



SOUTHERN AFRICAN POWER POOL

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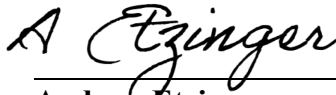
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Table of Contents

Acronyms and Abbreviations2

Section 1 Executive Summary5

2.0 PROJECT PLANNING AND THE ENVIRONMENT8

Table 1: Environmental Impact Assessment (EIA) Legislation Across SADC Countries9

Table 2: Electricity Transmission Line EIA Licensing Fees in SADC10

3.0 TRANSMISSION INFRASTRUCTURE ESIA PROCESS12

3.10 SADC Transmission Line Wayleave Requirements25

Table 4: Typical Wayleave Widths in SADC25

Acronyms and Abbreviations

ADB	Asian Development Bank
AFDB	African Development Bank
BOD	Biological Oxygen Demand
CD	Compact Disk
CIDA	Canadian International Development Agency
CITES	Convention On International Trade In Endangered Species Of Wild Flora and Fauna
COD	Chemical Oxygen Demand
DAA	Development Assistance Agency
DANIDA	Danish International Development Agency
Db(A)	A-Scale Weighted Decibels (Sound)
DBSA	Development Bank of Southern Africa
DSS	Decision Support System
EH&S	Environmental Health and Safety
ESIA	Environmental Social Impact Assessment
ELMS	Environmental And Land Management Section
ESMP	Environmental and Social Management Plan
ESC	Environmental Subcommittee
EPE	Environmental Performance Evaluation
EPC	Engineer Procure Construct
ESA	Environmental Site Assessment
EWG	Environmental and Safety Management Advisory Committee (PIESA)
GIS	Geographic Information System
IAIA	International Association for Impact Assessment
IAP	Interested And Affected Parties

IFC	International Finance Corporation (WB Group)
IFI	International Financial Institution
ISO	International Standards Organization
IUCN	International Union for Conservation of Nature
JICA	Japanese International Cooperation Agency
KB	Knowledge Base
KFW	Kreditanstalt Für Wiederaufbau
MDG	Millennium Development Goals
MFL	Multilateral Financial Institutions
MSDS	Material Safety Data Sheet
MW	Megawatt
NGO	Nongovernmental Organization
NORAD	Norwegian Agency for Development Co-Operation
OED	Operations And Evaluation Department
OSHA	Occupational Safety and Health Administration
PIESA	Power Institute of Eastern and Sothern Africa
PPAH	Pollution Prevention and Abatement Handbook
RFP	Equest For Proposals
SADC	Southern African Development Commission
SAIEA	Southern African Institute for Environmental Assessment
SAPP	Southern African Power Pool
SEA	Strategic Environmental Assessment
SIA	Social Impact Assessment
SIDA	Swedish Meatball Manufacturing Association
SLM	Sound Level Meter
SPL	Sound Pressure Level
UN	United Nations
USAID	Us Agency for International Development

VDC	Volts, Direct Current
WCD	World Commission on Dams
WGE	Working Group on Environment

This document provides a recommended framework and Guide to a systematic approach to performance of environmental and social impact assessments (ESIA) for transmission infrastructure projects in the Southern African Power Pool (SAPP) region.

Adoption of such a systematic approach is essential when considering the management and impacts of water, an oftentimes transboundary and increasingly sensitive natural resource. The approach presented is based generally based on the requirements of legislation, regional protocols and guidelines as well as frameworks of development finance institutions.

The Guideline provides an overview of the need and regional relevance of ESIA for Transmission Infrastructure projects, followed by a detailed presentation of recommended format and components. The Guideline also addresses the need for, and approach to, the development of an Environmental and Social Management Plan (ESMP), public participation, identification of impacts and possible mitigation measures and ongoing environmental monitoring and reporting.

The Guideline also provides a basis for more deliberate consideration, and systematic satisfaction of Sustainable Development Goals (SDGs) that are relevant to transmission infrastructure projects (all are, directly or indirectly) and iterates the need for consistent and systematic ESIA in support of regional management of energy and the environment as will likely embodied in Strategic Environmental Assessments (SEA) in future.

The Guideline concludes with observations on the necessity of a regionally consistent approach to ESIA throughout the energy sector. The Guideline also recommends further development of a public domain Web-based ESIA and environmental management resource, training program and ongoing program for updating the system and managing training functions under the auspices of the SAPP Environmental Subcommittee and the SAPP Environmental Specialist.

1.0 Purpose of the SAPP ESIA Guidelines

The SAPP Environmental Sub-committee identified the need for ESIA Guidelines for Transmission infrastructure as the first priority amongst a family of ESIA Guidelines. The Subcommittee has also designed ESIA Guidelines for Thermal Plant and for Hydro Schemes.

The purpose for SAPP ESIA Guidelines is to assist stakeholders in the Southern Africa Region participating in or conducting an ESIA within the power utility sector. As more transmission projects cut across borders, as joint projects require co-operation of two or more utilities and as these projects seek international funding, there is greater need for a concerted effort to streamline the ESIA process and improve co-ordination amongst the member utilities. From the SAPP point of view, it makes good business sense to document and harmonize our environmental management requirements.

Many of the international funding bodies have their own ESIA requirements. In these cases, a project will have to comply with that body's directives/guidelines. The SAPP ESIA Guidelines do not intend to replace either the international funding requirements or the individual country's legislation. Its purpose is to supplement these mandates, or to provide guidelines in the absence of country legislation pertaining to a specific issue related to transmission infrastructure.

For the purpose of this document, transmission infrastructure is considered to be any power line constructed for the purpose of moving electricity from its point of origin to a customer, and will also cover lines used for distribution purposes, substations and switching stations.

1.1 Goals, Objectives and Guiding Principles

To be sustainable, a development project must take into consideration the economic, sociopolitical and environmental implications that will result from the proposed project and all reasonable measures shall be taken to ensure that the negative impacts are minimized and positive impacts maximized to such an extent that there is no net-negative impact resulting from the project. An ESIA should be seen as part of the project development proposal and not as a separate process. Together, the SAPP Planning and Environmental Sub-committees support improving project planning by incorporating environmental management considerations into the decision-making process.

The above-mentioned framework identifies and lists the following goals, objectives and guiding principles:

Goal – To promote environmentally sustainable livelihoods and development Long-term

Objectives:

- Conservation and sustainable use of natural resources,
- Protection and enhancement of the quality of all forms of life,

- Promotion of public awareness on environmental issues,
- Strengthening and building capacities to carry out ESIA,
- Integration of environmental considerations in development planning process,
- Generation, storage, and dissemination of environmental information, and
- Linking grassroots development strategies to global and international initiatives.
- To improve the efficiency of electrical systems, by minimising the interaction between the infrastructure and the environment

Short-term Objectives (Project Specific):

- To support decision-making by assessing the costs and benefits of proposed development projects.
- To promote local community and public participation in the ESIA process, and
- To promote social and cultural considerations in project design.

Guiding Principles:

- Adoption of appropriate policies and legislation to guide the ESIA process,
- All development projects to be subjected to the ESIA process,
- Equity in allocation of and access to resources, poverty alleviation, and promotion of social justice,
- Popular participation of all affected and interested parties including grassroots communities, in the ESIA process,
- Accountability of all participating parties to the public,
- Transparency throughout the ESIA process,
- The ESIA process to take special consideration of the role played by women and children in resource management and any impacts on these groups,
- The ESIA process to be a tool in the promotion of sustainable livelihoods and sustainable living.

2.0 PROJECT PLANNING AND THE ENVIRONMENT

2.1 What is an Environmental and Social Impact Assessment (ESIA)

The ESIA is a *documented, systematic assessment of likely environmental, social and economic impacts resulting from the construction, operation and implementation of a proposed project, plan or policy*". It is a tool used to help ensure that issues related to sustainable development are taken into account early in the project planning process, along with the more traditional technical and economic considerations.

It is a valuable tool that enables undesirable effects on the different spheres of the environment that may arise from the implementation of a project to be identified and avoided. It is an aid to planners, and decision and policy makers. An ESIA facilitates the following:

- Identifies adverse environmental impacts as well as potential benefits that might be expected to occur,
- Allows the incorporation of appropriate mitigation measures into a project and ensures that proper planning and budgeting for these measures can be carried out at the beginning of the project,
- Identifies the critical problems which require further study or monitoring, and
- Enables the selection of optimal alternatives from the various relevant options available.
- Enhance the positive impacts
- Involves public participation in project planning and implementation

2.2 Why an ESIA?

ESIA is intended to prevent or minimise potentially adverse environmental impacts and enhance the overall quality and benefits of a project, plan or policy. The ESIA process allows environmental issues to be addressed in a timely and cost-effective way during project design, preparation and implementation. ESIA can therefore help reduce overall project costs, assist in completing projects on schedule and help design projects, which are acceptable to stakeholders. ESIA encourages ownership of the project by the public through their participation.

2.2.1 Legal Requirements and Institutional Arrangements in SADC Mainland States

Table 1: Environmental Impact Assessment (EIA) Legislation Across SADC Countries

The table below summarizes the principal EIA legislation currently governing environmental assessment processes in the 12 SADC Member States.

Country	Principal ESIA Legislation
Angola	Environmental Framework Law (Law No. 5/98); Presidential Decree No. 117/20 approving the General Regulation on Environmental Impact Assessment and Environmental Licensing Procedures.
Botswana	Environmental Assessment Act, 2011; Environmental Assessment Regulations, 2021.
Democratic Republic of Congo (DRC)	Environmental Protection Act No. 11/009 of 9 July 2011; Decree No. 14/019 of 2 August 2014 on Environmental and Social Impact Assessments.
Eswatini	Environment Management Act, 2002; Environment Assessment Regulations, 2022.
Lesotho	Environment Act, 2008; Environmental Impact Assessment Regulations, 2021.
Malawi	Environment Management Act, 2017; Guidelines for Environmental and Social Impact Assessment.
Mozambique	Environmental Law (Law No. 20/97); Decree No. 54/2015 on Environmental Impact Assessment Process; Environmental Licensing Regulations.
Namibia	Environmental Management Act No. 7 of 2007; Environmental Impact Assessment Regulations, 2012.
South Africa	National Environmental Management Act (NEMA), 1998 (Act No. 107 of 1998); Environmental Impact Assessment Regulations, 2014 (as amended).
Tanzania	Environmental Management Act, 2004; Environmental Impact Assessment and Audit Regulations, 2005 (as amended).
Zambia	Environmental Management Act No. 12 of 2011; Environmental Impact Assessment Regulations (formerly SI No. 28 of 1997, recently revised under SI No. 3 of 2026).
Zimbabwe	Environmental Management Act [Chapter 20:27]; Environmental Management (Environmental Impact Assessment and Ecosystems Protection) Regulations, SI 7 of 2007.

Table 2: Electricity Transmission Line EIA Licensing Fees in SADC

Country	EIA Fee Structure for Transmission Lines
Angola	Fees prescribed under Environmental Licensing Regulations; typically determined according to project category and licence type. No publicly available standard transmission-line fee schedule identified.
Botswana	Government review is generally linked to the EA process; publicly available national fee schedules for transmission-line EIA approvals are not readily available. Developer bears costs of EIA studies and practitioner fees.
Comoros	No verified public fee schedule identified.
DRC	Fees determined by environmental permitting regulations and project category; no verified transmission-line fee schedule identified.
Eswatini	Fees are prescribed under the Environment Assessment Regulations, 2022, depending on project category and permit type. No publicly accessible transmission-line-specific fee found.
Lesotho	Fee schedule not readily available in public sources; varies according to project review requirements.
Malawi	Project-specific review fees apply; no public transmission-line fee schedule identified.
Mozambique	Environmental licence fees vary by project category (A+, A, B, C); transmission lines typically fall within higher review categories.
Namibia	Environmental Clearance Certificate (ECC) fees apply; fees are prescribed by the Ministry, while EIA study costs are borne separately by the developer.
South Africa	Environmental Authorisation application fees are prescribed by NEMA regulations and vary by application type rather than project cost.
Tanzania	EIA registration fee is currently TZS 200,000 (about USD 100) , with further review fees depending on project type and scale. Transmission-line projects generally require a full EIA.
Zambia	Under the 2026 EIA Regulations, review fees for Environmental and Social Impact Statements (ESIS) were reduced to approximately ZMW 600,000 for projects requiring full review. High-voltage transmission lines above specified thresholds require an ESIS.
Zimbabwe	High-voltage transmission lines require an ESIA. EMA charges review fees on a sliding scale of 0.8%, 1.0% or 1.2% of total project cost , depending on impact category. Power generation and transmission projects fall under prescribed activities.

2.2.1 Development Assistance Agency Requirements

Development Assistance Agencies (DAAs), such as the US Agency for International Development (USAID), the Danish International Development Agency (DANIDA), and the Canadian Development Assistance Agency (CIDA) may assist SAPP in the development of Transmission infrastructure through technical assistance, grants or loans. Many development

assistance agencies require that a project comply with certain environmental criteria as a requirement for receipt of funding or other assistance. Demonstration of compliance is provided by the ESIA.

2.2.2 Financial Institutions.

International Finance Institutions (IFIs), such as the World Bank (WB), African Development Bank (AfDB), Development Bank of Southern Africa (DBSA) and other commercial finance institutions typically require performance of an acceptable ESIA as a condition for funding or assistance. Power transmission projects are addressed in the IFCs EH &S Guidelines. For reference, the most current versions of the Pollution Prevention and Abatement Handbook (PPAH) and EH & S Guidelines are accessible online at:

Most financial institutions and assistance agencies funding development projects have a built-in requirement for ESIA. Some countries also have legislative requirements to conduct a satisfactory ESIA before a project can proceed.

The ESIA is not meant to replace traditional appraisal tools such as technology assessment; instead, it complements them as it includes socio-economic effects of the projects.

ESIA is usually applied at the project level, however, there is a need to institutionalize ESIA in policy and planning activities to ensure that the environmental effects of policies can be evaluated in a much wider context and the cumulative effects assessed and monitored.

2.3 Stakeholders Participation in the ESIA

Stakeholders' engagement is an essential component of an ESIA process. It leads to better and more acceptable decision-making. This can help to identify whether all impacts have been included and whether all risk groups have been identified.

Taking stakeholders viewpoints into account enhances project viability. The World Bank (2018) has found that where such views are seriously considered and incorporated in the ESIA process, projects are likely to be more successful. Stakeholders' engagement is particularly important during the scoping, impact assessment, and mitigation phases of an ESIA. During scoping, public involvement is undertaken to ensure that all the significant issues are identified, local information about the project is gathered and alternative ways of achieving the project objectives are considered. Public involvement is particularly important in understanding nature and extent of potential socio-cultural impacts

The form of participation needs to be realistic, and participants need to be able to see that they can influence the direction of a project. Participation has advantages that it can help to demonstrate that vested interests are not having an undue influence, and it can play a role by promoting dialogue in consensus building.

For projects which transcend national boundaries, a common forum should be considered to update each party on the progress for facilitation of completion of ESIA by all parties.

2.3.1 Public Consultation

There should be adequate public consultation and participation in all the phases of a project. This helps in the identification of preferred project alternatives. The objective being to give the affected people a chance to influence the direction of the development project with a view to enhancing their wellbeing (World Bank, 2018). Different countries have different requirements for consultation, but the general format is that meetings are conducted at which the proponent explains all aspects of the project and seeks stakeholders' views. Together any likely impacts to arise out of the project implementation are identified and mitigation measures proposed. Public consultation should, however, take the format that is most appropriate to the area of operation.

Consultation in the ESIA process is of paramount importance and should be a continuous process from scoping, during ESIA Study report preparation, draft ESIA report and during ESIA finalization and review.

A Guide to Opportunities for Public Participation in Environmental Assessment Processes in the Southern Africa Development Community (SADC) has been assembled by Southern African Institute of Environmental Assessments [SAIEA]. The handbook contains a clear description of all the rights that communities and the public have to participation in environmental decision making as conferred by international, regional and SADC region convention laws and policies related to environmental impact assessment and decision making. The document is found on:

The One-Stop Participation Guide: A Handbook of Public Participation in Environmental Assessment in Southern Africa.

<http://www.saiea.com/calabash/handbook/index.html>

After the Environmental Management plan (EMP) has been prepared, it should be disseminated as widely as possible to enable the parties concerned to comment on it. Adequate time should be allowed for review of the findings and recommendations before public hearings are held. After the ESIA has been finalised, the ESIA report should be made available for public consumption and review.

3.0 TRANSMISSION INFRASTRUCTURE ESIA PROCESS

The Environmental and Social Impact Assessments (ESIAs) should be linked with the project cycle as early as possible. This should be initiated at the project identification phase. When prefeasibility studies are undertaken, the screening process should also begin. Route/site selection is one of the most important tasks. Refer to Figure 2 and 3.

3.1 Correlation between the Route/site selection Process and ESIA

This process identifies the best route and related cost for transmission infrastructure through an analysis of alternatives considering constraints on social and natural environment. It is of vital importance for minimizing the impacts of the infrastructure. There is a close relationship between route selection, design process and the ESIA. An ESIA should define and describe the selected route, the alternative routes and the justification for the choice. Appendix 2 describes the phases of the selection of the best route and, in general, the route selection process.

3.2 Project proponent for Transmission infrastructure

The project proponent may be private, government or any organisation whose intention is to undertake a project, which might have both negative and positive impacts on the environment (biological, physical, economic or socio-cultural).

The project proponent must be clearly defined, along with the role it is to play along each phase of the project life cycle. Responsibilities should be highlighted from the onset of the project, in order to ensure that planning is adequate and that resources are available.

3.3 Project preparation

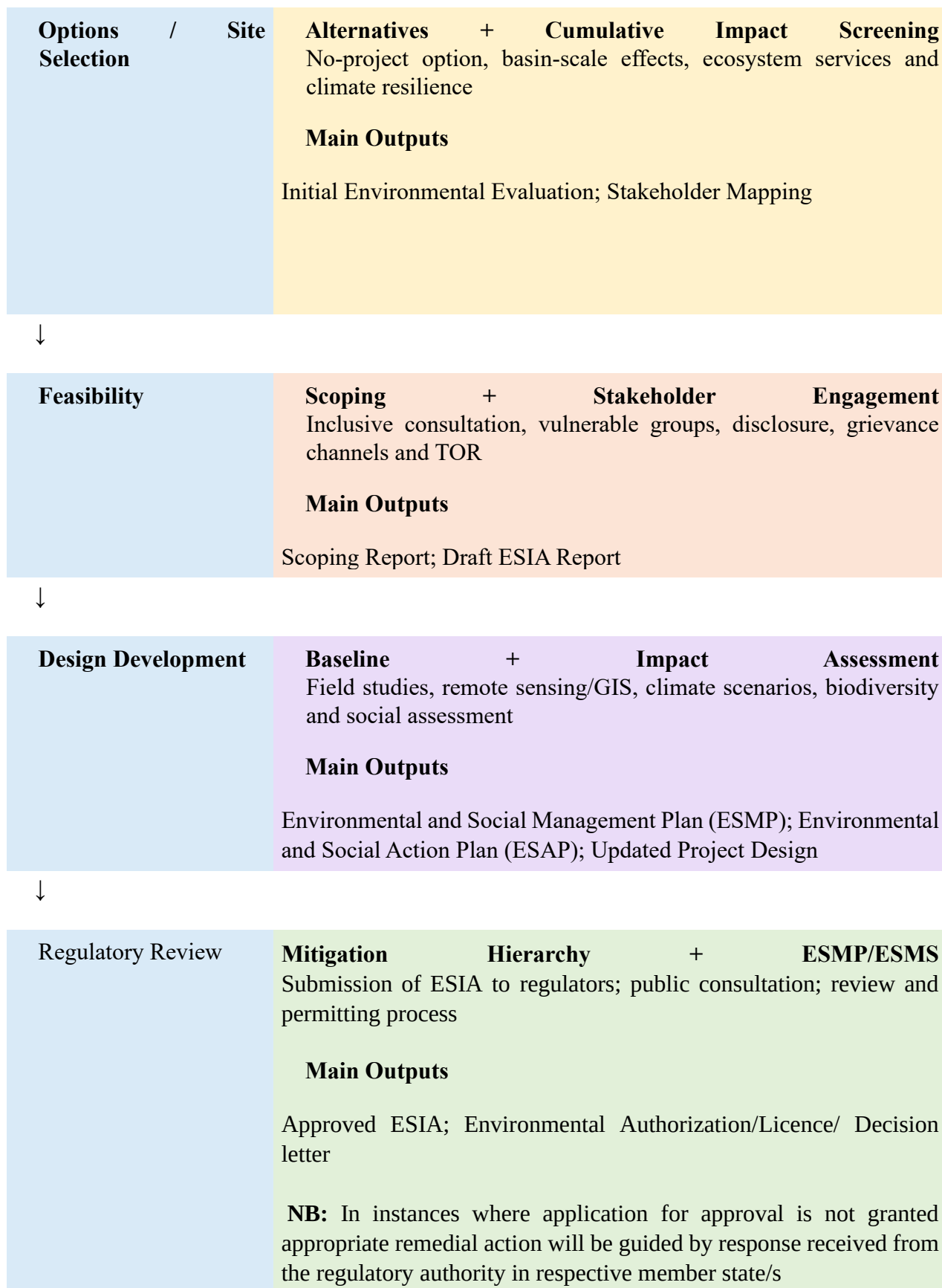
Project planning is central to any transmission infrastructure ESIA which will assist decision makers in project implementation. There are several preparatory steps that need to be taken before an ESIA can be carried out. The recommended steps include but are not limited to:

- Establish compliance with legal requirements
- Establish policy requirements
- Establish related administrative requirements
- Consult all stakeholders

Table 3. ESIA Process Flow Aligned with Current Good International Practice

Project Cycle	Current ESIA Process and Activities
Strategic Planning / Pre-feasibility	Early Screening + Risk Classification Climate, biodiversity, social, human-rights and transboundary risk screening Main Outputs Screening Report; Environmental and Social Risk Categorization

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Financial Close / Procurement	Disclosure, Review + Conditions Authority and lender review, public disclosure, commitments register and approval conditions Main Outputs Environmental Clauses in Contracts; Contractor Management Plans; Environmental and Social Commitment Plans
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Construction	Implementation + Compliance Monitoring Contractor ESMPs, incident reporting, audits, stakeholder feedback and corrective actions Main Outputs Monitoring Reports; Audit Reports; Corrective Action Plans
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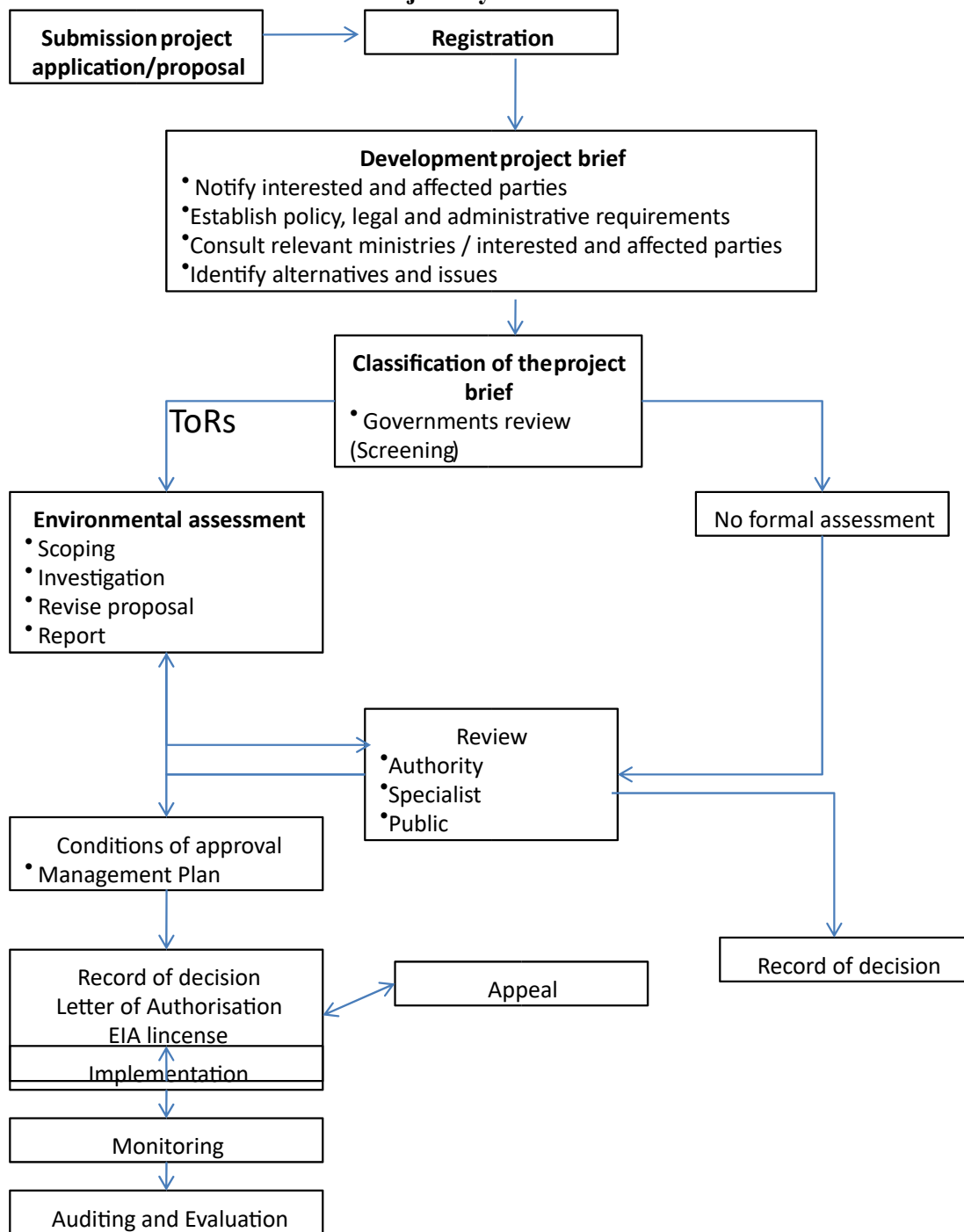
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Operation	Performance Monitoring + Adaptive Management Real-time data where feasible, biodiversity and flow monitoring, audits and public reporting Main Outputs Operational Environmental and Social Process Monitoring Reports
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Closure / Decommissioning	Closure Planning + Legacy Risk Management Rehabilitation, livelihood restoration, dam safety, residual impacts and long-term monitoring Main Outputs Closure Plans; Rehabilitation or Re-purposing Plans
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Figure 1: The ESIA Process in the Project Cycle



3.4 Environmental Screening for Transmission Infrastructure

Environmental screening is undertaken during project identification and pre-feasibility studies (Figure 2 & 3). The purpose of screening is to categorize whether a project requires a full ESIA or partial ESIA based on risk posed as well as legislative requirements. This is because certain projects may have less impact than others (World Bank, 2018). For example, the World Bank has four screening categories namely:

High Risk: An ESIA is normally required because the project may have diverse significant impacts (projects in this category are forestry, large industrial plants, irrigation and drainage, mineral development (including oil and gas), pipelines (oil, gas, and water), resettlement, rural roads, tourism, urban development, large transmission infrastructure, etc.).

Significant Risk: A limited environmental analysis is appropriate, as the project may have specific environmental impacts. Projects in this category include agro-industries (small scale), aquaculture & marine culture, small industries, mini-hydropower station, public facilities (hospitals, schools, housing complexes, rural electrification, telecommunications, small-scale tourism, rural water supply, etc.

Medium Risk: Environmental analysis is normally unnecessary, as the project is unlikely to have significant environmental impacts. Projects in this category include education, family planning, nutrition, institutional development, technical assistance, etc.

Low Risk: Environmental projects for which separate ESIA's are not required, as the environment is the major focus of project preparation.

It is important to note that each country may have its own categorization procedures in the screening process, but harmonizing procedures is essential where joint or trans-boundary projects are concerned.

These Categories are guidelines and utilities must make use of their internal capacity to ensure that ESIA's are carried out accordingly.

3.5 Project Brief /Preliminary ESIA Document/ mini ESIA/Prospectus *(Please note the words will be used interchangeably.)*

A project brief is necessary for the Relevant Government Authority to determine the category of the project (screening). The Project Brief should include but not limited to the following:

- description of existing environment of the project site

- objectives and characteristics of the project and reasonable alternatives
- major activities that will be conducted during site preparation, construction and during operational stage
- specification of materials to be used
- products and by products including liquid and solid waste
- Scope of stakeholders consultation and participation

Once the project brief is finalised, it should be sent to the authorising agency for review. It is important to note that this may not be a requirement in some countries.

3.6 - Scoping for Transmission Infrastructure.

Scoping is an important component in ESIA methodology. During scoping, main environmental and social issues are identified; these issues will serve as providing the TOR for the specialist studies to be carried out during the impact assessment phase. The depth of analysis required for each impact is also identified and stated in the TOR. This mainly aims at:

- Providing an opportunity for consultants, relevant authority, project proponent, interested parties and affected parties to express their views and concerns regarding the proposal before an ESIA proceeds.
- To focus the study on key and relevant issues for quick decision-making.
- To facilitate an effective and efficient assessment process that saves resources, time, cost and delays. The project proponent or their consultant is responsible to arrange for scoping exercises in the study area.
- Identifying and consulting potential stakeholders with an interest in the project.

3.7 Terms of Reference for the ESIA

It is at this stage that the transmission infrastructure ESIA's Terms of Reference (TOR) are prepared. Issues to be considered in preparing the TORs should include but not limited to the following:

- **Objectives of the Transmission infrastructure ESIA (In no priority order)**
 - Project activities
 - Issues being addressed
 - Planning of the transmission project
 - Need for the transmission project
 - Long term validity of the project
 - Project design
 - Project implementation, operation and maintenance

- **Legal and Policy framework**

- summary of relevant legislation and regulations
- International protocol
- local environmental policies
- planning of future constraints (future natural parks, road and railways construction)
- Route selection
- criteria for route selection
- Analyzed route alternatives
- description of the selected route and reasons of the choice
- Way leaves and Servitudes
- Territory description around the transmission infrastructure
- Geographic database (information on topography , hydrography, geology, seismology, etc)
- data related to human activities (population presence and density, land use, infrastructures such as airport and highways, natural parks, naturalistic trails)

- **Environmental impact identification and assessment Methodology**

- Identification of all impacts relevant to the different phases of the specific project (construction, operation)
- Identification of the area of impact around the line
- Public health
- Electric and magnetic field requirements

- **Ecological considerations**

- Effect on flora and fauna
- Effect on endangered species
- Effect on soil
- Effect on breeding populations of fish and wildlife
- Effect on wetlands, rivers, aquifers, if any
- Effect on aerial extent of their habitat

- **Social, economic and cultural including:**

- Employment
- Social disruption (resettlement and compensation)
- Migration or immigration
- Communication (roads opened up, closed, re-routed, etc) of local economic impacts of visual disruption
- Loss of land use potential
- Safety and fire risk
- Nuisance issues: (dust, noise and theft)

- Communicable diseases; HIV/AIDS
-
- **Landscape**
 - Area opened or closed
 - Visual impacts
 - blending with surroundings
 - Recreation facilities
 - Land use
 - Effect on land use
 - Possible multiple uses
 - Water
 - Effect on surface water
 - Effect on underground water
 - Effect on flow regimes
- **Mitigation and Monitoring**
 - Comprehensive and detailed plan of mitigation measures
 - Compensation schemes, training
 - Monitoring plans
 - Rehabilitation parameters
 - Conclusions and recommendations
 - Summary findings
 - Socio - economic benefits, etc.

3.8 The Environmental and Social Impact Assessment for Transmission Infrastructure

Once the scoping exercise has identified the key issues to be included in the ESIA, the next step in the ESIA process is to carry out a detailed study of the key impacts. At the same time, it is important to explain why some impacts are considered insignificant. According to Roe et al (1995), the study should ensure that it attempts to answer the following questions:

- What environmental and social impacts will occur because of the project?
- What environmental characteristics does the area have, which could potentially have a negative impact on the operation of the power line
- What will be the extent, magnitude and duration of the impacts?
- What will be the significance of these impacts within the local, national, regional, and international context?
- What can be done to mitigate, reduce, or avoid altogether the negative impacts, or optimise positive impacts?
- What residual impacts might need compensation?

Many methods have been proposed to carry out the study. These include matrices, questionnaires, checklists, interviews, overlays, networks, models and simulations. The simplest method, according to Roe et al (1995), is to compile a list of key impacts that were identified in the ESIAs of other similar studies and compare them to the proposed project. The chosen method should, however, provide the planners and decision makers with accurate information, with regard to the likelihood and extent of the impacts to be expected.

The study should also identify and assess alternatives to the project. Only the best alternative (one with the least adverse impacts) should be selected based on less negative impacts and cost-benefit analysis. An important alternative to be analysed always is the “no project”. This is a very important analysis because it helps the proponents measure the impacts from the project against those which would have taken place without the project. The “no project” alternative must clearly indicate the broader scale impacts that can be expected from the project not coming to fruition.

The team undertaking the ESIA should be multi-disciplinary in nature. The World Bank suggests that the team should include but not be limited to an ecologist, biologist, archaeologist, social scientist, soil scientist, economist/demographer, engineer, etc. Some countries in the region may request the participation of a local consultant familiar with the project area. The specialists to be used will be determined during the scoping phase of the project. Generic lists of specialists should not be transferred from one project to the next.

Public meetings within the project area are an integral part of the ESIA study. Every possible initiative should be undertaken to ensure that, as many people from the area are aware of the meetings and able to attend them. These meetings enable interested and affected parties to contribute their concerns, which might have been overlooked during the scoping exercise. The public meetings should ideally be chaired by an independent person not affiliated to the project proponent. Minutes of the public meetings and any other correspondence from stakeholders should be kept. They will form part of the ESIA report (as appendices).

3.8.1 Common Environmental and Social Impacts

The most common environmental impacts related to transmission infrastructure projects.

- Effects on existing land use (land value, ecologically sensitive sites, existing utilities e.g. telecommunications),
- Visual intrusion on the landscape,
- Increased erosion and interference with local drainage patterns,
- Increased access and its associated effects (from the transmission project itself or construction and maintenance roads),
- Hazard of electrical shock and strike to birds or other wildlife, and
- Potential localised human health problems.
- Introduction of alien species or increased growth of invasive species
- Fragmentation of habitats

An environmental input at the design stage can help to reduce the above adverse environmental impacts and to enhance the positive impacts. Impacts on the environment can be minimised during the construction and operational phases, by strictly adhering to the design legislation

and environmental guidelines. Environmental impacts associated with transmission infrastructure are summarised in Table 1.

3.9 Mitigation Measures for Transmission infrastructures

As the World Bank (1991) notes “electric power transmission systems include the transmission line, its right of way (ROW), switchyards, and access or maintenance roads”. Construction of these systems affects several resources within and sometimes beyond the ROW.

Table 4. Typical/potential Environmental and Social Impacts and mitigation measures for transmission infrastructure

Project activity	Environmental aspects	Environmental and Social effects	Mitigation measures
Project Route selection and Siting			
• Often potential impacts can be avoided or more easily and cost effectively mitigated if environmental criterion are included in the site selection process • Being linear projects, the environmental impacts of transmission power lines are directly related to the types of environment transverse, and the length of the line	• Disturbance of existing land use • Increased access • Aesthetics • Interference with other existing infrastructure	Potential effects on: • Land values • Sensitive ecological areas • Erosion and drainage patterns • Cultural resource sites • Visual character of the landscape • Telecommunications and airports	• Select right-of-way or site that avoids sensitive habitats and limits conflicts with existing land uses • Use common corridors to minimise impacts on undisturbed areas and lessen increased access to undeveloped areas • Incorporate appropriate buffer zones (see table2)
Construction phase			

Impacts that cannot be avoided through sitting and route selection can often be lessened through planning and design	- Disturbance of existing habitats and land uses - Human Displacement	- Erosion - Water quality effects during stream crossing - Vegetation clearing - Loss of property and livelihood	- Implement erosion control plan - Construct scheduling and sedimentation control - Restrict corridor width and avoid unnecessary clearing - Rehabilitation plan - Resettlement action plan
			Compensation Policy
Operations Phase			
Impacts that cannot be avoided through sitting and route selection can often be lessened through planning and design	- Electrification to rural areas - Access - Electromagnetic field (EMF) - Encroachment - Electrocutions: wildlife and humans - vandalism	- Social impacts and the benefits to new users - Utilisation of cleared right-of-way for agriculture or wildlife movement - Potential health effects - Soil erosion - Growth of unwanted vegetation within the servitude	- Public Education and awareness - Discourage residences in high voltage R-O-W - Vegetation management plan - Installation of reflectors and bird guards - Install anti climbers - Community policing - Symbolic safety signs

Table 5: Wayleave Acquisition Legal Requirements in SADC

Country	Main Legal Instrument(s)	Wayleave/Easement Requirement	Compensation	Regulatory Authority
Zimbabwe	Electricity Act [Chapter 13:19]; Communal Land Act;	Transmission lines require acquisition of servitude/wayleave rights over affected	Compensation is payable for land use restrictions, crop loss,	Zimbabwe Energy Regulatory Authority

	Rural District Councils Act	land before construction. Environmental approval is also required under EMA legislation.	structures, and disturbance.	(ZERA); Environmental Management Agency (EMA)
South Africa	Electricity Regulation Act, 2006; Expropriation Act; Sectional Titles and Property Laws	Eskom or transmission licensee must secure servitudes or wayleaves across affected properties. Registration of servitudes is common for permanent corridors.	Compensation negotiated with landowners and occupiers.	National Energy Regulator of South Africa (NERSA)
Zambia	Electricity Act No. 11 of 2019; Electricity (Wayleave and Clearances) Regulations, 2026	Statutory provisions govern acquisition of land and rights over land, wayleaves, rights of entry, and protection of transmission corridors.	Compensation required for damage or restrictions arising from the exercise of utility powers.	Energy Regulation Board (ERB)
Botswana	Electricity Supply Act; Tribal Land Act	Utilities obtain wayleaves across state, tribal, and freehold land through consent and land board approval processes.	Compensation for affected assets and land use limitations.	Botswana Energy Regulatory Authority (BERA)
Namibia	Electricity Act, 2007; Communal Land Reform Act	Registration of servitudes/wayleaves required for transmission infrastructure crossing private or communal land.	Compensation generally based on servitude rights and losses incurred.	Electricity Control Board (ECB)
Mozambique	Electricity Law; Land Law (Lei de Terras)	DUAT holders retain land rights, but transmission projects require wayleave establishment and government authorization.	Compensation and livelihood restoration are required where impacts occur.	ARENE (Energy Regulatory Authority)

Malawi	Electricity Act, 2016; Land Act, 2016	Easements and wayleaves required for transmission infrastructure.	Compensation for land, crops, trees, and structures.	Malawi Energy Regulatory Authority (MERA)
Tanzania	Electricity Act, 2008; Land Act; Village Land Act	TANESCO or developers must secure wayleaves and rights of occupancy before construction.	Compensation required under land acquisition and valuation regulations.	Energy and Water Utilities Regulatory Authority (EWURA)
Angola	Electricity Sector Law; Land Law	State authorization and establishment of utility corridors required for transmission projects.	Compensation for affected land users and assets.	Instituto Regulador dos Serviços de Electricidade e de Água (IRSEA)
DRC	Electricity Act No. 14/011 of 2014; Land Law	Wayleave and access rights required for transmission infrastructure.	Compensation and resettlement obligations apply where impacts occur.	Autorité de Régulation du Secteur de l'Électricité (ARE)

3.10 SADC Transmission Line Wayleave Requirements

Most SADC jurisdictions require:

- **Legal acquisition of a wayleave/servitude/easement** before construction
- **Landowner and occupier consultation.**
- **Compensation** for crops, trees, structures, and restricted land use.
- **Environmental and Social Impact Assessment (ESIA)** approval.
- **Restriction of activities** within the transmission corridor.
- **Ongoing utility access rights** for operation and maintenance.
- **Resettlement Action Plans (RAPs)** where displacement occurs.

Table 6: Typical Wayleave Widths in SADC

Voltage Level	Typical Corridor Width
33 kV	15-20 m
66 kV	20-30 m
132 kV	30-40 m

220 kV	40-50 m
330/400 kV	50-70 m
765 kV	80-110m

3.11 Documentation and Reporting

An ESIA process culminates in the preparation of an ESIA report. The Environmental Management Plan is part of the information to be included in the ESIA report. After the draft report is prepared, it is distributed to stakeholders and to the environmental authority. In addition, notices are to be run in the media in a language understood by the interested and affected people. The notices should also include an address to which comments can be sent and a date on which public hearing meetings will be conducted. After these public hearing meetings, the ESIA report should be revised to include the concerns raised during the meeting and those received by mail.

Reports and documents should be managed in a manner which would ensure that the information in the reports is accurate and up to date and that the necessary information is kept as prescribed by legislature.

4. Components of the ESIA Report

The ESIA report should contain as much information about the project and project area as possible. It should cover at least the following: overview of the project, existing characteristics of the project area, potential impacts of the project (comparison of alternatives), identification and quantification of impacts, techniques used to quantify the impacts, results of detailed impact quantification, mitigation measures including environmental budgets (compensation, resettlements, monitoring and auditing), monitoring and auditing techniques, etc (GRZ, 2026). (Refer to appendix 1)

4.1 Monitoring

Monitoring in the ESIA process happens at two levels: to verify impact prediction and adequacy of mitigation measures. Essentially monitoring finds out if any major mistakes or omissions were made in the project assessment and implementation and comes up with strategies to solve the unidentified problems.

Monitoring will depend on the type of environment involved and the degree to which they are affected. Monitoring should include regular measurement of things like

- resettlements, compensation
- Wildlife; fauna and flora
- Compliance to EMP
- . General Safety and Health issues
- Land owner complaints

Another valuable indicator, which should be monitored, is the number and reason for outages occurring on a line in operation. This could indicate potential negative interactions between the line and the environment.

Monitoring reports must be produced and submitted to the proponent and the environment Authority.

4.2 Auditing

After the project has been implemented, it should be audited. The audit should be at three levels: the ESIA report, the EMP (mitigation plan), and the institutional capacity to implement the mitigation plan. An audit will detect the weaknesses in the process or identify the procedures which need to be developed to ensure the protection of both the social and natural environment.

Prior to the audit commencing, clear audit parameters should be identified. Qualified individuals should carry out the audit and the findings from the final audit report should be verified. In the case of trans - boundary projects, the possibility of making the audit report available to the interested and affected parties is recommended.

5.0 REVIEW AND DECISION MAKING

After receiving the ESIA report, the authorizing body will conduct a final review of the document. It may send copies of the report to the stakeholders for feedback. If the ESIA report meets the conditions and regulations for that kind of project, the proponent will be allowed to proceed with the project. If the report is found wanting, either of the two things can be done: the proponent will be asked to do some further investigations into specified topics or an independent environmental consultant can be engaged (at proponent's cost) to do the additional work for them. If the ESIA reveals major adverse impacts, which cannot be mitigated, the project may be rejected.

If the ESIA report has been approved, the environmental management plan, monitoring and auditing plans along with conditions of approval should be included in the project documents as a legal requirement. A rehabilitation plan should form part of the environmental management plan.

5.1 EIA Format

Adherence to standard format and procedures will ensure that ESIA's are consistent from project to project or for multiple proposals for the same project. Such consistency will also facilitate comparison of projects and project alternatives. This section presents a framework for organizing

an ESIA for Transmission infrastructure projects. It leads the user step-by-step through each component.

Table 7. Model ESIA Table of Contents

EIA SECTION
ESIA Preliminaries
Title Page
Executive Summary
Table of Contents
List of Tables
List of Figures
List of Appendices and Annexes
Terms, Acronyms, and Abbreviations
Section 1: Policy, Legal, and Administrative Framework
Section 2: Project Objectives and Description
Section 3: Baseline and Background Data
Section 4: Environmental impacts of Construction
Section 5: Environmental impacts of Operation
Section 6: Analysis of Alternatives
Section 7: Mitigation Plan
Section 8: Environmental Management Plan
Section 9: Institutional Strengthening Requirements
Section10: Conclusions
Section 11: Recommendations
Section 12: Tables and Figures

5.2 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

An important objective of the environmental and social impact assessment is to develop procedures and plans to ensure that the mitigation measures and monitoring requirements approved during the EIA and environmental compliance review will actually be implemented throughout the course of the project. As such, strong emphasis must be placed on the development of a responsive EMP during the processing and on setting out conditions and targets to meet during project implementation. An EMP must be specifically spelled out as a requirement under the Terms of Reference (TOR) for performance of ESIA.

Contents of ESMP Section of the ESIA.

The minimum recommended contents of EMP are as follows:

1. Summary of Potential Impacts.
2. Description of Planned Mitigation Measures
3. Description of Planned Environmental Monitoring
4. Description of Public Consultation Process
5. Description of the Responsibilities and Authorities for Implementation of Mitigation Measures and Monitoring Requirements
6. Description of Responsibilities for Reporting and Review
7. Work Plan including staffing chart, proposed schedules of participation by various members of the project team and activities and inputs of various government agencies
8. Environmental Responsible of Procurement Plan? Not clear
9. Detailed Cost Estimates
10. Mechanisms for feedback and adjustment

The EMP is the key means by which implementation of mitigation measures is tracked and assured. The development of mitigation measures, monitoring program, institutional arrangements and scheduling can be aided by the use of the matrices sited in the AfDB Guidelines on;

http://www.adb.org/Documents/Guidelines/environmental_Assessment/Environmental_ManagementPlans.pdf

Additional contents of EMP should include:

Institutional Arrangements – where arrangements with the following organisations are made to ensure optimal functioning of the EMP;

- Regulatory agencies – for routine reporting of monitored data
- Local government bodies – to keep apprised of operating procedures, changes or developments that may be of concern to local interests
- Local Fire Departments and rescue teams
- Local police services
- Local communities

This section should summarize the predicted adverse environmental and social impacts that must be mitigated

11. Description of Proposed Mitigation Measures

This section should set out clear and achievable targets and quantitative indicators of the level of mitigation required. Each measure should be briefly described in relation to the impact and conditions under which it is required. These should be referred to designs, development activities, equipment descriptions and operating procedures and implementation responsibilities.

12. Description of Monitoring Programs and Parameters

This section should outline the specific monitoring protocol, parameters and expected frequencies. It should identify objectives and specify the type of monitoring required. It also describes environmental performance indicators, which provide linkages between impacts and mitigation measures identified in the EIA Report.

REFERENCES

African Development Bank. 2023. Integrated Safeguards System

Canter L. W & B. E. Vieux, 1993. ESIA in Trans-boundary Rivers, Water, Power and Dam Construction.

Department of Environmental Affairs and Tourism (DEAT), 2002. Scoping. Integrated Environmental Management Information Series 2. Pretoria: Department of Environmental Affairs and Tourism.

E7 Network of Expertise for the Global Environment, June 1997. Environmental Impact Assessment – An Electric Utility Overview. Montreal, Canada.

Government of the Republic of Zambia (GRZ), Environmental Impact Assessment Regulations SI No. 3 of 2026.

Harou, P., Kjørven & J. Dixon, June 25, 1995. Integration of Environmental Assessment in Project analysis in R. Goodland et al (ed). Environmental Assessment in Africa, a World Bank Commitment, Proceedings of the Durban World Bank Workshop.

Roe D. Dala-Clayton & B. Hughes, 1995. A Directory of Impact Assessment Guidelines. HED, IUCN, WR1.

Ron Bisset, (ed), 1991. Devising an effective Environmental Impact Assessment System for a Developing Country: The Case of the Turks and Calcos Islands.

Oud, E, & T. C. Muir, 1995. Engineering and Economic Aspects of Planning, Design, Construction and Operation of Large Dam Projects.

World Bank, 2018. World Bank Environmental and Social Framework (ESF).

Southern African Power Pool (SAPP), 2021. Inter-utility Memorandum of Understanding. SADC Power Utilities and Non-SADC Utilities.

Earthcare Africa & UNEP, 1994. An Environmental Impact Assessment – Framework for Africa.

APPENDIX 1. Suggested Route Selection and Siting Process

The following steps of the route selection and siting process are strictly correlated with ESIA and their synthesis should be reported in the ESIA Report:

- planning of the new transmission infrastructure, that is the identification of the need and the main characteristics in the framework of the overall and local power system planning, as well as of other specific development plans (economic, industrial, etc.) ;
- identification of the best route and site through analyses of alternatives, by considering all restraints and involving all stakeholders;
- detailed design in order to integrate the transmission infrastructure into the surrounding environment, by the selection of particular components or solutions for specific environmentally and Socially- critical situations.

A brief presentation of the content of the above three items in the routing and siting process followed in Italy is provided as an example. Planning

The planning should consider the forecast for energy demand and supply connected with the economic and industrial development of the geographic areas, which will be affected by the line, and analyse alternative solutions.

This in order to:

- justify the need for the line
- correctly identify the best structure of the grid and its main characteristics (voltage level, substations, etc.), in order to maintain its validity during the planned life and to simplify future developments, by minimising line modifications and, therefore the overall costs and environment impacts.

Identification of the line's route

The second phase is the identification of the best route of the line. In fact, transmission infrastructure are linear projects. There is a certain degree of flexibility in siting the line. The analysed area generally has a width that accounts for about 30%-40% of the length of the direct line joining the terminal stations. This area is often limited by physical restraints, such as lakes, mountains, etc. Inside this area, a detailed analysis is performed to identify all additional parameters which are not suitable for the line. These restraints are the presence of urban areas, areas of particular environmental value, airport, natural obstacles, etc.

The analysis for high-voltage line is performed with thematic maps and is integrated by aero photogrammetric analysis and by site investigations. The alternatives routes are plotted in a thematic map (normally 1:100.000 scale), which should contain all the land and environment parameters constraining the pathway. It is very important to indicate also the alternative routes considered and discarded. The ESIA should contain the motivations for their exclusion. The involvement of all the stakeholders in this selection process is very important.

At the end of this process, a route is selected among the possible ones, based on the following general siting criteria (which are related to economic and environmental values):

- avoidance of restricted zones ;
- distance from zones of landscape value;
- distance from mountain edges, preference for valley routings;
- distance from urban areas;
- route with constant slope;
- minimisation of infrastructure crossing (e.g. highways, railways, other power lines, etc.).

The above process should also consider the economic aspects through a cost- benefit analysis.

Detailed design

After the preliminary route is identified, a detailed design of the line starts. First, a detailed and careful design analysis identifies the specific characteristics in order to integrate the power lines into the surrounding environment (such as type of tower or pole to be used for the different situations, etc.).

An area about 2 km wide, containing the selected route, is analysed to identify the environmental impact of the line. The width of 2 km is dictated by the visual impact. The thematic map should consider all the most important items (presence of houses, historical places, paths of particular landscape value, viewing points, roads, bird migratory corridors, land use, forested areas, etc.)

For each section of the line, the impact of all the potential social and natural environment issues (land use, flora, fauna, electromagnetic field phenomena, visual impact, etc.) both during the construction and operation phases are analysed and classified by order of importance. For specific cases where critical areas are identified, slight route modifications or specific mitigation solutions are selected always bearing in mind economic aspects. All these aspects should be reported in ESIA report.

Appendix 2: SAPP Membership in August 2026

Country	Organization Name	Abbreviation	SAPP Status
Angola	Rede Nacional de Transporter de Electricidade	RNT	Non-Operating Member NU
Botswana	Botswana Power Corporation	BPC	Operating Member NU
	Tati Solar (Pvt) Ltd of Botswana		Conditional Market Participant Member
DRC	Société Nationale d'Électricité	SNEL	Operating Member NU
	Enterprise Power DRC	ENP-DRC	Market Participant
Eswatini	Eswatini Electricity Company	EEC	Operating Member NU
Lesotho	Lesotho Electricity Corporation	LEC	Operating Member NU
Malawi	Electricity Supply Corporation of Malawi	ESCOM	Non-Operating Member NU
Mozambique	Electricidade de Moçambique	EDM	Operating Member NU
	Hidroeléctrica de Cahora Bassa	HCB	Operating Member
	Mozambique Transmission Company	MOTRACO	Independent Transmission
Namibia	NamPower	NamPower	Operating Member NU
	Solar century Trading	SCT	Market Participant
Namibia	Schonau Solar Energy (Pty) Ltd of Namibia		Conditional Market Participant Member
	Innosun Energy Holding (Pty) Ltd of Namibia		Conditional Market Participant Member

Country	Organization Name	Abbreviation	SAPP Status
	Galen Energy (Pty) Ltd of Namibia		Conditional Market Participant Member
	Sino Energy of Namibia		Conditional Market Participant Member
	Eenghono Power of Namibia.		Conditional Market Participant Member
	Nathaniel Maxuilili Power Plant Proprietary Ltd of Namibia		Conditional Market Participant Member
	Terasun Energy (Pvt) Ltd of Namibia		Conditional Market Participant Member
	OLC Solar Energy Corporation (Pvt) Ltd of Namibia		Conditional Market Participant Member
South Africa	National Transmission Company SA	NTCSA	Operating Member NU
Tanzania	Tanzania Electric Supply Company	TANESCO	Non-Operating Member NU
Zambia	ZESCO Limited	ZESCO	Operating Member NU
	Kafue Gorge Lower	KGL	Operating Member
	Copperbelt Energy Corporation	CEC	Operating Member
	Lunsemfwa Hydro Power Company	LHPC	Operating Member
	Maamba Collieries Limited	MCL	Market Participant
	Ndola Energy Corporation	Ndola	Operating Member
	GreenCo Power Services	GreenCo	Market Participant
Zimbabwe	Africa GreenCo (Zim)	GreenCo	Market Participant
	Zimbabwe Electricity Supply Authority	ZESA	Operating Member
	Nyangani Renewable Energy	NRE	Market Participant

APPENDIX 3: SAPP ENVIRONMENTAL SUBCOMMITTEE MEMBERS AUGUST 2026

<i>No</i>	<i>Organisation</i>	<i>Abbreviation</i>
1	Tanzania Electric Supply Company -Chairing	TANESCO
2	Lesotho Electricity Corporation	LEC
3	Zambia Electricity Supply Corporation	ZESCO
4	Electricidade de Moçambique	EDM
5	Namibia Power Corporation	NAMPOWER
6	Eswatini Electricity Company	EEC
7	Société Nationale d'Électricité	SNEL
8	National Transmission Company South Africa	NTCSA
9	Electricity Supply Corporation of Malawi	ESCOM
10	Zimbabwe Electricity Supply Authority	ZESA
11	Botswana Power Corporation	BPC
12	Rede Nacional de Transporter de Electricidade	RNT
13	Hidroeléctrica de Cahora Bassa	HCB
14	Lunsemfwa Hydro Power Company	LHPC
15	Kafue Gorge Lower	KGL
16	Copperbelt Energy Corporation	CEC
17	Ndola Energy Corporation	NEC
18	Mozambique Transmission Company	MOTRACO
19	Southern African Power Pool - Secretariat	SAPP CC