DE MECONTA, Governo Distrital, 22 de Agosto de 2014, 10:00 – 12:00 horas

	NOME	INSTITUIÇÃO / COMUNIDADE	POSIÇÃO / RESPONSABILIDADE	CONTACTO
31	JOSÉ FORONICA	REG. [illegible]	[illegible]	
32	AFONSO CHAMANIA	REG. NIPUDO	NACAVALA	
33	MANUEL SARIVA	REG. NAHOCO	[illegible]-SEDE	
34	OSCAR JORGE	2º. EDUARDO MONDLANE	NAMIALO	
35	TOMAS AMORANE	1º SEC. C. VIEIRA	"	
36	JAIME MATEUS	1º SEC. ASSIST. VIEIRA	"	

PROJECTO DE REFORÇO DA REDE DE TRANSMISSÃO DO CORREDOR DE NACALA – PROVÍNCIA DE NAMPULA

REGISTO DOS PARTICIPANTES

DISTRITO DE MECONTA, Governo Distrital, 22 de Agosto de 2014, 10:00 – 12:00 horas

	NOME	INSTITUIÇÃO / COMUNIDADE	POSIÇÃO / RESPONSABILIDADE	CONTACTO
37	AFONSO DOS SANTOS LUCAS	SEC. C.C. DIST.		
38	FRANCISCO USSENE	REG. MUNICIPIA	NAMIALO	
39	ERNESTO SAIDE	CHEF. DE PRODUÇÃO	NAMIALO	

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Annex D – Questions and Answers Matrix

REINFORCEMENT OF THE TRANSMISSION NETWORK IN NACALA CORRIDOR, MECONTA DISTRIT, NAMPULA PROVINCE

Public engagement in Meconta District

Venue: Meeting room of the Meconta District Government
Date: 22nd August, 2014
Time: 10.00-12.00 hours

Questions and Answers Matrix

Questions	Answers
I thank the team for the presentation of the project. The project is welcome and will solve a problem, which has affected many inhabitants of the district and of Namialo administrative post in particular. However, I would like to know when the project will start. **Guilhermina Walila – Head of Namialo administrative post**	No dates have yet been defined for this project. However, as soon as there is a date and a work programme, the local authorities will be informed. **Victor Daniel – EDM Nampula**
I would like to know if the project will benefit the population of Namialo. **Tomás Ernesto – 1st Secretary of Micolene**	The project intends to make the reinforcement of electricity supply in the entire Northern region. As Namialo belongs to the Northern region, it is evident that it will benefit from it. **Victor Daniel – EDM Nampula**
The project is welcome and will solve the problem of weak electricity, which the Namialo locality has been suffering. But I would like to recommend that when the project starts to prioritise the contracting of local labour. **Lucas Victor – 1st Secretary of Joaquim Chissano suburb**	As you could see in the presentation done, the study recommends that in the case of needs for labour, local labour should be prioritised. The representatives of EDM are here present, who will guarantee the fulfilment of the recommendation of the EMP. However, the recommendation has been registered. **Herberto Nhampanze – IMPACTO Lda.**
First, I would like to thank for the project coming to the district. After this, I would like to recommend, that EDM selects a serious and honest contractor, because there are many companies that come to work in the district and then abandon the works and the workers without paying their remunerations, and when this is the case, the workers come to the administration to ask for explanations, and often we do not have answers. **Nesta Mateus – Member of the District**	The recommendation has been registered. EDM is here present and will, of course, register the suggestions raised here. **Herberto Nhampanze– IMPACTO Lda.**

Government	
I would like to know, which is the exact location exacta of the site, where the sub-station will be built, so that we can start with the sensitisation of the communities. **António Xavier**	The project will be located in Micolene village **Victor Daniel – EDM Nampula**
We recommend that always when you carry out an activity you need to involve the district authorities in order to avoid an overlap of projects in the same area. **Rosa Vianaque – District Administrator**	I think that we already heard the complaint regarding the lack of involvement of the local authorities to accompany our activities. It is necessary that we always inform about our projects, because the land can be occupied or another district might show up because of the lack of communication. **Steven Ferro – EDM Nampula**
I only thank that you have come to us to transmit this information. They have already apologised for the error of not involving the local leaderships, but they are excused, because the only person not committing errors is the one, who does not work. I also thank IMPACTO Lda. for having elaborated the study, which is very well done. We only regret that we still do not know the location for implementing the project, but we will do so during this week. This project is welcome, because it will bring development, the arrival of electricity has raised excitement amongst the communities, because now all want to have electricity, but this will be done in phases, so that we will have quality electricity. **Rosa Vianaque – District Administrator**	Comment registered.